Crisis management in project based organizations and mega projects: An integrated approach

Department of Business and Management
Doctoral thesis
PhD in Management
XXVIII cycle

PhD Candidate
Rehab Iftikhar

Supervisor:
Professor Andrea Prencipe
LUISS Guido Carli University
Acknowledgement

I always rapt with the respect and recognition, affiliated with teaching and university profession. Specifically in Pakistan, it is considered one of the noble professions. I always want to pursue with academic career. To fulfill my passion I started long ago, and here I am. For me it is “A dream comes true”. It is a privilege to be able to conduct a dissertation research. There are many who have contributed to this journey, and I would like to thank them who supported me.

First and foremost, I want to express deep gratitude to my supervisor Professor Andrea Prencipe for all the discussions, ideas, encouragement and support. He is the best possible supervisor I can imagine. His high standards are driving force behind my hard work. His invaluable support, comments, feedback and advice guided me during my doctoral studies, and I am indebted to him.

I would like to thank Associate Professor Catherine Lions from Umeå University, Sweden to provide friendly reviews, help with proofreading and language reviews. I am grateful to Professor Ralf Müller from BI Norwegian School, Norway for having several discussions regarding my progress, supported me with the statistical analysis for one of my paper and hosted me at BI Norwegian School for a week in October 2016. I have learnt a lot from you. Special thanks to Professor Richard Priem from Texas Christian University, USA to provide invaluable comments and suggestions for improvements. I am thankful to Assistant professor Muhammad Jamaluddin Thahem from National University of Science and Technology (NUST) Islamabad, Pakistan for hosted me at NUST for nine months and for his admirable assistance in data collection. I appreciate Associate professor Luca Giustiniano and Assistant professor Francesco Rullani for their suggestions and insights which are fundamental for my academic career.

I am grateful to all participating companies and people for providing rich understanding and insights on my research and those who contributed in the data collection phase. Without your output, my thesis would not be completed. Thank you very much for your appreciation, time and support.
I am thankful to my department “Department of Business and Management” at Luiss Guido Carli University for providing every possible support and excellent work environment. I would like to thank Doctoral office, which deal with enormous queries of mine and bear with me patiently.

I want to express my gratitude to all my PhD colleagues. Foremost, you have created a friendly atmosphere in which it has been nice to work. I was bit skeptical when I started PhD since I was the only international student in the cycle but I never feel like an alien. Thanks for making these four years magnificent. Special thanks to Pietro Versari for discussion on grounded theory method, N-vivo and most importantly the fun part - organizing PhD dinners, and thanks to Mirella Ciaburri, for your never-failing support.

I want to thank my friends those were great strength for me during this process. Special thanks to Aybuke for your suggestions and support, Erum and Sadaf for your prayers, Mehwish for your trust and keep on check daily and Serwat for all funny things we do together. Thanks for accompanied me in thick and thin.

I am obliged to my parents for their encouragement, appreciation and support. I will always be indebted to my mother: my role model and my strength. I’d like to thank my brothers, for their continuous moral support and affection, specially my younger brother for understanding me and always be there in time of need and my nephew; your videos are great source of reinvigoration.

Finally, I would like to thank my creator Almighty ALLAH for the success, strength and ability to learn and complete this dissertation. “So which of the bounties of your lord will you deny?” I am very thankful to you, words can’t even express it.
Table of Contents

Abstract .................................................. .............................................. 1

Chapter 1 .................................................. ........................................... 3
Introduction .................................................. ............................................ 3

Chapter 2 .................................................. ........................................... 8
Taxonomy among triplets: opening the black box ................................................. 8
Abstract .................................................. .............................................. 8
Introduction .................................................. ............................................ 8
Method .................................................. .............................................. 11
Theory .................................................. .............................................. 12
Risk .................................................. .............................................. 12
Crisis .................................................. .............................................. 13
Disaster .................................................. .............................................. 15
Taxonomy .................................................. ............................................ 16
Continumm .................................................. ........................................... 17
Explanation of 3D Diagrams .................................................. ...................... 18
Risk 3D .................................................. .............................................. 18
Crisis 3D .................................................. .............................................. 19
Disaster 3D .................................................. .............................................. 19
Evolution model .................................................. .................................... 20
Overview of key publications .................................................. .................... 20
Discussion .................................................. ........................................... 20
Conclusion .................................................. .......................................... 22
Notes .................................................. ............................................. 23
Hazard .................................................. .............................................. 23
Uncertainty .................................................. ........................................... 24
Black swan .................................................. .......................................... 24
Environmental jolts .................................................. ................................... 25
Issues .................................................. ............................................... 25
References .................................................. ......................................... 25
Chapter 3 ......................................................................................................................... 47
Crises and capabilities in Project based organizations ................................................. 47
Abstract ......................................................................................................................... 47
Introduction ................................................................................................................... 47
  Aim and research questions ......................................................................................... 48
Literature review .......................................................................................................... 50
  PBO performance ....................................................................................................... 50
  Project performance .................................................................................................... 51
  Stakeholder performance ............................................................................................. 53
  Project vs. stakeholder performance ........................................................................... 55
  Genre of crisis ............................................................................................................. 56
  PBO capabilities .......................................................................................................... 60
Model & hypothesis ....................................................................................................... 62
Methodology .................................................................................................................. 63
  Population, sample and method of data collection ..................................................... 63
  Measurement of concepts ............................................................................................ 67
    Independent variables ............................................................................................... 67
    Moderating variables ................................................................................................. 68
    Dependent variables ................................................................................................. 68
    Control variables ....................................................................................................... 70
Results ............................................................................................................................ 71
  Reliability .................................................................................................................... 71
  Validity ........................................................................................................................ 72
  Co-linearity (VIF) ......................................................................................................... 72
  Structural equation modeling (hypothesis)................................................................. 73
  Structural equation modeling (sub-hypothesis) .......................................................... 74
Discussion ...................................................................................................................... 75
  Crisis and PBO performance ....................................................................................... 75
  PBO Capabilities ......................................................................................................... 76
Conclusion ...................................................................................................................... 78
References ...................................................................................................................... 80
Chapter 4 .......................................................................................................................... 104

Sense making process in mega projects: The case of new International Islamabad Airport .......................................................................................................................... 104

Abstract .......................................................................................................................... 104

Introduction ....................................................................................................................... 104

Theory ............................................................................................................................... 107

Mega project ..................................................................................................................... 107

Crisis ................................................................................................................................. 108

Sense making .................................................................................................................... 109

Research context: (New Islamabad) International airport Pakistan .................................. 110

Method .............................................................................................................................. 111

Data collection .................................................................................................................. 112

Interviews ........................................................................................................................ 112

Observation ....................................................................................................................... 113

Archival data .................................................................................................................... 113

Newspaper articles .......................................................................................................... 113

Data analysis ..................................................................................................................... 113

Findings ............................................................................................................................. 114

Information gathering ..................................................................................................... 115

Crisis interpretation ......................................................................................................... 118

Report/Record crisis ....................................................................................................... 128

Response .......................................................................................................................... 133

Sense making process in mega project: A model ............................................................. 139

Sense making process matrix ......................................................................................... 141

Discussion ......................................................................................................................... 143

Conclusion ......................................................................................................................... 148

References ......................................................................................................................... 150

References for chapter 1 .................................................................................................. 170
Appendices

Chapter 2
Appendix A ................................................................. 35
Appendix B ................................................................. 39
Appendix C ................................................................. 40
Appendix D ................................................................. 41
Appendix E ................................................................. 42
Appendix F ................................................................. 43
Appendix G ................................................................. 44

Chapter 3
Appendix A ................................................................. 93
Appendix B ................................................................. 94
Appendix C ................................................................. 95
Appendix D ................................................................. 97
Appendix E ................................................................. 98
Appendix F ................................................................. 99
Appendix G ............................................................... 100
Appendix H ............................................................... 101
Appendix I ............................................................... 102
Appendix J ............................................................... 103

Chapter 4
Appendix A ............................................................... 159
Appendix B ............................................................... 160
Appendix C ............................................................... 161
Appendix D ............................................................... 162
Appendix E ............................................................... 163
Abstract
This doctoral dissertation addresses crisis management in project based organizations (PBOs) and mega projects. There has been much research on crisis in organizations but there has been little attention given to crisis management in temporary organization settings and when multiple stakeholders are involved. In other words, research on “how crisis management is adopted by project based organizations and mega projects” are scarce. This study addresses this gap. This study’s objective is to identify crises that are caused by the internal and external environment of project based organizations and mega projects and then manage these crises with organizational capabilities and sense making process. The dissertation consists of a compilation of three papers.

This research proposes three studies on different yet interrelated crisis management topics. They are categorized into three research areas: taxonomy among risk, crisis and disaster, crises and capabilities in project based organizations and sense making process of crisis in mega projects. Taxonomy among risk, crisis and disaster is addressed by Chapter 2, which identifies the dimensions from literature and develops taxonomy; it is a first step toward management. The second research area (i.e., crisis and capability in PBOs) has led to the development of Chapter 3 which respectively identities crisis that could impact PBO’s performance and investigates PBOs capabilities required for management of crises. It derived a conceptual framework of crises and capabilities that contains internal social, external social, internal technical and external technical crises (independent variables), performance i.e. project performance and stakeholder performance (dependent variables) and project based organizations’ capabilities such as strategic, functional and project capabilities (moderating variable). Sense making process is examined in Chapter 4, and it explores and develops a sense making process in mega projects where multiple organizational stakeholders are involved. Sense making/ giving model contains element of information gathering (internal and external sources), crisis interpretation (exogenous/endogenous, social and technical crisis), report/record (ask for compensation, report crisis to stakeholders or escalate to higher level within organization) and response (reactive and direct/ indirect response). The research reported in the dissertation is based on a multi- method approach of both quantitative i.e. survey of project based organizations and qualitative methods i.e. single-case study of mega project. The survey was conducted in IT, Telecom and
construction companies in Pakistan. The case study has been conducted on new International airport in Islamabad, Pakistan.

To conclude, the dissertation (a) identifies differences and similarities between risk, crisis and disaster, (b) develops taxonomy among risk, crisis and disaster by identifying dimensions (c) identifies crises that could impact project based organizations’ performance. For which both short term (project performance) and long term performance (stakeholder performance) are considered, (d) explore capabilities perspective on project-based organizations (strategic, functional, and project capabilities) and develops a conceptual framework that embraces the organizational capability to manage the relation between crises and organizational performance, (e) develops a sense making/ giving model for crises in mega projects when multiple organizational' stakeholders are involved, (f) identifies different sense making and sense giving elements and (g) develop a grounded theory model that contain sense making/ giving elements.

Keywords: risk, crisis, disaster, performance, capabilities, sense making, project based organization, mega project.
Chapter 1

Introduction

In recent years, intensive research has been done in the area of crisis management. It is widely studied in organizations. Crisis management is an attempt to avoid or manage crisis event (Pearson & Clair, 1998) that disturbs the entire organization and is concerned with the survival and development of stakeholders. Crisis is defined as low probability/high impact event (Weick, 1988: 305; Pearson & Clair, 1998). Crisis management is a "systematic attempt by organizational members with external stakeholders to avert crises or to effectively manage those that do occur" (Pearson & Clair, 1998: 61). Mostly crisis and crisis management studies focused on organizations and permanent organizations, without considering the overview of different stakeholders. They scarcely studied temporary organizations and settings where multiple stakeholders are involved. The aim of this dissertation is to understand crisis management by identifying crises, looking into capabilities and sense making process in empirical settings of project based organizations and mega projects.

In Söderlund’s typology, ‘project based organization’ is defined as where core activities are performed in projects, the projects are embedded in a permanent organizational context, and people are hired by the permanent organization, not directly by individual projects (Söderlund, 2005). PBO is a permanent organizational framework in which temporary projects are embedded. Whereas projects are temporary organizations (Lundin & Soderholm, 1995) where individuals, or small firms, collaborate in temporary alliances in project based organizations that dissolve once the project is completed (DeFillipi & Arthur, 1998). Mega projects are characterized as complex and large scale projects, and these projects gather several stakeholders, which makes it an interesting setting for crises and sense making research. Due to several stakeholders with diverse backgrounds, various unexpected events from environment may occur during project execution (Orr, 2005).

Currently, vast number of crisis management methods exists, but none of them pertain to a situation where multiple stakeholders and actors are required to work together on one project. However, there is a gap between crisis management techniques and their practical application by
project based organizations and mega projects. This study addresses these gaps by looking into primary stakeholders. They are formal members of project coalition and may affect or be affected by the project. I primarily focused on key stakeholders such as client, consultant, contractors etc. for my empirical studies.

The dissertation contains three objectives, and for each objective, papers have been written so at the end I have three papers

1. To examine what is crisis, and investigate differences and similarities with similar concepts like risk and disaster.
2. To identify different types of crisis that could impact project based organization’s performance and to identify project based organizations’ capabilities that are pivotal to handle crisis.
3. To explore the sense making process of crisis in mega projects.

This dissertation is a collection of three papers based on one conceptual study and two empirical studies carried out in Pakistan. The first paper is to understand what is crisis. The second papers studies project-based organizations and cover IT, Telecom and construction companies (project based organizations) as empirical setting. The third paper is concerned with mega projects and has new international Islamabad airport i.e. a mega project as an empirical setting. These studies are organized as follows.

First study is a conceptual piece, which investigates differences and similarities between risk, crisis and disaster. It presented a comprehensive overview on current status of risk, crisis and disaster derived from contemporary research. A detailed literature review was conducted in order to identify dimensions for taxonomy’s development. These dimensions served as a foundation for taxonomy development among risk, crisis and disaster; continuum to further highlight the differences and evolution model to explain how these concepts evolve over time. However, 3D diagrams and overview of key publications also highlight which area needs further research. This study is especially relevant since I am studying crisis so one of the argument is that are they (risk, crisis and disaster) same? I exhibit that they are not same, these concepts have few
similarities but there are considerable differences which make them different. Prior research
demonstrated that risk, crisis and disaster are similar and interchangeably used and these
concepts move with level of intensity. However, my study limelight’s the differences and
similarities between these terms by identifying several dimensions. More specifically, this paper
creates boundaries and enhances peculiarity between risk, crisis and disaster which will be
helpful to avoid confusion and augment the real use of the concepts. Key dimensions and
distinguishing dimensions represent and enrich idiosyncrasy and affinity.

Second study is empirical investigation about identification of different types of crises that could
impact temporary organizations’ (project based organizations) performance, and explore
capabilities that are needed to handle crises. To develop this study and to test hypothesis, cross-
sectional survey of 283 individuals belongs to primary stakeholders of project based
organizations was conducted, for that IT, telecom and construction companies from Pakistan are
empirically analyzed. Not all crises have the same impact. The study is empirical investigation of
multiple impacts of crises by showing that different types of crises (internal social, internal
technical/economic, external social and external technical/economic) have different impact on
performance (project performance and stakeholder performance). Prior studies have focused on
the relations between crises and project performance, and for them crisis is meant any event that
can create deviation from project performance (Hällgren & Wilson, 2008). However, project
performance is not standalone dimension for performance, this study highlights and provides
valuable insight on crisis impact on performance by looking into short term perspective (project
performance) and long term perspective (stakeholder performance) of project based organization.
probability and high impact event”. Moreover, it has been shown that performances of PBOs
have been influenced by crisis and which makes it imperative to study capabilities in PBOs to
handle crisis. I look into valuable set of capabilities (strategic, functional and project capabilities)
required for mitigating the relationship between crisis and performance. It posits that not all
capabilities are equally relevant. The set of capabilities, as presented in this study, provides new
insights and means for the evaluation for project based organizations.
Grounded on sense making literature (Weick, 1988, 1993), third paper attempts to enrich the insights regarding sense making process of crisis in mega projects. Traditional sense making process mostly focused on exogenous, life threatening events and organizations’ sense making process. However, this paper pinpoints to crises that are exogenous and endogenous, considering low probability and high impact events which are not necessarily life threatening and looking into context of mega projects where multiple organizational stakeholders are involved. This study promote the view, managers need to think beyond their own sub-project (package) and analyze the characteristics of the project overall (multiple organizational’ stakeholder are embedded) when considering sense making process. The main idea is to look at sense making process not from organization point of view but at the level of mega project. Context of new international Islamabad airport is chosen as mega project. Data collection was done through interviews, observations and archival data from new International Islamabad airport Pakistan. Grounded theory method was used to analyze collected data. Based on understanding gained during this research I formulated a sense making model. The model contains elements of sense making/sense giving i.e. information gathering (information from team member and information from different stakeholders), crisis interpretation (internal social crisis, internal technical/economic crisis, external social crisis and external technical/economic crisis), report/record (request for compensation, report to different stakeholders and report within organization) and response (up-gradation, advance procurement, hire specialized HR, formation of committee, negotiation, reinstatement and legal actions). The study depicts that information gathering, crisis interpretations and response are sense making elements whereas report/record is sense giving element yield in sense making process. The findings support both internal and external information gathering and crises; however, report/record is required for uncontrollable crises and leads to indirect response whereas controllable crises are dealt with direct response. It is not possible to isolate sense making process from sense giving and vice versa, they both complement each other.

The remainder of this dissertation consists of four chapters structured as follows. Chapter 1 is an introduction to the study that presents the background of the dissertation, research objectives and introduction to the research papers, research methods and data, and structure of the dissertation. Chapter 2 provides a first paper “taxonomy among triplets: Opening the black box”. Chapter 3
provides a second paper of “crises and capabilities in project based organizations”. Chapter 4 discusses the third paper of “sense making process in mega projects: The case of new International Islamabad airport”. Table 1 below depicts the structure of papers.

**Table 1: outline of thesis**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Title</th>
<th>Types of paper</th>
<th>Level of analysis</th>
<th>Research method</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper 1</td>
<td>Taxonomy among triplets: Opening the black box</td>
<td>Conceptual</td>
<td>Organization</td>
<td>-</td>
<td>Risk, crisis, disaster</td>
</tr>
<tr>
<td>Paper 2</td>
<td>Crises and capabilities in Project based organizations</td>
<td>Empirical</td>
<td>Organization</td>
<td>Survey</td>
<td>Crisis, project performance, stakeholder performance, project based organizations’ capabilities</td>
</tr>
<tr>
<td>Paper 3</td>
<td>Sense making process in mega projects: The case of new International Islamabad airport</td>
<td>Empirical</td>
<td>Mega Project</td>
<td>Single case study</td>
<td>Crisis, sense making, mega project</td>
</tr>
</tbody>
</table>
Chapter 2

Taxonomy among triplets: Opening the black box

Rehab Iftikhar
Luiss Guido Carli University

Abstract
In this paper, we discuss differences among risk, crisis and disaster. These terms are commonly and interchangeably used, but these terms tend to be conceptually different from each other. It is pivotal to understand the differences in order to manage them. We try to augment real substance of these concepts and work around three central themes: risk, crisis and disaster. Within each of these themes, the paper offers an overview of the literature, particularly paper reviews the definitions, types, characteristics, management approaches to present the taxonomy among risk, crisis and disaster. There are sixteen dimensions of difference that make taxonomy worthwhile. We positioned these three concepts according to key dimensions of probability, impact, intensity/severity, scope, scale, magnitude, frequency and predictability along continuum. 3D diagrams are presentation of key literature of risk, crisis and disaster against distinguishing dimensions i.e. nature of event, goal and scope. Last but not least an evolution model enhanced distinctiveness of these and similar concept in a single glance.

Introduction
In business field, researchers are more involved in risk and crisis management rather than in disaster management. Disaster management is rarely research topic in business; it is considered and treated purely as geographical field of research. One reason is that risk and crisis occur more frequently whereas disasters occur rarely toward business (Schenker-Wicki et al., 2010). These all are unfathomable mystery for management and business organizations. These concepts are increasingly discussed in contemporary research but paradoxically there is no implicit and explicit (universal) definition and management approach. In everyday life, we used these words frequently but these terms are not sufficiently clear to most of us, which is a dilemma. Not surprisingly, bulk of research has been conducted in field of risk, crisis and disaster and on their
management. The term risk, crisis and disaster are interdisciplinary in character, ancillary (sharing few properties) and interchangeably used in management, yet they are not the same, in reality they are very much different from each other and all of them are idiosyncratic. Within literature, individuality of each concept is unaddressed so this suggests it is pivotal to seek and explore the individuality of these concepts. That’s why these terms need clarification by providing precise and sophisticated definition, management process and differences among them. While reviewing these concepts we found that the literature itself talks about dimensions like magnitude, definition, management and others in general but no one specifies them and make an effort to combine and categorizes them in order to figure out difference and similarities; this is main reason contemporary researchers use them as similar concepts. In other words, there is lack of insight about these concepts. It seems that management literature and contemporary researchers are confused among these terms and misunderstood them. Our focus is to assess and advance the conceptual understanding of these terms and we tried to resolve confusion and misunderstanding about these concepts in this paper. This would be helpful for practitioners and researchers to enhance their indulgent about these concepts.

Despite of the plethora and popularity of these terms in management field and rich data available on risk, crisis and disaster; the distinction is not clear. This paper aims to address this deficiency; by providing essential datum to yielded classification (taxonomy, continuum and 3Ds diagrams and evolution model) to articulate and fathom these concepts, terms and differences among them, which is an open question. This paper will underline, risk, crisis and disaster are different phenomena. The central motif of this paper is taxonomy; it will be useful for practitioners and academicians to gain insight and real substance about these terms. This prompted us to exhaustively review work done in these areas (risk, crisis and disaster) and prepare this article describing the salient fundamental definitions and concepts in this area. Unfortunately, the differences among risk, crisis and disaster were shallow since no one worked on it. This paper not only spotlight definition but differentiation and it is among the first that made extensive attempt to differentiate among three disciplines. It is challenging since it will open new research directions and attempting to open the ‘black box’ of taxonomy. Most of the time, risk, crisis and disaster are taken individually as topic of research. In this paper, we consider all of them and we highlight that there might be some similarities, sharing characteristics and properties among risk,
crisis and disaster but there are few differences as well which is critical for practitioners and academicians to know in order to be more diligent. By doing so the paper would redress the important deficiency in management field i.e. to differentiate between risk, crisis and disaster.

The purpose of this paper is to investigate and understand the differences among risk, crisis and disaster by presenting a systematic and up-to-date review. To do so, this paper provides overview of different dimensions pertaining to risk, crisis and disaster respectively. However, the main purpose of this paper is to position risk, crisis and disaster auxiliary with past studies to understand their basic assumptions, and viewpoints. This makes it possible to compare risk, crisis and disaster. This article consequently, has four objectives. First, to review how risk, crisis and disaster have been conceptualized over the years and then extended the earlier theoretical work by enhancing the insight of these inter-related concepts and expressed each of the concepts in great detail. Second, we review literature to examine the overlap between risk, crisis and disaster in order to clarify boundaries between the phenomena and to navigate ourselves in direction of prior work to identify differences, to understand and manage these concepts, the required phases and possible types. Thirdly, we develop taxonomy that focuses on identification of differences. It can be used to describe sensibly the notion of risk, crisis and disaster, identify and demonstrate dimensions of difference, which distinguished them from each other. Taxonomy serves not only to organize the existing literature but to resolve some of the conceptual ambiguities and also provide the impetus for future research into the role that different categories play in shaping the substance of these concepts and pave the way for further empirical investigation. Hence, the overall aim is to identify individuality of these concepts and some of the key conceptual challenges surrounding concepts of as a basis for contributing to the further development of this important area of study. Substratum of taxonomy, we developed continuum (position risk, crisis and disaster) and 3D diagrams to place key literature against distinguishing dimensions) to strengthen and support taxonomy. Finally, we developed evolution model in order to understand the evolution of these concepts which reinforce taxonomy and also provide overview of key publications. This study is organized as follows. The following section begins by describing method followed by review of mainstream theories related to crisis, disaster and risk and proceeding with the taxonomy, continuum, 3D diagrams, evolution model and overview
of key publications followed by discussion. Finally, conclusions are drawn and contributions are documented.

Method

The primary sources used for literature survey were electronic databases (EBSCO Business Source complete, Google Scholar, and ISI web of science) retrieving all papers that were published in the business and management categories, with titles, abstracts, or keywords containing the terms “crisis, risk and disaster” or “crises, risks and disasters”. This revealed 310 articles all published between 1963 and 2015. These were published in variety of journal categories, indicating that these concepts and their perspectives are beginning to diffuse from the management area into fields such as Disaster Prevention and Management, Journal of Contingencies and Crisis Management, and Columbia Journal of World Business. Within the management area, the journals that ranked highest in terms of number of papers published in leading academic and practitioner-oriented management journals. Our initial list of journals included the Academy of Management Journal (AMJ), Academy of Management Executive (AME), Academy of Management Review (AMR), Administrative Science Quarterly (ASQ), Journal of Management Studies (JMS), Research Policy (RP), MIS Quarterly, Organization Science (OS), and Strategic Management Journal (SMJ). To these we added three of the leading practitioner-oriented journals, namely, the California Management Review (CMR), Harvard Business Review (HBR), and MIT Sloan Management Review (MSM). We deployed a snowball approach by tracing references of articles found, to incorporate the most imperative research work for which we don’t want to abscond but some time missed due to imperceptible reasons. The literature was selected for review based on its relevancy to the topic under study. If the article had little to do with risk, crisis and disaster; it was excluded from the collection. Our final sample, therefore, included 121 publications. We incorporated both empirical (qualitative and quantitative) and conceptual and theoretical studies in the review. Literature review included textbooks/reports (19) relevant to our study. Books and reports have made valuable contributions to the topic under consideration.
Risk is not a consistent concept. Different researchers have different views about risk. The definition of risk has been facing difference of opinion in the history. It is a challenge to generally agree on the definition of risk (Krane et al., 2012; Zhang, 2011). There are several definitions of risk available in literature, few of which are presented below.

Sicotte and Bourgault (2008: 468) relate risk to an “identifiable events that will have negative consequences”. Another definition of risk is the “probability of loss or injury” (Krane et al., 2012). Risk can be defined as “the ambiguity associated with both potential gain and loss” (Solomon et al., 2000), but mostly it is considered the possibility of suffering loss. Linsley and Shrives (2006: 389) define risk disclosures as “any information disclosing to reader on any opportunities, prospect, hazard, harm, threat or exposure that have already impacted or may impact upon the company or management in future”.

In essence, many definitions of risk comprise two dimensions: the probability associated with an undesirable event and the consequences of the occurrence of this event. Risk is also defined as “the degree of exposure to negative events and their probable consequences” (Wideman, 1986). Raz et al. (2002) defines risk as “undesired events that may cause delays, excessive spending, unsatisfactory results, safety or environmental hazards, and even total failure”. Risks may come from the task itself, which can be characterized by uncertainty, complexity, and urgency, or from lack of resources or other constraints such as skills, or policy. While no one can avoid risk (just as no one can avoid natural disasters or fire), Good news is that you can plan for risk but you can only recover from disasters (Raz et al., 2002).

In above definition of Raz et al. (2002), the word of uncertainty is used. Risk is always confused with uncertainty. There is difference between risk and uncertainty, and few researchers (Meyer et al., 2002; Knight, 1921) draw a line between them. Risk can be measurable, insurable (predict) and uncertainty can’t be measurable and non-insurability (can’t predict). Risks are the known events which can be managed (Knight, 1921). So we can say risk is expected whereas...
uncertainty is unexpected event. Please see note 2 for detail of differences among risk and uncertainty.

Most people associated risks with possibilities or likelihoods of loss or harm (Brinkmann, 2013). Unless its positive impact, risk is more likely consider “negative and undesirable consequences” (Gephart et al., 2009: 141; Maguire & Hardy, 2013). It is necessary to determine probabilities of undesirable events and their associated losses (Barki et al., 1993). For managers, risk associated with positive outcomes is not considered to be a risk at all, only the threat of negative outcomes is considered a risk (Berkeley et al., 1991). A characteristic of an event carrying risk is that there is a probability that the event can give a certain result, and further that the result may have measurable or given consequences (Krane et al., 2012). Risk is a probabilistic event that can have predictable effects. Risk and its affect can be studied, mitigated and prevented (Heath et al., 2009).

Crisis

Crisis research developed in the 1960s and 1970s in the field of psychology, sociology and disaster response (Jaques, 2009). Crisis is something which contains set of un-ness that is unfamiliar, un-expected, un-planned, un-pleasant, un-operational, and often un-imaginable and non-routine (Kouzmin, 2008; Oh et al., 2013). Crisis is unpredictable as they are unforeseen, immeasurable and unknowable (Seeger, 2002). However, there is plethora of definitions that create confusion. Researchers have difficulty in agreeing on a common definition for crisis since there is no universal definition. Usually crisis is a negative phenomenon, event that leads to demise. Crisis is an event which menaces the organization (Valackiene, 2011). Crisis is deemed when there is a disruption for which no specific plans have been made. Although crises are rare, little is known about how to define crisis (Billings et al., 1980). The large number of definitions continues to bedevil and consensus of a definition has been problematic (Kouzmin, 2008). In this respect a first important step is to clarify the notion of crisis. Due to this reason, we mentioned few definitions in order to make it understandable what different scholars think about crisis.

Crisis has been defined in numerous ways. For example, Fearn-Banks (1996) defines crisis as "a major occurrence with a potentially negative outcome affecting an organization, company, or
industry, as well as its publics, products, services, or good name” (p. 1). According to Turner (1976) crisis must be ill-structured and “precipitating event”. Milburn et al., (1983:1161) define crisis as “situation in which organizational survival is perceived to be, at stake”. Crisis is defined as “specific, unexpected, and non-routine event that threaten organization goals” (Seeger et al., 1998:233). Crisis is “a threat to the stability, core beliefs, goals of the organization and ultimately survival” (Ulmer & Sellnow, 2002). Coombs (1999) described it as “unpredictable event that threaten to harm organization and its stakeholders”. Weick (1988:305) argue a crisis is “low probability/ high consequence events that threaten the most fundamental goals of the organization”. Crisis is “highly ambiguous situation where cause and effects are unknown” (Dutton, 1986; Quarantelli, 1988); “to have a low probability of occurring but threat to survival of organization, little time to respond” (Quarantelli, 1988) “and surprise for organization and need urgency for decision making” (Hermann, 1963).

Scholars have struggled to find an acceptable definition of crisis. Finally, the most widely cited definition is proposed by Pearson and Clair, they view a crisis as "a low-probability, high impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly" (1998: 60). Examining the above definitions, there are few commonalities. First, a crisis is an unplanned event that has the potential of dismantling the internal and external structure of an organization. A crisis may affect not only the employees and other members internal to the organization, but also key stakeholders external to the organization. Second, a crisis may occur in any organization. For example, non-profit organizations, governmental agencies, multinational organizations, and so forth, all are susceptible to a crisis (Barton, 1993). Finally, a crisis may affect the legitimacy of an organization. In the event of a crisis, influence on public perception may affect the livelihood of an organization. Crisis influences public perception in regards to issues involving cause, blame, response, resolution, and consequences. Presented in a negative light, the legitimacy of an organization may be threatened (Ray, 1999).

“The Chinese symbol for crisis combines two simpler symbols (Weji), (We) the symbol for danger and (Ji) the one for opportunity. Crisis is time of danger, but it is also times of opportunity” (Starbuck et al., 1978:135; Valackiene, 2011). Crisis can have negative and positive
outcome. Crisis can be considered as an opportunity to change and opportunity to learn. Crisis is opportunity to change when warning signals are recognized before crisis occurs. However, it is only possible after the crisis, because warning signals are easier to detect after the crisis. Crisis as opportunity to change if warning signal is not ignored and if warning signal is ignored then crisis can only be an opportunity to learn. Signals can come from inside or outside organization (Veil, 2011). Negative impact is still prevailing in interpreting crisis. Prediction of crisis is difficult and it is also improbable any harm was intended (Carone & Lorio, 2013). Managing extreme events could occur in earlier stage when signals are usually ignored (Andriani & Mckelvey, 2011). Crises are usually unpredictable as time and impact is unpredictable (Mckelvey & Andriani, 2010). It is an event which is not planned for, happens suddenly and requires immediate attention. Crisis is a universal phenomenon for organization survival (Zhang, 2010). Due to unpredictable nature of crisis it is difficult for scholars to study these events in real time (Pearson & Clair, 1998:74). There are two ways to deal with crisis. First is to prevent crisis. Hence, crisis is unimaginable so it is impossible to prevent them. Second is to prepare for crisis which is more realistic. Humans can merely foresight few things and usually not unthinkable (Hällgren & Wilson, 2008).

**Disaster**

The history of disaster is as old as civilization itself. Disasters are large intractable and lethal event (Alexander, 1997). Any expected and unexpected event resulting in great damage to humans in term of life, environment, economy or quality of life in the present and future can be considered a disaster (Yi et al., 2010). Disasters are destructive and continue to cause loss of human life, environmental damage, disruption of infrastructure, and economic loss (Altay & Green, 2006; Alexander, 1997). Loss is measure in term of people affected and loss of lives. Despite the resilience, disaster affected large number of people and community, disaster is destroying home, businesses, roads and causing over billion in damage (Julca, 2012).

There is no single definition for disaster; the term disaster is interpreted differently by different authors and institutions (Siriwardena et al., 2013; Alexander, 1997). Smith (2004) viewed disaster as “social phenomenon that occurs when a community suffers exceptional, non-routine, levels of disruption and loss”. Disaster can be defined as “a situation which overwhelms local
capacity, necessitating a request to the national or international level for assistance, or is recognized by a multilateral agency or by at least two sources, such as national, regional or international assistance groups and the media” (Moe et al., 2007), “or as an acute, collectively experiences traumatic events with a sudden onset, and they can be both natural and man-made” (Norris et al., 2002; United Nations, 2006). Disaster is also defined as “an unusual and dramatic event, in relatively short time span, causes enough death and destruction as to disrupt normal pattern of livings” (As cited in Dean, & Payne, 2013 (Pampel, 2008)). The most recent definition is “a disaster is an event in which a society is pulled into serious danger and suffers human loss or material damage to the extent that the local social structure collapses and all or some of the essential functions of the society can no longer be fulfilled” (Schenker-Wicki et al., 2010:339).

Disaster is categorized in man-made and natural disaster. Man-made disaster can be avoided whereas it is impossible to fully avoid or prevent natural disaster (Schenker-Wicki et al., 2010). There is an extensive literature on the frequency of natural disasters and their damages in contrast to man-made or technological disasters. Data is far more known for natural disaster than man-made equivalent. Natural disasters are far more damaging, they cause 10 times more fatalities then man-made disasters (Coleman, 2006). Natural disaster tends to include visible damage with clear stages of recovery in contrast man-made disasters are usually less visible without warning and clear stages of recovery (Williams, 2008). However, this is beyond the scope of our paper. The demand of disaster management is increasing as numbers of disaster are growing (Coleman, 2006).

**Taxonomy**

Taxonomy is referred to classification. This paper broadly reviews literature on risk, crisis and disaster in an attempt to create a basic taxonomy. Throughout this paper, the focus is to classify risk, crisis and disaster. We believe this paper is among the first that develops taxonomy. Taxonomy is not just an academic exercise, it will enable researchers to systematically categorize and analyze these concepts; and it is conceptually and managerially meaningful. Table 1 (Appendix A) presented the comparison between risk, crisis and disaster.
This paper in specific and taxonomy in general helps to get insight of risk, crisis and disaster, which is a first step in considering how to manage and reduce or limit the impacts of such events. There has been lack of holistic analyses that treat risk, crisis and disaster as integrated phenomena. Many links among the various aspects of them remain poorly understood (Alexander, 1997). We use word triplets as triplets share few characteristic. However, at the same time, they are different as well. They may be identical in look but they have different nature and habits. Same is the case with our research paper. Risk, crisis, and disaster all are events, but their nature and temperament are different. By reading numerous papers, we find out that risk, crisis and disaster are not only different in definition, but the way they are managed; their management phase; their types and nature etc. all are different. So we identified dimensions from prior literature which were understated, in order to differentiate. Failure to understand this distinction results in exercises which are not realistic. In this paper we developed a general taxonomy model that can help to understand these concepts comprehensively.

***Insert Table 1 about here***

**Continuum**

***Insert Figure 1 about here***

The dimensions mentioned in figure 1 (Appendix B) move along continuum. As we move from risk to crisis and crisis to disaster in continuum, the scale moves from low to medium/ high to medium and medium to high/ medium to low. For example, probability moves in continuum from low for risk to medium for crisis and high for disaster. Other dimensions like impact, intensity/ severity, scope, scale and magnitude moves from low for risk to medium for crisis and high for disaster. However, frequency and predictability moves from high for risk to medium for crisis and low for disaster.

This study aims to have an insight into the basic assumptions, viewpoints, and tendencies adopted by the studies of risk, crisis and disaster and locate their positions in continuum. It is hoped that analyzing and comparing them can help others to understand the difference between
the concept of risk, crisis and disaster. It is necessary to clarify the dimensions i.e. probability (likeliness that an event will occur), impact (effect), intensity/severity (extremity or danger), scope (effect individual, organization/industry or community), scale (how much would it damage), magnitude (size of disruption), frequency (number of occurrence) and predictability (degree to which a correct prediction or forecast can be made). Figure 1 (Appendix B) displays position of risk, crisis and disaster.

**Explanation of 3D diagrams**

In the 3D diagrams (Appendices C, D and E) we placed key literature of risk, crisis and disaster. Risk, crisis and disaster have multiple dimensions but few of dimensions dominate the others since implicitly and explicitly elucidate the difference. We call these dimensions distinguishing dimensions. We identified three distinguishing dimensions i.e. nature of event (ongoing - extremely rare), goal (prevention-response) and source (internal-external). So we position nature of event on X-axis, goal on Y-axis and place source on Z-axis, this will help us to understand what is already researched and where more research is needed.

So we assign value from 0 to 1 by assumption. 0 means that the literature does not talk about the dimension. For example, goal is containing two ends prevention and response, 1 means that literature is placed in response box. We assume that 0.5 is a value where we place a literature that talks about both prevention and response; literature deals with prevention are placed where value is less than 0.5. Nature of event is the only dimension in which we can’t find that event can be placed as 0.5 since it is not possible that an event can be ongoing and rare at the same time.

**Risk 3D**

***Insert Figure 2 about here***

We found literature e.g. Maguire & Hardy, 2013; Andriani & McKelvey, 2011 that deal with nature of event that is ongoing. Literature about goal is segregated as few of the papers talk about prevention i.e. Kaliprasad (2006); Holt, (2004), few about response i.e. Osipova & Eriksson (2011); Hwang et al., (2013) and some of them consider both prevention and response i.e. Shen,
1997. Same is the case with source, papers of Tah & Carr, 2000; Berkeley et al., 1991; Gil, 2009; Kaplan & Mikes, 2012, is containing both internal and external and some of the literature only discuss that risk is external i.e. Senge & Carsedt, 2001; Senge et al., 2007. There is only on paper Brinkmann, (2013) that deals with prevention as goal and internal and external as nature of event.

**Crisis 3D**

***Insert Figure 3 about here***

Weick, 1988; Oh et al., 2013; Pearson & Clair, (1998) deal with nature of event which is rare not extremely rare so we assign 0.7 to it. Najafbagy, 2011 paper treated goal as response, and Valackiene, 2009; Heath, 1998; Hale et al., 2005, consider prevention and response both as goal. There are papers of Mitroff et al., 1987; Shrivastava & Mitroff, 1987, which deal prevention as goals and describe internal and external sources of crises. Hensgen et al., 2006; Milenkovic, 2001; Coombs & Holladay, 1996, papers also deal with internal and external sources of crisis. Coombs (2007), is the only paper which deals with nature of event (rare) and internal and external both as source of crisis.

**Disaster 3D**

***Insert Figure 4 about here***

Smet et al., 2012; Schenker-Wicki et al., 2010, papers deal with nature of event, since disaster is extremely rare event so we assign 1 to it. We found papers like Hristidis et al., 2010; Altay & Green, 2006; Cutter, 2003, which deal with response as goal while few of the papers i.e. Wallace, & Balogh (1985) consider prevention as goal whereas Moe & Pathranarakul, 2006; Cronstedt, 2002; Nateghi-A, 2000, papers consider prevention and response both as goal of disaster.
Evolution model

***Insert Figure 5 about here***

The evolution model (Appendix F) would create sound understanding of how concepts evolve over the years and when they were first appeared in scientific journals. Over the years, concepts become more alienated and representing the real essence of the concept. If we consider Knight’s work (1921), disaster, risk, crisis and related concepts fall under the category of risk or uncertainty, but passage of time these concepts were evolved with their own distinctiveness and positioning. This model might be useful, specifically, in future research to understand the positioning of concepts and key literature in shape of first and latter appearance on evolution of concepts over the years. Usually contemporary researchers bewildered all these concepts so this model could be a good example of concept distinctiveness over years. It would help future researchers to understand and keep the distinctiveness of these concepts in their research as well. In order to use them immaculately, it is essential to understand their distinctiveness.

Overview of key publications

The table 2 (Appendix G) describes the key publications with motivation of studies, methodologies (trend of research) and its focus of study in term of risk, crisis and disaster.

***Insert Table 2 about here***

Discussion

Risk is not crisis and crisis is not disaster. These terms are often associated with each other; they are not in fact completely synonyms. This paper is a modest contribution to the exploration of taxonomy among risk, crisis and disaster (Appendix A), developing continuum (Appendix B), 3D diagrams (Appendices C, D and E) and evolution model (Appendix F). All these support to develop distinctiveness of risk, crisis and disaster. Taxonomy is developed by reading the papers that are already published. In which we differentiate risk, crisis and disaster on several dimensions. This would help the future researchers to understand the difference between risk, crisis and disaster. Moreover, taxonomy is supported by continuum, 3D diagrams and evolution model. After this we take taxonomy to next level by creating continuum of key dimensions.
derived from dimensions of taxonomy. By looking at figure 1 (Appendix B) we can say that risk and disaster are two extreme of continuum whereas crisis is in the middle, because crisis does have few properties of risk, and also have few attributes of disaster. In figure 1 (Appendix B), we mentioned eight dimensions (impact, intensity/ severity, scope, scale and magnitude, frequency and predictability); those move along the continuum, which help to position risk, crisis and disaster. The key dimensions are the one that make difference more understandable. It would help future researchers and practitioners to position any event along continuum within key dimensions of risk, crisis and disaster to make sure that event is belonged to particular concept of risk, or crisis or disaster and positioned properly.

The 3D diagrams (Appendices C, D and E) in which we used distinguishing dimensions like nature of event, goal and source for risk, crisis and disaster, and then we placed key literature, so it would help to understand which area needs more research. The key literature helps to identify which key dimension is a good candidate for future research. In 3D diagrams we figure out distinguishing dimensions i.e. nature of event, goal and source were not studied altogether, not even a single paper according to our knowledge deals with all three dimensions. All of the key literatures represent individual dimensions so this is something researchers can think about. So it would be possible to incorporate all these distinguishing dimensions in to one piece of writing. However, the interesting fact here is that none of the literature represents the source of disaster. Hence, we strongly believe that source is the strong candidate for research. There could be more dimensions that we could considered as distinguishing dimensions like scope (predictability-unpredictability) and impact (success-survival). This is the limitation of the paper and meanwhile potential research area. Evolution model would be helpful to understand the evolution of the concepts over the years, dissection into different concepts. This makes the distinctiveness of underlying concepts more clear. This also justify our claim that risk, crisis and disaster are different. This would help researchers to be explicit about the distinctiveness of these concepts i.e. we can talk about crisis, it means that we are only talking about crisis, not about uncertainty, risk and disaster. In prior research, it is treated same and intermingles with risk, disaster and uncertainty. For example, in knight work, uncertainty is considered as crisis and disaster etc. so from knight work’s (1921) to Taleb’s work (2007), the concepts have been evolved which position the concepts clearly. Table 2 (Appendix G) present the overview of key publication
which also represent the trend of prior research. It would also help the researchers to find out gaps for research.

**Conclusion**

Terminology confusion is existed in this milieu with risk, crisis and disaster. Literature reveals that scholars in different fields use the same term to explain different phenomena. In other words, the term risk, crisis and disaster in its current use are not same concept; they are different. Due to peculiarity in risk, crisis and disaster, individuality of these concepts is diluted. We are concerned with understanding of those dimensions that differentiate between risk, crisis and disaster. We tried to present an overview of fundamental differences among concepts of risk, crisis and disaster and then juxtaposed them in order to come up with classifications. Since paper offers an integrated synopsis on three themes risk, crisis and disaster and then identified sixteen dimensions from literature (Table 1 presented in appendix A): definition, management, management phases, characteristic, initiator, level of change/management, classification, nature, type, frequency, stakeholders, austerity, impact, scale, scope and magnitude. On the foundation of developed taxonomy, we come up with continuum (to position risk, crisis and disaster) and 3D diagrams (to place key literature). In figure 1 (Appendix B), we position risk, crisis and disaster along key dimensions (derived from taxonomy) in continuum. We have 3D diagrams of risk, crisis and disaster (Appendices C, D and E), in which we placed key literature along distinguishing dimensions derived from taxonomy (Table 1 in appendix A). Furthermore, this paper is unique in three important aspects. First we extended prior research by taking a first step to pry black box of taxonomy among risk, crisis and disaster. Second, we explore and pick out key dimensions associated with them. This paper provides taxonomy, positioning in continuum and 3D diagrams of these concepts which can be taken as one step further than previously realized. Rather than simply considering all these concepts similar, this paper highlights the individuality of each concept. Finally, this paper provides evolution model of risk, crisis, disaster and related concepts like hazard, uncertainty, issue, environmental jolts and black swan. The evolution model helps to understand how these concepts evolve over a period of time and enhance the distinctiveness of these concepts.
Our intended contributions in this article are fourfold: first, to provide the most comprehensive and up-to-date literature review on risk, crisis and disaster, as well as to document carefully the discrepancies in contemporary literature (existing literature offers conflicting views regarding risk, crisis and disaster). Within literature individual perspective is underdeveloped and each concept is considered conglomerate, since this paper seeks to contribute by exploring dimensions of taxonomy within each concept. Second, the key contribution of the paper is taxonomy; it will substantially change theoretical view of risk, crisis and disaster. Third, we develop continuum and we placed key literature in to 3D diagrams which will be help to explore more distinguishing dimensions that are not adequately researched. Finally, we developed the evolution model. The findings of this study contribute significantly to risk, crisis and disaster literature that has focused primarily on individuality of these concepts and understanding difference among them. This paper offers several recommendations. First, practitioners and academicians need to understand substance of these concepts comprehensively. This article would be immense help to the managers, practitioners and stakeholders, because to the best of our knowledge there is not a single article that deals with taxonomy among risk, crisis and disaster. Second, practitioners and academicians will foster the individuality of these concepts. A comprehensive taxonomy would enable them to take corrective measures (determine the roadmap and draw the blueprint) to deal with risk, crisis and disaster and provides an integral view (difference) which eliminates doubts. This study maps a route and identifies taxonomy with purpose to contribute and explain phenomenon. The journey is complicated, but the pathway is clear. Finally, on based of this new perspective, this paper provides new directions for further research into mechanism of risk, crisis and disaster management/s, contributes to organization success and survival as well as to dig into distinguishing dimensions. Researchers and academicians must be careful while using these concepts as they meant different. We hope that this study sparks increased research attention pertaining to use these concepts with their real essence.

Notes

**Hazard:** Disasters are different from hazards (Wisner et al., 2003). Hazards are the potential threats to people and things they valued. Hazard could be earthquake, tornadoes, blizzards, floods, drought, industrial plant failure, terrorism, and air pollution. Disasters on the other hand are the outcome of hazards (Cutter, 2003). Considerable damage is a requirement of disaster
Disasters are, in fact, created by the interaction of many elements, if there is no population there is no disaster (Ball, 1979). Hazards transform into disasters through human agency (Mutter, 2008). Moreover, not every hazard is the source of a disaster. Disasters only occur when the human system intersects with a hazardous situation.

**Uncertainty:** An uncertainty is defined as “a difference between the amount of information required to perform the task and the amount of information possessed by the organization” (Galbraith, 1977:36-37). Uncertainty is hard to predict and control. It can be described as the difference between the information one has and the information one needs to complete a task (Galbraith, 1973). Knight (1921) first distinguishes between risk and uncertainty. Risk is measurable and insurable while uncertainty is unmeasurable and uninsurable. It has been argued that the term ‘risk’ is mostly associated with threats and ‘known unknowns’, leaving positive sides of risk. Uncertainty, on the other hand, has a broader perspective and focuses on both positive and negative effects as well as they are ‘unknown unknowns’. Risk refers to those situations in which probabilities of potential outcomes are known, in contrast to uncertainty, for which probabilities of possible outcomes are unknown (Knight, 1921). Risk is assumed that reality is known, predictable, and measurable whereas uncertainty is origin of complexity or unpredictability (Holt, 2004) can’t be reduced by risk management (Pender, 2011) because it is unknown, unpredictable, and immeasurable.

**Black swan:** A black swan is a highly improbable event with three essential properties: It is unpredictable (it is an outlier (unusual event), as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility). Second, it carries a massive and extreme impact; and, finally after the event, it is possible to come-up with an explanation that makes it appear less random, and more explainable and predictable, than it was. To sum up three main ingredients of black swan are: rarity, extreme impact, and retrospective (not prospective). They occur rarely, with a totally unknown frequency, yet they carry large impact. Black swans (the highly improbable consequential event) are the rare events and outlier in a sense happens very often. Prediction is nearly impossible for these events (Taleb, 2007).
**Environmental jolts:** Jolts are change that is so sudden and it is a temporary disruption that leads to drastic change (Meyer et al., 1990). Jolts are difficult to foresee and its impacts on organizations are disruptive and often inimical (Sine & David, 2003; Meyer, 1982). The sudden environmental change put organization in jeopardy (Starbuck et al., 1978; Staw et al., 1981). We postulate that environmental jolts are often viewed as a crisis, however crisis could be internal and external but jolts are usually from environment which are external (Wan & Yiu, 2009).

**Issues:** An issue is “an unsettled matter which is ready for decision” (Chase, 1984: 38). Yet, there is reasonably broad acceptance of an issue as “a condition or event, either internal or external to the organization which, if it continues, will have a significant effect of the functioning or performance of the organization or on its future interests.” (cited in Regester & Larkin, 2002: 42)

**References**


<table>
<thead>
<tr>
<th>Risk</th>
<th>Crisis</th>
<th>Disaster</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>A risk is an “identifiable events that will have negative consequences” (Sicotte &amp; Bourgault, 2008: 468).</td>
<td>One of the most cited and in our opinion more complete and comprehensive definition of crisis is “a low-probability, high impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly” (Pearson &amp; Clair, 1998: 60).</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Risk management could be defined “as a business process whose purpose is to ensure that the organization is protected against risks and their effects” (Tah &amp; Carr, 2001). Risk management is considered to be standalone discipline (Jaques, 2007).</td>
<td>Crisis management is a &quot;systematic attempt by organizational members with external stakeholders to avert crises or to effectively manage those that do occur” (Pearson &amp; Clair, 1998: 61).</td>
</tr>
<tr>
<td><strong>Management phases</strong></td>
<td>Phases are risk identification, risk analysis, risk prioritization and mapping, risk response planning and risk monitoring (Kaliprasad, 2006; Boehm, 1991)</td>
<td>Consists of five phases: signal detection, preparation and prevention, damage containment, recovery and learning (Pearson &amp; Mitroff, 1993; Mitroff et al., 1987; Mitroff, 1994).</td>
</tr>
<tr>
<td><strong>Characteristic</strong></td>
<td>Potential future event; holds a certain probability of occurrence; negative consequences but risk can be planned. (Nieto-Morote &amp; Ruz-Vila, 2011; Yosha, 2012)</td>
<td>Severe threat, ambiguity of cause and effects, high uncertainty (informational and situational), contain element of surprise, and time pressure and urgency of prompt decision (Hart et al., 1993; Hermann, 1963; Coombs, 2004) unanticipated and outside of organizational control (Pearson &amp; Mitroff, 1993; Pearson &amp; Clair, 1998; Hermann, 1963).</td>
</tr>
<tr>
<td><strong>Initiator</strong></td>
<td>Individual/ organization</td>
<td>Individual/ organization</td>
</tr>
</tbody>
</table>

### Table 1: Taxonomy among triplets
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification</td>
<td>Categories of crisis that belongs to social/organization and technical/economic factors and it has internal (refers to a crisis caused by something organization did by itself) and external (refers to a crisis caused by something outside the organization) dimensions (Mitroff et al., 1987; Shrivastava &amp; Mitroff, 1987).</td>
<td>Two type of disaster: Natural (act of God, uncontrollable) and Man-made (due to human error and negligence) (Williams, 2008; Norris et al., 2002; Shaluf et al., 2003).</td>
</tr>
<tr>
<td>Nature</td>
<td>Every crisis is unique and influenced by internal weakness and external threats (Egelhoff &amp; Sen, 1992). Crisis are divided into intentional/expected (refers to some actors committing crisis purposefully) and unintentional/unexpected (refers the crisis event was not committed purposefully) (Coombs &amp; Holladay, 1996; Ponis, &amp; Koronis, 2012).</td>
<td>External and Internal: earthquake is act of God however terrorism is something that comes from inside the community/ nation.</td>
</tr>
<tr>
<td>Type</td>
<td>Technical/ economic (internal: product/service defects, product recall, computer breakdown, defective information, bankruptcy), (external: widespread environmental destruction, natural disaster that (disrupt the major project &amp; service; destroy organizational information base; eliminate key stakeholders), (hostile takeovers) Social/organizational crisis (internal: organizational breakdown, miscommunication, on-site product tampering, illegal activities, sexual harassment, work-related homicide), (external: terrorism, executive kidnapping, off-site product tampering, labor strikes, product/ service boycotts) (Pearson &amp; Mitroff, 1993; Mitroff et al., 1987; Shrivastava &amp; Mitroff, 1987).</td>
<td>Natural disaster such as droughts, earthquake, extreme temperature, floods, tsunamis, landslides, storms, hurricanes volcanoes and wildfires, hydro-meteorological, blizzards, cyclones, typhoons, torrential, tornadoes, and rains, etc.) Man-made disaster are riots, infectious disease, plane crashes, epidemics and war, terrorism, bioterrorism, pandemics, radiation releases from nuclear power plant, poisoning, radiation, chemical spill, collapse and explosions at sites etc. (Smet et al., 2012; Yi et al., 2010).</td>
</tr>
</tbody>
</table>

**Classification**

Operational risk (usually contain day to day, internal activities and managers do have control over them) and strategic risk (societal effects and these risks are beyond the control of managers) (Krane et al., 2012; Cabedo & Tirado, 2004).

Categories of crisis that belongs to social/organization and technical/economic factors and it has internal (refers to a crisis caused by something organization did by itself) and external (refers to a crisis caused by something outside the organization) dimensions (Mitroff et al., 1987; Shrivastava & Mitroff, 1987).

Two type of disaster: Natural (act of God, uncontrollable) and Man-made (due to human error and negligence) (Williams, 2008; Norris et al., 2002; Shaluf et al., 2003).

**Nature**

External and Internal: External risks arise from events outside the company and are beyond the influence or control. Internal risks are within the ambit of organization that are controllable and ought to be eliminated or avoided. (Kaplan & Mikes, 2012; Berkeley et al., 1991; Hobday, 2000).

Every crisis is unique and influenced by internal weakness and external threats (Egelhoff & Sen, 1992). Crisis are divided into intentional/expected (refers to some actors committing crisis purposefully) and unintentional/unexpected (refers the crisis event was not committed purposefully) (Coombs & Holladay, 1996; Ponis, & Koronis, 2012).

External and Internal: earthquake is act of God however terrorism is something that comes from inside the community/ nation.

**Type**

Internal risk: Market, financial, technological, management, completion, technical, operational, legal risks

Technical/ economic (internal: product/service defects, product recall, computer breakdown, defective information, bankruptcy), (external: widespread environmental destruction, natural disaster that (disrupt the major project & service; destroy organizational information base; eliminate key stakeholders), (hostile takeovers) Social/organizational crisis (internal: organizational breakdown, miscommunication, on-site product tampering, illegal activities, sexual harassment, work-related homicide), (external: terrorism, executive kidnapping, off-site product tampering, labor strikes, product/ service boycotts) (Pearson & Mitroff, 1993; Mitroff et al., 1987; Shrivastava & Mitroff, 1987).

Natural disaster such as droughts, earthquake, extreme temperature, floods, tsunamis, landslides, storms, hurricanes volcanoes and wildfires, hydro-meteorological, blizzards, cyclones, typhoons, torrential, tornadoes, and rains, etc.)

Man-made disaster are riots, infectious disease, plane crashes, epidemics and war, terrorism, bioterrorism, pandemics, radiation releases from nuclear power plant, poisoning, radiation, chemical spill, collapse and explosions at sites etc. (Smet et al., 2012; Yi et al., 2010).
<table>
<thead>
<tr>
<th><strong>Frequency</strong></th>
<th>Crisis is low probability- high consequence event (Coombs, 2004; Oh et al., 2013; Weick, 1988).</th>
<th>Rare events with high impact (McConnell &amp; Drennan, 2006; Shaluf et al., 2003).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stakeholders</strong></td>
<td>Organization stakeholder: supplier, client, financer, employee etc. Not external assistance is needed. Organization usually handles risk by itself.</td>
<td>Organizational stakeholders: employee, government agencies, customer and financiers and shareholders.</td>
</tr>
<tr>
<td></td>
<td>Government is major stakeholder. Non-governmental agencies (NGO, Armed forces, Disaster cell, International relief organizations and special response teams) (Nateghi-A, 2000; Moe &amp; Pathranarakul, 2006; Mutter, 2008).</td>
<td></td>
</tr>
<tr>
<td><strong>Austerity (Intensity/ Severity)</strong></td>
<td>Risk is known, predictable, and measureable (Holt, 2004). These events are common and occur more frequently. It is impossible to avoid. We can plan for risk (Maguire &amp; Hardy, 2013).</td>
<td>Inevitable, unexpected, extreme rare event with no control (Smet et al., 2012; Schenker-Wicki et al., 2010). It is almost impossible to fully prevent the damage or neutralizing all negative impact (McConnell &amp; Drennan, 2006). We can only recover from disaster; we can’t escape and mitigate them.</td>
</tr>
<tr>
<td></td>
<td>Sudden, unexpected, negative, dangerous event (Robert &amp; Lajtha, 2002) unusual and abnormal event and inevitable (Pearson &amp; Clair, 1998) for an organization (Loosemore, 1998) and poses financial reputations threat (Coombs, 2007).</td>
<td></td>
</tr>
<tr>
<td><strong>Impact</strong></td>
<td>Crisis could have short and long term impact on organization (Coombs, 1999). Crisis deal mostly with organization survival (Mitroff et al., 1987). Crisis can jeopardize and decimate entire organization (Pearson &amp; Mitroff, 1993). It can have positive and negative impact (Shaluf et al., 2003).</td>
<td>Disasters are highly extreme events in their effects as well (Cutter, 2003). Disaster has only high negative impact on community for longer period of time. Communities are struggling for their survival. Disaster has high degree of complexity (Shaluf et al., 2003).</td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Expected, known-unknown (identifiable but not possible to find out when it will occur) and unfavorable events. Small scale and affect organization. Risks lead deviation and disruption (Krane et al., 2012; Wideman, 1986; Barki et al., 1993). Risk can be identifiable and management does have alternative plans (Meyer et al., 2002).</td>
<td>Some crisis is predictable (expected/ intentional) while some are unpredictable (unexpected/ unintentional) (Carone &amp; Lorio, 2013). Crises are event with large scale damage (Mitroff et al., 1987; Shrivastava &amp; Mitroff, 1987). Crisis is unidentifiable/ unpredictable, there is no alternative/ contingency plans (Meyer et al., 2002).</td>
</tr>
<tr>
<td></td>
<td>Collapse of system (Schenker-Wicki et al., 2010) and chaos: basic structure is shaky, contingency plans are insufficient (Meyer et al., 2002). Large scale, highly complex and extraordinary event (Wei et al., 2009) leads to devastation (Shaluf et al., 2003).</td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td>Magnitude</td>
<td>Affect the entire community or nation (Wei et al., 2009). Disaster shift from country/ies or community to industry or organization.</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Some of the risk effect on individual organization and industry. It could shift from industry to organization or from organization to industry.</td>
<td>Risk usually disrupts the operational activities, the consequences/impact are known and risk can be identifiable (Knight, 1921; Holt, 2004).</td>
<td>Crisis can hit anytime and anywhere (Loosemore, 1998) in any firm large, small, national or international (Shaluf et al., 2003). Crisis not only affect organization but also industry and sometimes world (Reilly, 1987).</td>
</tr>
<tr>
<td>Crisis is incomprehensible and inevitable (Wan &amp; Yiu, 2009; Oh et al., 2013). It is potentially a threat, unpredictable and unanticipated event (Coombs, 2004). Crisis is high magnitude even, threat to viability and reputation of organization (Pearson &amp; Mitroff, 1993).</td>
<td>Disasters are potentially disastrous and devastating and also have severe consequences (Siriwardena et al., 2013).</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1: positioning of risk, crisis and disaster in continuum by using key dimensions
Figure 2: Risk 3D diagram

Appendix C
Figure 3: Crisis 3D diagram
Figure 4: Disaster 3D diagrams
Figure 5: Evolution development of risk, crisis, disaster and related concept (The red boxes are not the main focus of the paper, but in order to avoid confusion we added them and you can read their detail in notes.)
### Appendix G

#### Table 2: Overview of key publications

<table>
<thead>
<tr>
<th>Key publications</th>
<th>Motivation of study</th>
<th>Methodology</th>
<th>Risk</th>
<th>Crisis</th>
<th>Disaster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knight (1921)</td>
<td>To unpack the distinction between risk and uncertainty.</td>
<td>Theoretical</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raz et al. (2002)</td>
<td>To explore the variations of risk management techniques and suggest principles for better selection of such techniques and better development of specific risk management tools in the future as well as to understand relationship between types and application of risk management practices and contribution of these practices to success.</td>
<td>Quantitative (Survey)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gephart et al., (2009)</td>
<td>To enhance the field of organization studies by encouraging to focus attention on risk and risk management as a mean to enlarge and enrich the field of organization studies.</td>
<td>Theoretical</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krane et al. (2012)</td>
<td>To examine how different motivations among actors around projects are handled and to study the interaction between the project actors (owners and management team) regarding risk management.</td>
<td>Qualitative (interviews and document studies) and quantitative (risk register analysis). Study 7 large projects</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maguire &amp; Hardy (2013)</td>
<td>Examine organizing processes through which products &quot;become&quot; risky or, for that matter, safe.</td>
<td>Qualitative (Case studies: publicly available data, government web portal and websites)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hermann (1963)</td>
<td>To explore how certain responses to crisis may hinder an organization's viability, the paper will offer a series of interrelated propositions, or a model.</td>
<td>Propositions and illustrative material (case studies)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turner (1976)</td>
<td>To consider a manner in which high-quality intelligence could be used to identify the conditions that fosters the failure of foresight.</td>
<td>Qualitative (Observation: behaviour pattern and information condition and reports: In which it was easy in official inquiry to attribute the failure, reports of incidents were analysed)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Billings et al. (1980)</td>
<td>To review and evaluate Hermann's model (surprise, short decision time, threat to valued goals) of crisis and to develop a revised model from previous theoretical and empirical research and to analyse the individual decision</td>
<td>Case study (a case where crisis occur) and survey: 250 of the largest profit making organizations and to 250 educational institutions.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Focus</td>
<td>Methodology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutton (1986)</td>
<td>To reveal how crisis strategic issues are processed differently from non-crisis issues in organizations.</td>
<td>Single case study (intensive study of five real-time strategic issues processed by a single organization over a 5-year time period and interviews)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weick (1988)</td>
<td>To explore the complications of delicate trade-off between dangerous action which produces understanding and safe inaction which produce confusion.</td>
<td>Literature review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarantelli (1988)</td>
<td>To summarizes and highlights the major research findings that have been established about organizational behaviour at the emergency stage of community disasters.</td>
<td>Literature review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fearn-Banks (1996)</td>
<td>To understand how organization, companies and individual cope with communication aspects of crisis management.</td>
<td>Case studies (interviews, blogs and newspaper)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seeger et al. (1998)</td>
<td>Define organizational crisis, examine the role of communication in crisis and explore various departmental approaches used to describe crisis.</td>
<td>Literature review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coombs (1999)</td>
<td>Provides an integrated and multi-disciplinary approach to the entire crisis communication process and explains how crisis management can prevent or reduce the threats of a crisis, and provides guidelines for how best to act and react in an emergency situation.</td>
<td>Case studies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oh et al. (2013)</td>
<td>To explore the information quality issue in the context of social crises and media crises and conceptualize the participatory social reporting phenomenon as collective intelligence and information processing to make sense, cope with, and adapt to situational and informational uncertainties under crises.</td>
<td>Quantitative (research model, hypothesis) and qualitative (test hypothesis on three cases using tweeter data set)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author(s) (Year)</td>
<td>Objective</td>
<td>Methodology</td>
<td>Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------</td>
<td>----------------------------------</td>
<td>---------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ball (1979)</td>
<td>To explore the definition of two key concepts: natural disaster and vulnerability.</td>
<td>Literature review</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexander (1997)</td>
<td>To develop a disaster continuum and position disaster in continuum from acute to chronic</td>
<td>Literature review</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisner et al. (2003)</td>
<td>To examine the significance of the human factor is as much of a cause of disasters as the natural environment.</td>
<td>Theoretical and case studies for illustration</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coleman (2006)</td>
<td>Understand the frequency and consequences of natural disasters; comprehensive understanding of probable incidence and damages. To quantify frequency, nature and change in disasters in developed economies during the 20th century.</td>
<td>Literature review and disaster database is used to analyse two disasters in Australia.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altay &amp; Green (2006)</td>
<td>To point out issues in disaster operations management.</td>
<td>Literature review and review disaster database</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moe et al. (2007)</td>
<td>To develop an integrated approach for effectively managing natural disasters by providing a framework for effective natural disaster management from a public project management perspective, proposes an integrated approach for successfully and effectively managing disaster and specifies a set of critical success factors for managing disaster related public projects.</td>
<td>Case study of tsunami (Thailand)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 3

Crises and Capabilities in Project-based Organizations

Rehab Iftikhar
Luiss Guido Carli University

Jonas Söderlund
BI Norwegian Business school

Abstract: The purpose of this paper is to investigate the impact of internal (social, technical), and external (social, technical) crises on the performance of project-based organizations (i.e. project performance and stakeholder performance) and to explore PBOs’ capabilities (strategic, functional and project capabilities) to handle them. To achieve the objective, a cross-sectional questionnaire survey was conducted. Based on 283 responses from IT, Telecom and construction companies, analysis were done through structural equation modeling. The result reported that internal crisis is negatively while external crisis is positively related with PBOs’ performance. Furthermore, PBOs’ capability moderates the internal and external crisis relation with PBOs’ performance.

Introduction
Organizations experience a crisis from time to time and most organizations spend a lot of resources making sure that crises are avoided, yet we all know that they will occur. In that respect, an organization needs to do what it can to avoid it, but equally make sure that they have the ability to deal with it once it occurs. If severe enough and ill-prepared, a crisis might have fatal consequences to the organization, in some cases leading to its. Studies have shown that crises can degrade organizational performance (Scott, 1987). Any organization including PBOs in private and public sector do not want to fail and cannot afford poor performance (Zeyanalian et al., 2013). Problems happen at companies every day, but one single crisis may be enough to significantly damage or even destroy an organization (Coombs, 1999; Fearn-Banks, 2002). Crisis is described as low probability, high impact event (Pearson & Clair, 1998) creating high levels of
threat and uncertainty for organization. One common mistake toward crisis is an approach, that this won’t happen to us, and even if it did we are much better prepared, or we would be able to handle it well, are obvious mistakes (Jaques, 2008:18). Crises never occur in exactly the same way as previous ones, which make observations difficult to conduct (Roux-Dufort, 2007). Not all crises are alike. We believe that each crisis is unique in type and impact, and affects PBOs’ performance in a different way which might require different types of capability (Quarantelli, 1988). Most organizations are found inadequate to handle crisis and it might be inappropriate to handle different crises likewise (Burnett, 1998). Crisis phenomenon is in dire need for more research. We need to develop better understanding of crisis in PBOs. This paper explores the nature of crisis with particular reference to PBO.

Aim and research questions
The primary objective in this paper is to highlight the way different crises influence PBOs, specifically their performance and understand PBO capabilities to handle crisis. In this paper, we propose the concept of ‘capability’ to capture the ability of PBO to manage the relation between crisis and performance. Therefore, the aim is to find a set of capabilities, which is worth to follow.

This article creates a comprehensive conceptual model, which highlights PBOs’ performance from two perspectives: project and stakeholder. Prior research focused on project performance (temporary setting) which is simple, incomplete, is not wrong but is inconclusive and unconvincing. The model we suggest will scrutinize PBOs’ performance from short-term (project) and long-term (stakeholder) perspective. According to Loosemore (1998) prior papers capture only project performance and neglect other indicators for PBOs’ performance. We can’t say that project performance such as time, cost and quality are the only performance indicators for PBO. It is essential to look from stakeholder performance (Loosemore, 1998). PBOs’ performance in this study is therefore multi-dimensional in nature, incorporating both short and long term measures (Shenhar et al., 1997). Organizations may face many different types of potential crises. Our goal here is not to delve deeply into one crisis or one crisis type, but rather to develop a framework useful for different types of crisis. This study investigates the linkages of different types of crisis with PBOs’ performance and therefore, provides guidelines for managing
crisis by looking into PBO’s capabilities. The objective of the study is threefold (i) to identify different crises that, influence project performance (time, cost and quality), (ii) to identify the various crises that, influence the key stakeholders, namely project team, sponsor, top management and client and (iii) to explore the key capability of PBO to handle crisis.

We are trying to answer the following research questions

1. What are different possible types of crisis that could impact PBOs’ performance?
2. What are different capabilities of PBO to handle crisis?

This study intends to ask not how to avoid crises but to investigate different types of crisis that could impact PBOs’ performance and to investigate capabilities to manage and handle these crises. None of these questions has been adequately treated in that past literature. It is therefore pertinent to address the existing knowledge gap by not only identifying different types of crisis along PBO but also demonstrate and analyze the relationship between different genre of crisis and PBOs’ performance and to understand PBO capability to handle crisis. Understanding these questions is important because it broadens our existing understanding of crisis and PBO capability, which is currently limited. It might be possible that not all types of crisis are equally relevant for PBOs. This paper is not about developing the capability within the organization but to react flexibly and to make the use of right capability that will be required when crisis does happen (Bonn & Rundle-Thiele, 2007). This paper makes following contributions. First this paper broadens the existing knowledge of crisis in PBO. Previous researchers have explored different types of crisis in permanent setting; we are exploring crisis in PBO which is different. Second, we also add stakeholder perspective in our study to measure PBOs’ performance, which is usually neglected in prior research. Since this study demonstrates crisis impact on project performance and stakeholders’ performance and provides insight about different types of crisis and their impact on PBO. Third, this research extends current understanding of capability by providing empirical support for moderating role of PBO capability in the relationship between crisis and PBOs’ performance. Moreover, PBO capabilities handle crisis and provide guidelines for managing and dealing with crisis in PBOs. Last but not least, to the best of our knowledge, it is safer to assume that present study is the first one to develop a conceptual model examining the relationship between different types of crisis, performance and capability of PBOs; in a single study we explore and refine the concepts for understanding substance.
The rest of the paper is organized as follows. Research objectives are first clarified. Subsequent to the introduction, focal concepts are defined in literature review. The conceptual framework is presented; the research method is presented; the empirical data is presented. Results are discussed. The final section of conclusions will be drawn based on the key findings of the study and derive implications that offer food for thoughts for both academia and practice.

Literature review

PBO performance

Recently, PBOs have received increasing attention as an emerging organizational form (Hobday, 2000). Project-based organization (PBO) first became famous in late 1990s. Project-based organizations are found in a wide range of industries (Thiry & DeGuire, 2007). These include consulting and professional services (e.g. accounting, advertising, architectural design, law, management consulting and public relations), cultural industries (e.g. fashion, theatre, filmmaking, video games, advertisement and publishing), high technology (e.g. software, computer hardware, multimedia, aerospace, ICT and IT), and complex products and systems (e.g. construction, ship building, transportation, telecommunications, oil and gas, defense, infrastructure, pharmaceutical, bio-tech, semi-conductors, automotive, and electric equipment) (Midler, 1995; Berggren et al., 2001; Hobday, 1998; 2000; Ebers & Powell, 2007).

One of the common misperceptions is that contemporary researchers thought PBOs are similar to high reliability organizations (HROs) but PBOs are different from HROs. Roberts (1990) and Bigley & Roberts (2001) presented the concept of high reliability organizations (HRO). The primary goal of HRO is not performance but reliability. HRO is characterized by extreme interdependence. Roberts (1990) illustration is about nuclear power aircraft which is technological complex, hazardous technology and high reliability organization. The reliability of HRO is defined in term of peace time, not its ability to perform in wartime. High and complex technology is waiting for accident to happen. However, Bigley and Roberts (2001) provide an example of fire department, the nature of the organization is to deal with unexpected. The nature of organization is very different from normal organization; they contain hazardous technology or dealing with unexpected so reliability is the goal. We are considering IT, Telecom and
construction industry which are not technological hazardous and performance is the primary goal not reliability.

Prior research focuses more on performance, as “one of the most important constructs in management research” (Richard et al., 2009: 718). Performance is probably the most popular dependent variable in management and contemporary research (March & Sutton, 1997). Organizational performance is the ultimate dependent variable of interest for researchers (Richard et al., 2009). The performance of an organization is defined as “the extent to which an organization realizes its short-term objectives and prepares to realize its long-term objectives” (Smet et al., 2010). Richard et al. (2009) emphasize on the importance of finding context sensible performance measures; here the context is project-based organizations. This study suggests a new way to examine relationships between crisis and performance by not merely focusing on project performance but also considering stakeholder performance. Performance of PBO is categorized as project performance and stakeholder performance. Stakeholder performance is as important as traditional project performance (Kissi et al., 2013) since stakeholder performance is long term perspective while project performance is mostly short term perspective of PBO (Ouedraogo & Boyer, 2012). There is no commonly agreed framework of performance of PBOs. A truly 'excellent' PBO must balance the competing claims of its various stakeholders, and project performance (Chakravarthy, 1986). We suggest that without stakeholder performance perspective, we may not ultimately define performance of PBOs. Once crisis hits, organizations should consider both short term and long term performance since impact of crisis may be seen different on stakeholder performance and project performance.

**Project performance**

The performance of project is measure in term of the achievement of project objectives. Failure to achieve against any project objective is, prima facie, failure of the project. The most appropriate criteria for project performance are project objectives. The degree to which objectives have been met determines the performance of a project. Usually every project has objectives such as adherence to schedule (time), cost, and quality requirements and this is also criteria for project performance (De Wit, 1988). Project performance is objective and objectively
gauge in relation to time, budget and quality/ requirement parameters, which were defined as outset of the project (De Bakker et al., 2011).

Project performance is determined by objective result of three parameters i.e. schedule, cost, and quality targets. **Time:** There is a due date for project completion and one need to expedite the project. A good project needs to be finished within a specific timeline. If a project is finished too early, it might be too expensive since more resources are utilized to finish it earlier. On the other hand, if a project finishes too late, it shows inefficiency and inability to meet deadlines, thereby resulting in quality compromises. **Cost:** Project has to be finished within budget. Budget is decided before project is started. Good project is not only finished within budget; but also is not over-budget. Alternatively, project should not be under-budget, as it will compromise quality. Cost includes both initial capital cost and subsequent operation and maintenance costs. **Quality:** Quality has different meanings to everyone and has many definitions. Quality in project management deals with projects that fulfill client desire and demand customer satisfaction. Quality also refers to characteristics and attributes of projects (Maylor, 2005; El- Rayes & Hyari, 2004).

As suggested by Mallak and Kurstedt (1997), crisis seems inevitable in projects. Crises in projects are one of the main reasons of deviation from critical path of projects i.e. financial overrun, time delays and compromise on quality (Hällgren & Wilson, 2008). Suppose the example of infrastructural cost of the project is one billion Euros over three-year time period. Thus, delay of one day in project cost one million more. This is illustration of cost and time overrun. Deviations are taken as negative phenomena since they diverge and change project objectives (Hällgren & Maaninen-Olsson, 2005). Hällgren & Wilson (2008), consider project in crisis when deviation occurs along the critical path and when crisis diverges from critical path (objectives) of projects. Not all deviations, however, are crises. It is only when the deviation occurs along the critical path (Hällgren & Wilson, 2008). This study also employed a broader definition of PBOs’ performance than the typical triple constraints of cost, time and conformance to specifications. According to De Wit (1988), Pinto & Slevin (1988) and De Bakker et al., (2010), project performance characteristic time, cost and quality should be included since it is part of PBOs’ performance but not exclusively and it may also include other characteristic such

**Stakeholder performance**

Generally, the term stakeholder refers to the various influential persons, groups, or organizations with varying degrees of responsibility; authority can affect an organization’s performance or attainment of goals (Bryson, 2004; Mitchell et al., 1997; Lerbinger, 1997). Stakeholder theory (Freeman, 1984) is primarily concerned with how group and individual affect an organization. The canonical definition of a stakeholder is “any group that can affect or be affected by the achievement of organizational objectives” (Freeman, 1984:46). The term stakeholder refers to groups of constituents who have a legitimate claim on the firm (Freeman, 1984; Pearce, 1982). This legitimacy is established through the existence of an exchange relationship. Stakeholders include stockholders, creditors, managers, employees, customers, suppliers, local communities, and the general public. Following March and Simon (1958) each of these groups can be seen as supplying the firm with critical resources (contributions) and in exchange each expects its interests to be satisfied (by inducements). Stockholders provide the firm with capital. In exchange, they expect the firm to maximize the risk-adjusted return on their investment. Creditors provide the firm with finance and in exchange expect their loans to be repaid on schedule. Managers and employees provide the firm with time, skills, and human capital commitments. In exchange, they expect fair income and adequate working conditions. Managers are also stakeholders, according to many stakeholder theorists, albeit rather a unique sort of stakeholder: managers have a “stake” in the organization but are also responsible for identifying other stakeholders (Donaldson & Preston, 1995; Maignan & Ferrell, 2004; Hill & Jones, 1992). Customers supply the firm with revenues and expect value for money in exchange. Suppliers provide the firm with inputs and seek fair prices and dependable buyers in exchange. Local communities provide the firm with locations, a local infrastructure, and perhaps favorable tax treatment. In exchange, they expect corporate citizens who enhance and/or do not damage the quality of life. The general public, as tax payers, provides the firm with a national infrastructure. In exchange, they expect corporate citizens who enhance and/or do not damage the quality of life and do not violate the rules of the game established by the public through their legislative agents (Hill & Jones, 1992).
The “stake” that stakeholders have is that they stand to gain or lose something from the organization’s performance. The traditional assumption is that performance is well-defined if stakeholder are satisfied (Shenhar et al., 1997). Invariably, stakeholders have distinct vested interests, and failure to address these interests may be detrimental to their performance (Clarkson, 1995; Freeman, 1984; Harrison & St John, 1994; Bryde & Brown, 2005). Stakeholders group has its own unique set of expectations, needs and values that would all concentrate on measures of performance most directly related to their own goals and what is important for one actor might be insignificant for other (Greenle & Foxall, 1997; Fitzgerald & Storbeck, 2003; Hillman & Keim, 2001). Adding in different stakeholders increases the dimensionality of performance. Freeman and Beale (1992) provide an interesting example of disparity in points of view: architecture may consider success in terms of aesthetic appearance, an engineer in terms of technical competence, an accountant in terms of dollars spent under budget, a human resources manager in terms of employee satisfaction and chief executives’ offices rate their success in the stock market (Freeman & Beale, 1992). A popular distinction is between ‘primary’ stakeholders like suppliers, investor, employees and customers who have a direct exchange relationship with the firm and ‘secondary’ stakeholders that do not and is other groups that have some type of interest in the organization (Wheeler & Sillanpää, 1997; Casciaro & Piskorski, 2005).

Same is the case with PBO, in project-based organization stakeholders refer to individuals and groups, internal and external to the organization, and have a vested interest in the activities and outcome of the projects (PMI, 2004). The varied perception of performance may mean different things to different stakeholders who often result in different perceptions of performance (Agarwal & Rathod, 2006; Shenhar et al., 2001). This has significant implications as the project can deemed a complete failure by one group and success by another (Baclay et al., 2010). The most important stakeholders for project are project manager, top management, customer-client, user, team members, project sponsor and supplier. The two most obvious parties having a stake in any project are the client and the contractor but other stakeholders are often overlooked, however, they have a key interest in the outcome of the project as well. Crisis can impact on stakeholder performance but each stakeholder has his/her own goals and they focus on crisis that impact on their specific goal. The contractor, for example, is more interested in identifying crisis
that can influence cost, while client is more interested in crisis that could affect quality of final product. Sponsor: who makes finance available to buy project’s deliverables is interested to identify crisis that affect cost of project (Krane et al., 2012). Different stakeholders do have different interest but project team considers all these objectives at same time (Osipova & Eriksson, 2011). Project manager has to play his/her role to take care of stakeholder interest (satisfaction usefulness and effectiveness etc.), and make sure that the requirements of project should meet the client expectations (expectation in term of time, cost and quality) (Berkeley et al., 1991) by understanding client needs and translate them into specifications of the project deliverables (Creasy & Anantatmula, 2013). Organizations can’t survive unless they are able to satisfy diverse stakeholders with distinct interest (Ice, 1991). In crisis situations, interests and needs of distinct stakeholders are often contradictory. In this study, we contend that organization’s stakeholders are influenced by crisis to varying degree. Stakeholders are not only affected by the organization, in turn, they may impact on organization’s stability (Ulmer & Sellnow, 2000).

**Project vs. stakeholder performance**
The traditional system of measures (adherence to cost, time and specifications) commonly used to assess the performance of project and PBO due to their simple and clear nature (Tatikonda & Rosenthal, 2000:404) but they have been identified as being incomplete. Researchers and practitioners have argued that these measures do not sufficiently reflect the realities and usually overlook several critical factors of contemporary projects (Atkinson, 1999; Atkinson et al., 2006; Wateridge, 1998). They represent at most a partial list of performance measures. For example, projects that meet budget and schedule constraints may be considered successful even though they do not meet customer needs and requirements (Shenhar et al., 1997) so it is essential to add stakeholder measures. Cohen and Graham (2001) argued that a fundamental shift is needed to highlight the satisfaction of stakeholders rather than focus on fixed specification, budget and deadline. Therefore, with continued sole reliance on the traditional perspective there is a menace that other relevant and important performance dimensions are not scrutinized and evaluated. It is noted that if practice is to persist with these trends, projects may continue to struggle to justify its contributions that’s why researcher usually includes some combination of measure of project and stakeholder performance. PBOs’ performance is seen as an achievement of the project objectives.
that are aligned to the performance criteria of the individual stakeholders (Barclay, 2008; Collins and Baccarini, 2004). The traditional gauges of project performance (i.e., time, cost, and quality) are a subset of performance (Jugdev & Müller, 2005). We cannot detach performance from long term perspective of organizations (Shenhar et al., 1997). In this context, PBOs’ performance is measurement of project’s performance and stakeholders’ performance, which is representative of different dimensions of PBOs’ performance. Therefore, it is imperative to consider the full context of the performance.

**Genre of crisis**

We follow mostly widely accepted definition of crisis, "crisis is a low-probability, high impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly" (Pearson & Clair, 1998: 60).

The definition highlights three important aspects of a crisis. First, a crisis is a major, unpredictable event that is likely to interfere with normal business operations and has the potential to threaten organizational survival. Second, a crisis has a low probability of occurring and includes an element of surprise. Finally, a crisis is characterized by time pressures, requiring a quick decision/response in order to minimize its impact (Bonn & Rundle-Thiele, 2007). Examining the above definitions, there are few commonalities. First, a crisis is an unplanned event that has the potential of dismantling the internal and external structure of an organization. A crisis may affect not only the employees and other members internal to the organization, but also key stakeholders external to the organization. Second, a crisis may occur in any organization (small, medium and large and national or international) and in any industry, each will see their potential demise (Coleman, 2004; Keeffe & Darling, 2008; Fink, 1986). For example, non-profit organizations, governmental agencies, houses of worship, utilities, cooperatives, multinational organizations, and so forth are all susceptible to a crisis (Barton, 1993). Finally, a crisis may affect the legitimacy of an organization. In the event of a crisis, the media's influence on public perception may affect the livelihood of an organization. Media can influence public perception in regards to issues involving cause, blame, response, resolution, and consequences. Presented in a negative light, the legitimacy of an organization may be threatened (Ray, 1999).
A crisis is an unstable time or state of affairs in which a distinct possibility of a highly undesirable outcome or one with a distinct possibility of a highly desirable and extremely positive outcome (Darling, 1994). Moreover, Burnett (1998), Filipova (2010), Milburn et al. (1983) and Veil (2011) also describe that crisis does have positive and negative consequences. However, negative impact is still prevailing in interpreting crisis (Carone & Lorio, 2013). For those who work in the field of crisis management it is no longer a question of whether a major crisis will strike any organization, but only a matter of when, how, what form will it take, and who and how many will be affected? A crisis can be viewed as a threat to an organization (Allen & Caillouet, 1994). Crisis can present critical challenge to organization performance both externally and internally, and there is no guarantee that high performing organization will continue performing well during a crisis situation (Lin et al., 2006). Crisis can affect the performance (Altiok, 2011). Not all crises can be viewed from the same perspective; each crisis is unique and required different approaches and management techniques (Massey & Larsen, 2006). For managing crisis, it is essential to know different types of crisis, what has caused it, or what could cause it (Najafbagy, 2011). Crisis can be divided in to external and internal category. Internal refers to a crisis caused by something organization did by itself and relatively more controllable. External refers to a crisis caused by something outside the organization and relatively uncontrollable (Tah & Carr, 2001; Coombs & Holladay, 1996).

Corporate crises occur in many forms. To fully understand them a typology of crises is proposed by Shirvastava and Mitroff (1987), they categorize crises into four types. The framework consists of two dimensions, an internal-external and technical-social dimension. The internal-external dimension determines the source of the factors that result in crisis, which can be either failure of internal organization system or failure of the external environment of organizations. The technical-social dimension is employed to investigate the characteristic of factors that cause a crisis. These can be either technical/economic failures, or matter associated with human, organizational and social concerns. Mitroff (1988) recommend collapsing crisis types into clusters, families of similar crisis, developed group of crises according their underlying structural similarities. The contention is that similar crises, those in the same cluster, can be managed in similar ways (Pearson & Mitroff, 1993). Once crises are grouped, select a minimum of one crisis from each cluster, organization can prepare plans for each cluster, instead of generating plans for
every possible crisis type an organization might face. This way, organizations can avoid the tendency to prepare mainly for all crises and can thus begin to broaden their perspective about potential crises (Mitroff et al., 1987-1989). The reality is that not even a single organization can prepare for every single crisis. Table 1 (Appendix A) differentiates between crises that arise within the organization and those that arise outside it and also differentiates between crises caused by technical/economic breakdowns and those caused by people/organizational/social breakdowns. To fully understand them a typology of crises is suggested in Table 1 (Appendix A). Each crisis resulted from organization-environment interactions of socio-technical factors. Crisis can therefore be classified along an internal-external dimension, and a technical-social dimension (Shirvastava & Mitroff, 1987). Mitroff et al., (1987) and Shrivastava & Mitroff (1987) develop typology by classifying crisis on the bases of similarity by using these dimensions to classify different types of crisis; we follow their typology and have indicated four cells in table 1 (Appendix A). However, one should keep this in mind that it might be possible that not all types of crisis are equally relevant for PBOs.

***Insert Table 1 about here***

Cell 1 represents technical and economic failure in internal organizational systems. These are caused by failures in core technology of firms. Crisis in this cell are triggered by major industrial accidents, such as Bhopal, Three Mile Island, or Chernobyl. Defective plant equipment, design, or supplies are the primary cause of these crises. For example, in April, 1986, a reactor meltdown at a nuclear power plant in Chernobyl, in the Soviet Union, caused the deaths of about thirty people. Hundreds of thousands of people living in vicinity of plant were severely irradiated. Significant amounts of harmful radiation spread to fifteen neighboring countries causing extensive damage to standing crops, vegetation, and the natural environment. The estimated economic cost of radiation damage adds up to billions of dollars. Complete global health risks of this crisis are still not fully known (Shrivastava & Mitroff, 1987).

Cell 2 crises result primarily from technological and economic failure in the firms’ environment, causing crises within the organization. For example, hostile takeover attempts prompted by restructuring of industries, exchange rate changes, other macroeconomic forces, or attacks by
corporate raiders, can create crisis for corporations. Detail example: In May/June 1985, cheese contaminated with poisonous bacteria was sold in California. It caused the deaths of 84 people, and created a major public health risk in the state. The relatives of the victims sued the manufacturer, the Jalisco Cheese Company, for billions of dollars, forcing it into hostile takeover (Shrivastava & Mitroff, 1987).

Cell 3 represents failure in internal social processes and systems. These crises are primarily caused by operator or managerial errors, intentional harm by saboteurs or psychopaths, faulty control systems, unhealthy working conditions, and failure in decision making systems. Miscommunication of vital safety information, unsafe decisions, and deliberate harm result from these failures. The explosion of the space shuttle Challenger, that created a crisis for NASA and many of its sub-contractors, could be attributed to this type of failure (Shrivastava & Mitroff, 1987). On 28th January, 1986, the space shuttle challenger exploded 74 seconds after take-off killings all 6 crew members and one civilian passenger- the first teacher in space. This was a big failure for National Aeronautics and Space Administration (NASA). The explosion was caused by the failure of the right side solid rocket booster that powered the shuttle. The launch took place at very low temperature, which caused the seals of the solid booster malfunction. The problem was in the faulty design of booster seals (Shrivastava et al., 1988).

Cell 4 represents failure in social environment of corporations. These crises are caused when agents or institutions in social environment react adversely to corporation. Incidents of sabotage, terrorism, or off-site product tampering or misuse are examples of such failures (Shrivastava & Mitroff, 1987). For example, in 1982, dozens of Tylenol capsules were found contaminated with cyanide. Eight people who ingested these capsules died instantaneously. It created a nationwide public health risk and an internal crisis for Johnson and Johnson (J&J), the manufacturer of the capsules. The company immediately recalled the product on the retailers’ shelves at a cost of over 100 million dollars, changed its packaging to a triple tamper resistant package, and reintroduced the product into the market. In 1986 a second round of poisoning that killed one person in New York, confronting a loss in consumer confidence for the second time in four years, forced J&J to withdraw all its Tylenol capsules from the market at a loss of 150 million dollars. The company abandoned capsule from medication and had resign its production facility.
The full cost of withdrawing products from shelves and of switching from the production of capsules to other forms of medication has cost significantly more in range of 500 million dollars. Johnson & Johnson faced two crises: product sabotage and product recall (Shrivastava et al., 1988; Mitroff et al., 1988; Shrivastava & Mitroff, 1987).

**PBO Capabilities**

Capabilities are overwhelming elements in companies’ life (Rungi, 2014). Capability is seen as “the power or ability to do something” (Oxford Dictionaries, 2013). Usually, capabilities have been researched at an abstract level, “Capability” refers to the company’s ability to integrate, build and reconfigure its internal and external resources, skills and expertise to meet the needs of changing environment (Teece et al., 1997), only some works have paid attention to specific capabilities and few look several capabilities together. The organizational capabilities are feasible through individual skills, accumulated experiences, and organizational arrangements (Dosi et al., 2000). In other words, capabilities are what the firm can do with those resources. Since resources alone do not create value, a firm must draw upon the knowledge and experience or organizational capabilities (Chandler, 1990).

Project-based organizations (PBOs) have become a widespread form of organizations, ideally suited to deal with unstable and dynamic environments. The recent literature on project-intensive organizational settings has highlighted the interest on capabilities perspective in PBOs (Davies & Brady, 2000; Melkonia & Picq, 2011). The concept illustrates the set of skills inside a firm necessary for carrying out its vital operations. One of the most cited works on organizational capabilities in project-based organizations is done by Davies and Brady (2000). In addition to Chandler’s functional and strategic capabilities, they propose the concept of project capabilities. Chandler (1992) brought out the distinction between strategic capabilities (required to monitor internal operations and adjust strategies to a changing environment) and functional capabilities (distributed expertise required to produce standardized products and services). Project capabilities (based on routines and learning processes related to the execution of similar types of projects over time) are a third type of organizational capabilities, necessary to perform in turbulent environment (Davies & Brady 2000). These capabilities make it possible for firms to
conduct projects more effectively in turbulent environment. We focus on three types of capabilities: strategic, functional and project.

Strategies are based on the internal and external situations of the firm and are implemented by adapting strategic capabilities to environmental changes (Venkatraman, 1989). Strategic capability refers to a business' ability to successfully employ competitive strategies that allow it to survive and increase its value over time. We can say that strategic capability is responsible for managing competitiveness. The main essence of strategic capability in our study is dealing with strategy of the organization (PBO) in crisis, since strategy is the method or plan to get the desired goal when there is crisis you might/might not stick to the strategy that is pertinent in normal situation. There are several organizations in the market trying to achieve their desired goals so there is competition in the market. Strategic capability of the organization is to have different set of strategies to cope with crisis and also to achieve the desired goal in order to survive. It is crucial for top management to create flexibility of actions by effectively monitoring internal operations and adjusting strategies to a changing environment; since strategic management is responsible for the future direction of the corporation (Davies & Brady, 2000; Brady & Davies, 2004).

Functional capability is defined as task based capability, which enables companies to employ and develop the expertise that is needed for the firm’s operations and to perform regular activities. Functional capabilities are related to R&D, product design, production, distribution, purchasing, finance, marketing, obtaining supplies, improving existing products and processes and the development of new ones (Chandler 1992; Davies & Hobday, 2005). Functional capabilities are required to perform normal function and activities of firm. In PBOs we can say that functional capability is to design, produce, test and deliver the project and for that there are several activities from which a project has to go through. Functional capability reflects the ability to continue its day to day activities and perform its normal operations or return to normalcy. Functional capabilities are required to produce products and services (Brady & Davies, 2004).

Project capability address the ability of PBO to create lasting performance based on multiple short term projects (Davies & Brady, 2000). Project capabilities are the abilities required for
accomplishment of project. In project context, knowledge, experience and skills necessary to perform project activities constitute project capabilities (Söderlund, 2005; Davies & Brady, 2000). Project capability is the ability to complete project/s in crisis. Project capability is a third type of PBO capabilities, necessary to perform in turbulent environment (Thiry & Deguire, 2007).

Crisis is an incipient moment or crucial point it should never be wasted (Koronis & Ponis, 2013). It is evident that crisis is unpredictable, erratic and difficult to prevent. Different types of crisis may require a separate set of capability suitable for the specific crisis situation. Therefore, it is crucial that organization should be aware of different considerations and requirements of different types of crisis, and be flexible to handle/manage crisis. Operating under severe time pressure and highly ambiguous situation, an organization must draw upon capabilities to address crisis. Nevertheless, in most of crisis time, it is likely that an organization does not have all necessary capabilities to effectively manage crisis immediately. Even if they have, crisis may not repeat per se and given crisis solution might not be directly applicable to another crisis (Baker & Nelson, 2005). It is pivotal to strengthen PBO capabilities in a substantial way to better handle future crisis in an effective and efficient way. A capability that can’t handle crisis becomes less valuable whereas capability that can handle crisis become more valuable (Su et al., 2013). PBO capability has a moderating effect on the relationship between crisis and PBOs’ performance. To measure the concept of PBO capabilities, we used three capabilities i.e. strategic, functional and project capabilities. These capabilities can handle turbulent environment (internal and external) so it is appropriate for our study of internal and external crisis.

**Model & hypothesis**

***Insert Figure 1 about here***

**Hypotheses**

\( H_1: \) Internal crisis negatively influences PBO performance

\( H_{1a}: \) Internal social crisis negatively influences project performance

\( H_{1b}: \) Internal social crisis negatively influences stakeholder performance
H1c: Internal technical crisis negatively influences project performance
H1d: Internal technical crisis negatively influences stakeholder performance

H2: PBO performance is negatively influenced by external crisis
H2a: Project performance is negatively influenced by external social crisis
H2b: Stakeholder performance is negatively influenced by external social crisis
H2c: Project performance is negatively influenced by external technical crisis
H2d: Stakeholder performance is negatively influenced by external technical crisis

H3: PBO capability moderates the relationship between crisis (internal and external) and PBO performance.
H3a: Strategic capability moderates the relationship between crisis (internal social, technical and external social, technical) and PBO performance (project and stakeholder performance)
H3b: Functional capability moderates the relationship between crisis (internal social, technical and external social, technical) and PBO performance (project and stakeholder performance)
H3c: Project capability moderates the relationship between crisis (internal social, technical and external social, technical) and PBO performance (project and stakeholder performance).

Methodology
We have divided the description of our research methodology into three sub-sections: the questionnaire administration, the measurement of the research concepts and data analysis.

Population, sample and method of data collection
The population is comprised of Pakistani companies. The sample consists of data collected on projects based firms in Pakistan from information technology, telecom and construction industries. Why IT industry? IT industry from its nascent beginnings in the late 1980s, the industry has successfully arrived to a point where its value proposition has been validated over and over again. The largest members are grossing 15-25 million dollars in revenues, and receiving 100 million dollar valuations. Most tech companies are growing in excess of 30% a year annually. The industry today as a whole is doing over 2 billion dollars a year in revenue. 39% growth is expected in software and services sector for 2007-2008. About half of this growth
is coming from foreign, software and high end service projects. This industry growth in employment of professionals is 41%. Current growth rates indicate that the industry will exceed 11 Billion USD mark within the next 5 years. What other sectors and countries have achieved in 15-20 years, Pakistan’s technology scene is poised to achieve in less than a decade (PASHA, 2015). Why telecom sector: Annual revenues from telecom sector reached to an estimated US 4.65 billion during 2014, up from US 4.4 billion last year, and registering an annual growth of 5.6%. Despite slow economic growth of country, revenues of telecom sector are registering positive growth. During 2014, telecom sector of Pakistan witnessed revitalization with the advent of 3G/4G services and related activities. It is expected that introduction of next generation telecom services in the country will further boost the growth of telecom sector in Pakistan. The overall telecom investment reached US$1,815 million in 2014; an almost three times increase from the level of US$600 million from 2013. Almost half of telecom investment was in the form of foreign direct investment (FDI), telecom sector attracted over US$903 million of FDI in 2014, 34.2% of the total FDI received by Pakistan in that period. As far as employment is concerned this sector create around 2 million jobs (PTA, 2014). Why construction sector: Pakistan is a developing country that is currently enjoying relatively strong growth in construction activities. The share of construction in industrial sector is 11.48 percent and is one of the potential components of industries. Roughly 30-35% of employment is directly or indirectly affiliated with the construction sector. As such, the construction sector in Pakistan has played an important role in providing jobs and facilitating revival of the economy (Farooqui et al., 2008).

In selecting our target population, we retained only one criterion for IT companies which is the availability of the companies’ email address. Email addresses were collected from databases such as Pakistan software houses association (PASHA) and Pakistan software export board (PSEB-IT portal), but also directly from companies’ websites. Approximately 300 IT firms were contacted from PASHA (2014) and from IT Portal under PSEB (2015). Few of the companies are members of PASHA and PSEB as well, so we contacted them once. Each firm received an email in which we introduce and explain our research theme and request for appointment in order to verify that firms are project-based and to get insight about their working. From 300 firms approached by email, 85 IT firms agreed to participate and give time for meeting and 48
firms’ email addresses does not exist anymore so we get delivery error and were not able to contact them. After getting appointment, the researcher personally visited companies and in total we visited around 47 companies and few of the companies are accessed remotely via Skype. During the initial telephonic and email conversation, it was made clear to the representative of firm (CEO, HR manager and project manager) that this study is concerned about crisis in project-based organization only. Furthermore, initial interviews help us to come up with 70 out of 85 IT companies (software houses) that are project-based. These IT firms have divergent software projects including client based object oriented applications, client server PC solutions, web development, mainframe-based applications, mobile apps, and personal digital assistant technologies.

For telecom we used personal contacts, since the researcher worked in one of leading Telecom companies and we approached few of the people and ask them to provide contact details of officials working in other telecom companies. There are 20 big telecom companies in Pakistan, 18 were contacted and 16 agreed to participate in study. We contacted via, telephone and ask for appointment. We personally visited 10 companies and get insight and share details and requirement of study.

For construction companies, we asked the department of National University of Sciences and Technology, to provide the contact details of people working at construction sector. There are several big construction companies and we were able to gathered data from 20 construction companies. We contacted them by means of telephone and visited their offices if offices are situated in Islamabad and Rawalpindi, if the office is located in another city then we send questionnaire through emails.

Our research was conducted in two stages. In the first stage, we conducted interviews with organization representative at several companies, both to understand the nature of the organization and to examine the list of crisis and capability scales (shortlisted from literature) and to update list if they did not find a crisis they faced or capability they have for handling crisis in list. However, all of them agreed with crisis we mentioned and did not add any new crisis in list but they recommend minor changes in capability scales. In the second stage, we collected
data through the use of a survey instrument distributed to representative at a sample of firms. First, we did pilot testing of questionnaire using 12 project team members and senior management in IT, telecom and construction companies who already agreed to participate in research. The pilot survey was conducted to get feedbacks in terms of survey design, wording error, and explanation of main terms. On the basis of the pilot, we refined the questionnaire. We do 2nd round of pilot testing using 18 respondents. No changes were made to the questionnaire after the second pilot. The pilot data is not used for the final analysis.

After pilot test, we sent our questionnaire to 70 software houses and 16 telecom and 20 construction companies to participate in the Internet-based questionnaire. The questionnaire has been created on www.kwiksurvey.com, a website specialized in online data collection. We administered to the target companies on 1 July 2015 via the same website. An email was sent to all target companies. The email was comprised of an invitation letter explaining the purpose and the structure of the questionnaire and a link to the questionnaire. Approximately, 7 IT companies told us that they will not respond because they are busy around the time the survey reached them. 57 responses were received in the first week, 78 after the first reminder (given on 10th of July), second reminder was sent on 1st of August since there were Eid vacations for 15 days, we got 65 responses and last and third reminder was sent on 17th August, so 200 responses were gathered through internet based questions. However, we also provide 150 hard copies of our questionnaire to construction and telecom sector as few of the respondents prefer to fill hard copy of questionnaire. We received 102 responses back from them. So in total we received 302 questionnaires, in which 283 were the valid questionnaires, so we discarded 19 questionnaires which were not properly filled. Same surveys with same layout and scales were used. To encourage participation, we offered to provide a summary of the study’s results to company. We assured confidentiality to all respondents. The original questionnaire was developed and written in English, utilizing previously validated items and constructs to help ensure the validity of our measures. We used a snowball sampling approach to reach different stakeholders. We asked representatives of companies (to whom we took interviews) to send the questionnaire link to their project team members, senior management and client and to other organizations. Snowball sampling is commonly used when it is difficult to identify members of the desired population. The main problem is making initial contact. Once you have done this, these cases identify further
members of the population, who then identify further members, and so sample snowballs (Saunders et al., 2007).

Unit of analysis for this study is project-based organizations. The survey was divided into four sections: crisis (internal technical, external technical, internal social and external social), performance (project and stakeholder performance), and PBO capabilities (strategic, functional and project capabilities) and demographics (see table 2 appendix C).

**Measurement of concepts**

The measurement scales used in this research have already been used by other researchers in previous studies. All scales are five points Likert scale. Subsequently, we describe each of the constructs in detail and their underlying items used in the study.

**Independent variables**

*Genre of crisis:* Four dimensions of crisis were assessed: internal technical, external technical, internal social and external social. Although we do expect empirical differences for these four dimensions, that’s why we made the distinction between internal technical, external technical, internal social and external social crisis. We used 29 crisis questionnaire items; we used scales developed by Pearson & Mitroff (1993), Mitroff et al. (1988); Mitroff, et al., (1987-1989); Shrivastava & Mitroff (1987). Seven of which were associated with internal technical and external technical crises, ten were associated with internal social crisis and five items for external social crisis. This scale measures the different types of crisis and its extent in PBO. However, Harwati (2013) highlighted few of the same internal social crisis and Crandall et al., (2009), also confirmed internal technical crisis we used as item. Operationalization was done by using five point Likert scales ranging from rarely to very large extent. As the literature review section described the inconsistent direction (+ve, -ve) of crisis (could have negative and positive impacts), but it is more likelihood that crisis has a negative impact, so that we suppose that crisis do have negative impact.
**Moderating variables**

*PBO capabilities:* To measure the concept of PBO capabilities, we have three dimensions i.e. strategic, functional and project capabilities. Questions are assessed on a five point Likert scale from strongly disagree to strongly agree.

*Strategic capability:* we used a construct composed of seven-items. These items are taken from the scale developed by Ouakouak et al., (2014), Papke-Shields et al., (2006), Chandler (1992; 1990), Yu et al., (2014), the first item measures ability to make strategic decision more quickly than competitor, The second item reflects the organizations ability monitor internal operations, third item is to identify, create and exploit business opportunities, fourth item is ability to enhance generation of new ideas and initiative, fifth item assess to renew and change organizational strategy, sixth item is ability of the organization to adjust strategy in changing environment more quickly than their direct competitors and seventh item assess the ability to introduce new strategy.

*Functional capability* is composed of six items, items are developed by Chandler (1992; 1990), Menor et al., (2007) and Melkonia & Picq (2011). Respondents indicated the degree they agreed or disagreed with the following statements, first, ability to produce and perform regular activities, second, ability to respond to changing condition, third, to assess ability to produce standardized product/service, fourth, ability to continue operations in normal way, fifth, ability to employ and develop the expertise that are needed for the firm’s operations and sixth, ability to improve existing products, processes and development of new ones.

*Project capability* is composed of 4 items developed by Söderlund (2005), Davies & Hobday (2005) and Davies & Brady (2000). First item is knowledge, second item reflects skills, third item assesses experience and fourth item reflects routine practice.

**Dependent variables**

*PBO performance:* PBO performance has two types of performance i.e. project performance and stakeholder performance. Stakeholders are project team including project manager and others (customer, sponsor and top management) were asked the same questions.
Project performance: Project performance is based on the items for adherence to schedule and budget from Shenhar et al., (1997, 2001), Tukel & Rom (2001), and Matlz et al. (2003). The items for quality were adopted from Shenhar et al., (1997, 2001), and Turner & Muller (2004). Five point Likert items measured the combined level of performance in terms of time, cost, and quality (using 5 scale item for quality i.e. project feature, reliability, meeting technical specification, meeting operational specification, and achievement of project purpose).

Stakeholder performance: In this study, we have decided to use comparative stakeholder performances’ measures. To this end, we divided stakeholders into project team (engineer, project leader, project manager, project team, project team leader, and team member), project recipient (customer-client), and senior management (top management and sponsor). For project team, we used a thirteen-item scale. Four items of productivity, morale, accuracy of work produce and reputation of work excellence are developed and validated by Spekle & Verbeteen, (2014), we used other items developed by Belassi & Tukel (1996), Davis (2014), Yeung et al. (2009) and Matlz et al. (2003) that has been subsequently used in other studies (for example Baclay et al., 2010; Muller and Turner, 2007). For project recipient, we used 13 items developed by Shenhar et al. (1997), Pinto & Selvin (1987), Selvin & Pinto (1986) and Tukel & Rom (2001) that has been used in other studies like Din et al. (2011), Sethi & Iqbal (2008) and Matlz et al. (2003). We asked questions pertaining to customer satisfaction, meeting customer needs and requirements, solving customer problems, fulfilling customer expectation, customer utility, customer acceptance, responsiveness to requirements, customer consultation, customer preferences, repeat business with customer, customer focus and involvement, convenience of customer and customer loyalty and retention. We measure senior management performance with twelve items according to Davis (2014), Pinto & Selvin (1987, 1989), Belassi & Tukel (1996), Cleland & King (1983) and Baker et al. (1983). Questions contain these items, identification of objective, executive commitment, monitoring and feedback, top management support, access to resources, availability of resources, timely and comprehensive control, sufficient resource allocation, maximizing efficiency, developing a quality reputation, financial support and funding to complete project.
Control Variables

We used a control variable to reduce “noise” in analyses. We controlled for the following five variables: organization size, organization age, project team size, project duration, and industry type.

Organization size: The link between crisis, performance, and capability may vary for firms operating on different scales. Firm capabilities are deeply embedded in organizational processes and routines (Day, 1994). Larger firms are idiosyncrasies, in which multiple organizational routines coexist. Furthermore, larger organizations are characterized by more complex routines and processes, all of which would be more difficult for competitors to imitate. Therefore, the capability may be stronger for large firms than of small firms. We controlled for firm size due to large firms’ propensity to input more resources into R&D activities and introduce more new projects than the smaller firm. In addition, researchers find a positive association between firm size and performance (Bantel & Jackson, 1989).

Organization age: Organization age does have influence on crisis, performance, and capability. Flexibility is decreased as age is increased; companies restrict itself to the traditional way of working (specific formula of handling crisis) and avoid trying new solutions.

Project team size: Team size varies from project to project. Project does have different number of project members. Team size might influence the performance. As project team size varies at different phases of project; if team is small then adding and dropping one individual influence (Bantel & Jackson, 1989).

Project duration: Duration is an important control variable since longer projects are more prone to cost overruns, either due to forecasting difficulties or employee attrition. We measure project duration as the actual months taken for project completion.

Industry domains: The firm we studied executed projects for clients in multiple industries i.e. IT, telecom, and construction. Since the impact of a crisis on PBOs’ performance varies with industry type and PBO capabilities may not be entirely fungible across industry domains. We
include industry dummies to control for industry-specific differences. We included four dummy variables for IT, telecom, construction and others.

**Results**

The table 2 (appendix C) presents the profile of data collected from questionnaires. Among the companies, construction, IT, and telecom represented 20%, 48%, and 26% respectively. 6% of respondents were from engineering companies specified in category of others. 75% of the organizations belong to private sector; whereas 11% were public organizations and 14% were semi-government. In term of respondents’ position, 44% of them were project team, 27% were project manager, 19% were senior management, and 9% were customer-client. Among the company foundation of the respondents 3% were start-up, 10% were up to three years and 11% of them were up to 5 years, while 76% were established more than 5 years ago. Respondents’ company size was 8% for less than 20 employees, 10% between 20 to 30 employees, 12% between 31-50 employees and 23% of number of employees between 51-250, whereas 14% of number of employees between 251 to 500 and 32% were having more than 500 employees.

***Insert Table 2 about here***

We applied test on hypotheses 1, 2 and 3 and sub-hypotheses. Hypotheses 1, 2 and 3 are describing the overall impact, like hypothesis 1 internal crisis influences PBO’s performance but in sub-hypotheses we go more in detail by looking in to each internal crisis (internal technical and internal social) and looking in to each PBOs’ performance (project performance and stakeholder performance).

**Reliability**

For measuring reliability, we used two reliability tests: Composite reliability and Cronbach alpha. Reliability is internal consistency (Iconaru, 2013). Table 3 contains (Appendix D) the coefficient of internal consistency indicators for hypotheses 1, 2 and 3. Table 4 (Appendix D) contains the coefficient of internal consistency indicators of the sub-hypothesis of 1, 2 and 3. Composite reliability and Cronbach alpha coefficients are greater than the critical value of 0.7.
(Fornell & Larcker, 1981; Nunnaly, 1978), so we can state that the measurements are highly reliable which means each set of indicators belongs to a particular latent variable.

Validity
Analyze whether the measurement is valid or not. There are two kinds of measurements convergent and divergent validity. Convergent validity is represented by indicators loading and cross loading. Convergent validity evaluates the score of indicators that are supposed to measure the same construct (Iconaru, 2013). Loadings must be equal to or greater than 0.5 for convergent validity to be considered acceptable (Hair et al., 2009, Kline, 1998). All the loading coefficients are above threshold at p value <0.05. Table 5 (Appendix E) shows the correlations among latent variables and square-roots of the average variance extracted (AVEs) for each latent variable. The square-roots of the AVEs are shown in the diagonal within the parentheses. These coefficients are used to test the discriminant/divergent validity of the measurement instrument. Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. Thus, establishing discriminant validity implies that a construct is unique and capture phenomena not represented by other constructs in the model (Hair et al., 2014). It was assessed following Fornell and Larcker approach comparing square roots of AVE of each latent variable (LV) with all the other correlations of that LV with other latent variables (Fornell & Larcker, 1981). The number of diagonal should always be higher, for acceptable discriminant validity. However, Internal and external crisis are not discriminate valid because in internal crisis we have both social and technical crisis and same is the case with external crisis that we have social and technical crisis. So we can’t only group them in internal and external but also in social and technical crisis. In our case, internal crisis has social and technical crisis and external crisis has social and technical crisis so there might be some similarity between technical crisis for internal and external and likewise social crisis also have commonality even if they belong to internal and external crisis. Same explanation is valid for interaction terms PBC*INC and PBC*EXC.

Co-linearity (VIF)
In full co-linearity test, variance inflation factors (VIFs) are generated for all latent variables in a model. VIFs should be less than 5. If it is higher, it suggests existence of co-linearity in the structural equation modeling (SEM) (Kock & Lynn, 2012; Hair et al., 2014). In table 6
VIFs for all latent variables are less than 5, so we can say that our SEM is free from co-linearity. However, in table 7 (Appendix F), some of the interaction terms have VIF more than 5, but it can be expected as in interaction terms VIF is usually higher. As we have multiple latent variables so in our case SEM is free from multi-co linearity.

**Structural equation modeling (SEM) (hypothesis)**

The SEM analysis was performed in figure 2 (Appendix G) having PBOs’ capability as a moderator between internal, external crises and PBOs’ performance. We used Warppls to conduct SEM (to assess the relationship between internal, external crises, PBOs’ performance and project-based organization capability). The path diagram (Appendix G) illustrates the outcome of the SEM.

Table 8 (Appendix H) presents the path coefficients. The moderation effect is associated with an interaction effect. The sign and power of the path coefficient refers to the effect and intensity of relationship. Internal crisis negatively influences performance and it is significant at the p value of 0.05. So hypothesis 1 was supported. External crisis positively influences performance of project-based organization and it is also significant at 0.01. However, hypothesis 2, we can say it is not supported as external crisis affect the performance positively, not negatively as we hypothesized. Team sizes (Tsize), last project duration (Pdur), organization size (Orsize), organization age (Orgage) and industry type (Intype) are the control variables, which are significant except organization size. Project-based organization capability (PBC) is moderating the relationship between internal, external crises and performance of project-based organization. PBOs’ capability is acting as a moderator and is significant so hypothesis 3 was supported.
Structural equation modeling (sub-hypothesis)

The SEM analysis was performed having strategic capability, functional capability and project capability as moderators between internal technical, internal social, external technical and external social crises and project performance and stakeholder performance. The path diagram (Figure 3, Appendix I) illustrates the outcome of SEM.

According to table 9 (Appendix J), Internal social crisis negatively influences project performance and stakeholder performance and both are significant at the p value of 0.01. So hypothesis $H_{1a}$ and $H_{1b}$ were supported. Internal technical crisis negatively influences project performance but positively influences the stakeholder and it is significant at the p value of 0.1 and 0.01. So we can say hypothesis $H_{1c}$ was supported whereas hypothesis $H_{1d}$ was not supported. External social crisis positively influences project and stakeholder performance, however they were not significant, so hypothesis $H_{2a}$ and $H_{2b}$ were not supported. Furthermore, external technical crisis was positively influences project and stakeholder performance, so we can say hypothesis $H_{2c}$ and $H_{2d}$ were not supported as external technical crisis affect the project and stakeholder performance positively, not negatively as we hypothesized. Team sizes (Tsize), last project duration (Pdur), organization size (Orsize), organization age (Orgage) and industry type (Intype) are the control variables, which are significant except organization size. Strategic capability (SC), functional capability (FC) and project capability (PC) are moderating the relationship between internal (social and technical) and external (social and technical) crises and project and stakeholder performances.

Strategic capability (SC) moderates the relationship between internal social crisis and project performance and relationship between internal social crisis and stakeholder performance positively. However, strategic capability does not moderate relationship between internal technical, external social crisis and project performance and stakeholder performance. It does not moderate external technical crisis and stakeholder performance but it positively moderates the relationship between external technical crisis and project performance. So we can say that $H_{3a}$ is partially supported. Functional capability (FC) moderates relationship of internal social crisis and
project performance negatively. FC positively moderates the relationship between internal social crisis and stakeholder performance. Same is the case with internal technical crisis, functional capability moderates the relationship between internal technical crisis and project performance negatively and stakeholder performances positively. Functional capability does moderate external (social, technical) crisis and project and stakeholder performances negatively. The path coefficients of FC are significant. So hypothesis $H_{3b}$ was fully supported. Project capability (PC) does not moderate relationship of internal social crisis and project performance, internal technical crisis and stakeholder performance, external social crisis and project performance and stakeholder performance and external technical crisis and project performance. However, PC moderates internal social crisis and stakeholder performance negatively. Same is the case with the external technical crisis and stakeholder performance. It also moderates internal technical crisis and project performance negatively. Since project capability is partially moderating the relationship so we can say that $H_{3c}$ is partially supported.

**Discussion**

This paper advances the understanding of different types of crisis in PBO and their impact on PBOs’ performance and the capabilities required for their management.

**Crisis and PBO performance**

In the first model, project-based organization was taken as dependent variable (Figure 2, Table 8) (Appendices G and H) whereas in second model presented in Figure 3 (Appendix I) and Table 9 (Appendix J), we relied on two dependent variables (project performance and stakeholder performance). By looking at these tables, we can say that we have crises with negative and positive impact on performance. The statistically negative relationship found between performance and internal crisis, more specifically between internal social crisis and project performance, between internal social crisis and stakeholder performance and between internal technical crisis and project performance. However, internal technical crisis is having positive relationship with stakeholder performance. So this is an interesting finding that a crisis might have different impact on project and stakeholder performance. While there is positive relationship between external crisis and project-based organization; particularly between external technical crisis, project performance and stakeholder performance. This is consistent with
previous research (Darling, 1994; Burnett, 1998; Filipova, 2010; Milburn et al., 1983; Veil, 2011) as crisis can have negative and positive impact. However, among our formulated hypotheses, the relationship between external social crisis and performance (project and stakeholder performance) was not confirmed.

**PBO capabilities**

Our study clearly documents that capabilities moderate the relationship between crises and performance. Whereas strategic, functional and project capabilities are acting as moderators between internal social, internal technical, external social and external technical crises and project and stakeholder performances (see table 9, appendix J). In table 8 (Appendix H), PBC is moderating relationship between internal and external crises and performance of project-based organization. The relation between internal crisis and performance was negative and since it is a negative path coefficient of an effect that moderates a negative direct relationship. Accordingly, negative relationship between internal crisis and performance of PBOs will go up with PBOs’ capability. In other words, we find that PBC enhances the negative relationship of internal crisis and PBOs’ performance. This is not desirable. The path coefficient of moderating effect for external crisis and PBOs’ performance is positive and it moderates a positive direct relationship of external crisis and performance of PBOs, so we can say as PBOs’ capability increases the positive impact of external crisis on PBOs’ performance. However, the predominant view in prior research is that capabilities are positively associated with performance (Day, 1994). Nevertheless, several studies report that capabilities might even have a negative influence on firm performance (Haas & Hansen, 2005; Leonard-Barton, 1992). It allies with our study as PBO capability is moderating PBOs’ performance positively and negatively as well. We can get better insight and substance by looking into each capability separately which will represent the capabilities that would aid PBOs in managing crises.

**Project performance**

If we looked into the path coefficients of internal social and project performance, it is negative and significant, but strategic capability coefficients are positive, which means that strategic capability reduces the negative impact of internal social crisis and project performance. Meanwhile the relationship between external technical crisis and project performance was
moderated positively so strategic capability maximize the positive impact of external technical crisis for project performance. Relationship between external technical crisis and project performance is positive, it means that strategic capability would help to enhance and get the positive impact, so it is intensifier as we are not using strategic capability to deal with negativity of crisis. Hence, we can say strategic capability is minimizing negative impact of internal social and maximizing positive impact of external technical crisis on project performance. However, functional capability is only increasing the negative influence of these crises, so we should avoid functional capabilities while we are dealing with project performance. Project capability also increases the negative impact of internal technical crisis on project performance, which is not desirable. Baker and Nelson (2005) said that in most crises, it is likely that an organization does not have all of the necessary capabilities to effectively respond. Same is the case here, that PBOs don’t have capability that is reducing the negative impact of internal technical crisis on project performance. As external social crisis is not significant so we are not interested to know the capabilities that are impacting it. We can say strategic capability is valuable for project performance.

**Stakeholder performance**
The impact of internal social on stakeholder performance is negative and significant, strategic capability is positively moderating the negative relationship, which means that strategic capability reduces the negative impact of internal social crisis on stakeholder performance. Functional capability is positively moderating internal social and internal technical crisis for stakeholder performance while it is negatively moderating the positive relationship of external technical crisis and stakeholder performance, we should not use functional capability for external technical crisis. This is consistent with prior research as different kinds of crisis may require a separate set of capabilities suitable for specific crisis situation (Baker & Nelson, 2005). Project capability is increasing negative relationship between internal social and stakeholder performance and between external technical and stakeholder performance, we should avoid project capability. One of the reasons is that project capability is constitute of the practiced routines, skills, knowledge and experience (Söderlund, 2005) but crises may not repeat themselves so experience and knowledge of one crisis might not be applicable for another crisis...
(Baker & Nelson, 2005). We should only consider strategic and functional capability for stakeholder performance.

However, it is bit tricky, since functional capability is influencing internal social and internal technical crisis for project performance negatively, it means that these capabilities, would increase the negative impact of internal social and internal technical crises for project performance, while for stakeholder performance, functional capability reduces the negative impact of internal social and internal technical crises. So it is important to be very careful while using functional capabilities because it might have different impact on same crisis while dealing with project performance and stakeholder performance. According to Hobday (2000), PBOs organize their capabilities around the needs (crisis) of projects (Hobday, 2000).

**Conclusion**

Within this study, we investigated different types of crisis that could impact performance and project-based organization capability to handle these crises. The uniqueness of this paper is the research context, crisis has not been in focus and PBO capabilities have not been investigated before in project-based organization settings. PBOs’ performance is affected from internal social, internal technical and external technical crises. More specifically internal social crisis for project performance and stakeholder performance and internal technical crisis for project performance are in line with our hypotheses. Internal technical crisis for stakeholder performance and external technical crisis for project and stakeholder performances are not. External social crisis does not have any impact on PBOs. Strategic capability moderates the relationship of internal social crisis for project and stakeholder performance and also relationship between external technical crisis and project performance. While functional capability moderates the internal social, internal technical, external social and external technical crises for project performance and stakeholder performance. Project capability positively moderates the relationship of internal technical crisis and project performance. Some interesting findings were identified, as capability influence is not only positive. Functional capability negatively influences internal (social and technical) and external (social, technical) crises for project performance and external (social and technical) crisis for stakeholder performance; project capability negatively influences relationship between
internal social crisis and stakeholder performance and external technical crisis for stakeholder performance.

This study contributes to the literature on project-based organization in several ways. First we introduce the construct of stakeholder performance as part of PBOs’ performance. As we believe project performance is not true representation of PBOs’ performance. By having project performance and stakeholder performance in our framework lays the foundation for real substance of PBOs’ performance. Second, for the first time, we provide quantitative empirical evidence for the relevance of different types of crisis in project-based organization setting. Different types of crisis might impact performance differently, so there is need to identify crisis in project-based organization setting. Third, we introduced project-based organization capability as a moderator between crisis and PBOs’ performance. As we believe different types of crisis might require different capabilities and our findings support this argument. Our research offers a deeper understanding of different types of crisis (internal social, internal technical, external social and external technical), their impact on performance (project performance and stakeholder performance) and project-based organization capability (strategic, functional and project capabilities) to handle these crises.

From practitioners’ point of view, the finding highlights the importance of identification and management of crisis in temporary organization. Our study highlights internal social, internal technical and external technical crises impact project and stakeholder performance. Managers can use this knowledge as a foundation for planning crisis management. Moreover, strategic, functional and project capabilities are dealing with different types of crisis, this would help practitioners to enhance the appropriate capability for specific crisis, finding also support that not all capabilities are equally relevant for all types of crisis.

There are several limitations for this study. First, limitation is that single method of data collection, limited sample size and cross-sectional design was taken into account. Second, the study was limited to project-based organizations from Pakistan. Therefore, result may consider valid in this particular context. Different countries might face and handle crisis differently. Future studies can investigate the same study but in different countries to see whether the
findings explore the influence of culture and can also do cross comparisons between different countries. Another strong candidate for future research would be the role of emotions in crisis; it might impact the emotions which in turn affect the capability to respond. We did not consider the financial performance of project-based organizations, so this could be a topic for future research as well.

References


## Table 1: Different typologies of crisis

<table>
<thead>
<tr>
<th></th>
<th>Technical/ Economic crisis</th>
<th>Social crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal</strong></td>
<td><strong>Cell 1</strong></td>
<td><strong>Cell 3</strong></td>
</tr>
<tr>
<td></td>
<td>Product/ service defect</td>
<td>Organizational breakdown</td>
</tr>
<tr>
<td></td>
<td>Computer breakdown</td>
<td>Miscommunication</td>
</tr>
<tr>
<td></td>
<td>Bankruptcy</td>
<td>Sexual harassment</td>
</tr>
<tr>
<td></td>
<td>Defective/ undisclosed information</td>
<td>On-site product tampering</td>
</tr>
<tr>
<td></td>
<td>Plant defects</td>
<td>Illegal activities</td>
</tr>
<tr>
<td><strong>External</strong></td>
<td><strong>Cell 2</strong></td>
<td><strong>Cell 4</strong></td>
</tr>
<tr>
<td></td>
<td>Industrial accidents</td>
<td>Executive kidnapping</td>
</tr>
<tr>
<td></td>
<td>Natural disaster</td>
<td>Terrorism</td>
</tr>
<tr>
<td></td>
<td>Hostile overtakes</td>
<td>Boycotts</td>
</tr>
<tr>
<td></td>
<td>Large scale systems failure</td>
<td>Labor strike/ work stoppage</td>
</tr>
<tr>
<td></td>
<td>Societal crisis (Civil and political)</td>
<td>Off-site product tampering</td>
</tr>
</tbody>
</table>
Appendix B

Figure 1: Research model
### Appendix C

**Table 2: Demographics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of company</strong></td>
<td>Construction</td>
<td>55</td>
<td>19.43</td>
</tr>
<tr>
<td></td>
<td>IT</td>
<td>137</td>
<td>48.41</td>
</tr>
<tr>
<td></td>
<td>Telecom</td>
<td>74</td>
<td>26.15</td>
</tr>
<tr>
<td></td>
<td>Other (specify)</td>
<td>17</td>
<td>6.01</td>
</tr>
<tr>
<td><strong>Sector</strong></td>
<td>Private</td>
<td>214</td>
<td>75.62</td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>30</td>
<td>10.60</td>
</tr>
<tr>
<td></td>
<td>Semi-government</td>
<td>39</td>
<td>13.78</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>283</td>
<td>100</td>
</tr>
<tr>
<td><strong>Your position</strong></td>
<td>Project manager</td>
<td>76</td>
<td>26.85</td>
</tr>
<tr>
<td></td>
<td>Project team</td>
<td>127</td>
<td>44.87</td>
</tr>
<tr>
<td></td>
<td>Senior management</td>
<td>52</td>
<td>18.44</td>
</tr>
<tr>
<td></td>
<td>Customer-client</td>
<td>26</td>
<td>9.18</td>
</tr>
<tr>
<td></td>
<td>Other (specify)</td>
<td>1</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>282</td>
<td>99.65</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>0.35</td>
</tr>
<tr>
<td><strong>Company foundation</strong></td>
<td>Start up</td>
<td>7</td>
<td>2.47</td>
</tr>
<tr>
<td></td>
<td>1-3 years</td>
<td>29</td>
<td>10.24</td>
</tr>
<tr>
<td></td>
<td>3-5 years</td>
<td>31</td>
<td>10.95</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 years</td>
<td>214</td>
<td>75.61</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281</td>
<td>99.29</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>2</td>
<td>0.70</td>
</tr>
<tr>
<td><strong>Number of employees</strong></td>
<td>&lt;20</td>
<td>23</td>
<td>8.12</td>
</tr>
<tr>
<td></td>
<td>20-30</td>
<td>29</td>
<td>10.24</td>
</tr>
<tr>
<td></td>
<td>31-50</td>
<td>35</td>
<td>12.36</td>
</tr>
<tr>
<td></td>
<td>51-250</td>
<td>65</td>
<td>22.96</td>
</tr>
<tr>
<td></td>
<td>251-500</td>
<td>39</td>
<td>13.78</td>
</tr>
<tr>
<td></td>
<td>&gt;500</td>
<td>90</td>
<td>31.80</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>281</td>
<td>99.29</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>2</td>
<td>0.70</td>
</tr>
<tr>
<td><strong>Last project’s duration</strong></td>
<td>&lt;3</td>
<td>55</td>
<td>19.43</td>
</tr>
<tr>
<td></td>
<td>3-6</td>
<td>58</td>
<td>20.49</td>
</tr>
<tr>
<td></td>
<td>7-12</td>
<td>43</td>
<td>15.19</td>
</tr>
<tr>
<td></td>
<td>13-18</td>
<td>55</td>
<td>19.43</td>
</tr>
<tr>
<td></td>
<td>18-24</td>
<td>21</td>
<td>7.42</td>
</tr>
<tr>
<td></td>
<td>&gt;24</td>
<td>48</td>
<td>16.96</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>98.92</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>3</td>
<td>1.06</td>
</tr>
<tr>
<td>Last project’s team size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>---</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>145</td>
<td>51.23</td>
<td></td>
</tr>
<tr>
<td>16-25</td>
<td>42</td>
<td>14.84</td>
<td></td>
</tr>
<tr>
<td>26-35</td>
<td>27</td>
<td>9.54</td>
<td></td>
</tr>
<tr>
<td>36-50</td>
<td>20</td>
<td>7.06</td>
<td></td>
</tr>
<tr>
<td>&gt;50</td>
<td>46</td>
<td>16.25</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>98.92</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>1.06</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix D

#### Table 3: Reliability coefficients (Hypothesis)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s alpha</th>
<th>Composite reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal crisis</td>
<td>0.917</td>
<td>0.928</td>
</tr>
<tr>
<td>External crisis</td>
<td>0.926</td>
<td>0.937</td>
</tr>
<tr>
<td>Project based organization performance</td>
<td>0.981</td>
<td>0.982</td>
</tr>
<tr>
<td>Project based organization capabilities</td>
<td>0.947</td>
<td>0.953</td>
</tr>
<tr>
<td>Team size</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Project duration</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Organization size</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Organization age</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Industry type</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Project based organization capability* Internal crisis</td>
<td>0.988</td>
<td>0.988</td>
</tr>
<tr>
<td>Project based organization capability* External crisis</td>
<td>0.985</td>
<td>0.985</td>
</tr>
</tbody>
</table>

#### Table 4: Reliability coefficients (sub-hypothesis)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s alpha</th>
<th>Composite reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal social crisis</td>
<td>0.907</td>
<td>0.924</td>
</tr>
<tr>
<td>Internal technical crisis</td>
<td>0.809</td>
<td>0.860</td>
</tr>
<tr>
<td>External social crisis</td>
<td>0.853</td>
<td>0.895</td>
</tr>
<tr>
<td>External technical crisis</td>
<td>0.901</td>
<td>0.922</td>
</tr>
<tr>
<td>Project performance</td>
<td>0.918</td>
<td>0.935</td>
</tr>
<tr>
<td>Stakeholder performance</td>
<td>0.982</td>
<td>0.983</td>
</tr>
<tr>
<td>Strategic capability</td>
<td>0.905</td>
<td>0.925</td>
</tr>
<tr>
<td>Functional capability</td>
<td>0.890</td>
<td>0.916</td>
</tr>
<tr>
<td>Project capability</td>
<td>0.866</td>
<td>0.909</td>
</tr>
<tr>
<td>Team size</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Project duration</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Organization size</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Organization age</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Industry type</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Strategic capability* Internal social crisis</td>
<td>0.969</td>
<td>0.970</td>
</tr>
<tr>
<td>Strategic capability* Internal technical crisis</td>
<td>0.949</td>
<td>0.953</td>
</tr>
<tr>
<td>Strategic capability* External social crisis</td>
<td>0.940</td>
<td>0.945</td>
</tr>
<tr>
<td>Strategic capability* External technical crisis</td>
<td>0.962</td>
<td>0.964</td>
</tr>
<tr>
<td>Functional capability* Internal social crisis</td>
<td>0.965</td>
<td>0.967</td>
</tr>
<tr>
<td>Functional capability* Internal technical crisis</td>
<td>0.934</td>
<td>0.940</td>
</tr>
<tr>
<td>Functional capability* External social crisis</td>
<td>0.915</td>
<td>0.924</td>
</tr>
<tr>
<td>Functional capability* External technical crisis</td>
<td>0.956</td>
<td>0.959</td>
</tr>
<tr>
<td>Project capability* Internal social crisis</td>
<td>0.960</td>
<td>0.962</td>
</tr>
<tr>
<td>Project capability* Internal technical crisis</td>
<td>0.906</td>
<td>0.918</td>
</tr>
<tr>
<td>Project capability* External social crisis</td>
<td>0.899</td>
<td>0.913</td>
</tr>
<tr>
<td>Project capability* External technical crisis</td>
<td>0.954</td>
<td>0.958</td>
</tr>
</tbody>
</table>
### Appendix E

**Table 5: Latent variable Correlations with square roots of AVEs on diagonal**

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>Tsize</th>
<th>PDur</th>
<th>Orsize</th>
<th>Orgage</th>
<th>Intype</th>
<th>INC</th>
<th>EXC</th>
<th>PBOP</th>
<th>PBC</th>
<th>PBC*INC</th>
<th>PBC*EXC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tsize</td>
<td>2.21</td>
<td>1.53</td>
<td>(1.000)</td>
<td>0.54***</td>
<td>0.46***</td>
<td>0.24***</td>
<td>-0.12**</td>
<td>0.05</td>
<td>0.03</td>
<td>0.15**</td>
<td>0.07</td>
<td>-0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td>PDur</td>
<td>3.26</td>
<td>1.72</td>
<td>0.54***</td>
<td>(1.000)</td>
<td>0.37***</td>
<td>0.18***</td>
<td>-0.10*</td>
<td>-0.001</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td>Orsize</td>
<td>4.2</td>
<td>1.63</td>
<td>0.46***</td>
<td>0.37***</td>
<td>(1.000)</td>
<td>0.44***</td>
<td>0.14**</td>
<td>0.05</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.12**</td>
<td>0.11**</td>
</tr>
<tr>
<td>Orgage</td>
<td>3.6</td>
<td>0.77</td>
<td>0.24***</td>
<td>0.18***</td>
<td>0.44***</td>
<td>(1.000)</td>
<td>-0.02</td>
<td>0.03</td>
<td>0.03</td>
<td>0.08</td>
<td>0.06</td>
<td>0.12**</td>
<td>0.11*</td>
</tr>
<tr>
<td>Intype</td>
<td>2.18</td>
<td>0.814</td>
<td>-0.12**</td>
<td>-0.10*</td>
<td>0.14**</td>
<td>-0.02</td>
<td>(1.000)</td>
<td>0.17***</td>
<td>0.20***</td>
<td>-0.15***</td>
<td>-0.22***</td>
<td>0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td>INC</td>
<td>35.82</td>
<td>12.23</td>
<td>0.05</td>
<td>-0.001</td>
<td>0.05</td>
<td>0.03</td>
<td>0.17***</td>
<td>(0.66)***</td>
<td>0.80***</td>
<td>0.009</td>
<td>-0.09</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>EXC</td>
<td>23.54</td>
<td>10.05</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.20***</td>
<td>0.80***</td>
<td>(0.74)***</td>
<td>0.03</td>
<td>-0.23***</td>
<td>0.03</td>
<td>-0.007</td>
</tr>
<tr>
<td>PBOP</td>
<td>120.04</td>
<td>33.67</td>
<td>0.15**</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.08</td>
<td>-0.15***</td>
<td>0.009</td>
<td>0.03</td>
<td>(0.76)***</td>
<td>0.35***</td>
<td>-0.16***</td>
<td>-0.06</td>
</tr>
<tr>
<td>PBC</td>
<td>64.66</td>
<td>12.06</td>
<td>0.07</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.06</td>
<td>-0.22***</td>
<td>-0.09</td>
<td>-0.23***</td>
<td>0.35***</td>
<td>(0.73)***</td>
<td>-0.18***</td>
<td>0.06</td>
</tr>
<tr>
<td>PBC*INC</td>
<td>-0.07</td>
<td>-0.05</td>
<td>0.12**</td>
<td>0.12**</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
<td>-0.16***</td>
<td>-0.18***</td>
<td>(0.47)***</td>
<td>0.76***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBC*EXC</td>
<td>-0.01</td>
<td>-0.06</td>
<td>0.11**</td>
<td>0.11*</td>
<td>-0.03</td>
<td>0.04</td>
<td>-0.007</td>
<td>-0.06</td>
<td>0.06</td>
<td>0.76***</td>
<td>(0.50)***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6: Full co-linearity VIFs estimates (hypothesis)

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal crisis</td>
<td>1.272</td>
</tr>
<tr>
<td>External crisis</td>
<td>1.212</td>
</tr>
<tr>
<td>Project based organization performance</td>
<td>1.258</td>
</tr>
<tr>
<td>Project based organization capabilities</td>
<td>1.579</td>
</tr>
<tr>
<td>Team size</td>
<td>1.206</td>
</tr>
<tr>
<td>Project duration</td>
<td>1.185</td>
</tr>
<tr>
<td>Organization size</td>
<td>1.037</td>
</tr>
<tr>
<td>Organization age</td>
<td>1.036</td>
</tr>
<tr>
<td>Industry type</td>
<td>1.123</td>
</tr>
<tr>
<td>Project based organization capability* Internal crisis</td>
<td>4.277</td>
</tr>
<tr>
<td>Project based organization capability* External crisis</td>
<td>4.263</td>
</tr>
</tbody>
</table>

Table 7: Full co-linearity VIFs estimates (sub-hypothesis)

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal social crisis</td>
<td>1.286</td>
</tr>
<tr>
<td>Internal technical crisis</td>
<td>1.784</td>
</tr>
<tr>
<td>External social crisis</td>
<td>1.419</td>
</tr>
<tr>
<td>External technical crisis</td>
<td>1.634</td>
</tr>
<tr>
<td>Project performance</td>
<td>1.184</td>
</tr>
<tr>
<td>Stakeholder performance</td>
<td>1.289</td>
</tr>
<tr>
<td>Strategic capability</td>
<td>1.878</td>
</tr>
<tr>
<td>Functional capability</td>
<td>1.708</td>
</tr>
<tr>
<td>Project capability</td>
<td>2.262</td>
</tr>
<tr>
<td>Team size</td>
<td>1.513</td>
</tr>
<tr>
<td>Project duration</td>
<td>1.475</td>
</tr>
<tr>
<td>Organization size</td>
<td>1.126</td>
</tr>
<tr>
<td>Organization age</td>
<td>1.203</td>
</tr>
<tr>
<td>Industry type</td>
<td>1.296</td>
</tr>
<tr>
<td>Strategic capability* Internal social crisis</td>
<td>2.356</td>
</tr>
<tr>
<td>Strategic capability* Internal technical crisis</td>
<td>2.382</td>
</tr>
<tr>
<td>Strategic capability* External social crisis</td>
<td>2.450</td>
</tr>
<tr>
<td>Strategic capability* External technical crisis</td>
<td>5.917</td>
</tr>
<tr>
<td>Functional capability* Internal social crisis</td>
<td>2.001</td>
</tr>
<tr>
<td>Functional capability* Internal technical crisis</td>
<td>2.386</td>
</tr>
<tr>
<td>Functional capability* External social crisis</td>
<td>2.504</td>
</tr>
<tr>
<td>Functional capability* External technical crisis</td>
<td>9.910</td>
</tr>
<tr>
<td>Project capability* Internal social crisis</td>
<td>2.304</td>
</tr>
<tr>
<td>Project capability* Internal technical crisis</td>
<td>3.051</td>
</tr>
<tr>
<td>Project capability* External social crisis</td>
<td>4.483</td>
</tr>
<tr>
<td>Project capability* External technical crisis</td>
<td>4.592</td>
</tr>
</tbody>
</table>
Appendix G

Figure 2: Path diagram

INC= Internal crisis, EXC=External crisis
PBOP= Project based organization performance, PBC=Project based organization’s capability
Tsize=Team size, PDur=Project duration, OrSize=Organization size, Orgage= Organization age, Intype=Industry type
Table 8: Path coefficient

<table>
<thead>
<tr>
<th>Path</th>
<th>Coefficient</th>
<th>Hypothesis supported/ not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal crisis - project based organization performance</td>
<td>-0.081**</td>
<td>Supported</td>
</tr>
<tr>
<td>External crisis - project based organization performance</td>
<td>0.130***</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team size</td>
<td>0.170***</td>
<td></td>
</tr>
<tr>
<td>Project duration</td>
<td>-0.152***</td>
<td></td>
</tr>
<tr>
<td>Organization size</td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td>Organization age</td>
<td>0.076*</td>
<td></td>
</tr>
<tr>
<td>Industry type</td>
<td>-0.155***</td>
<td></td>
</tr>
<tr>
<td><strong>Moderating affects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project based organization capability* Internal crisis</td>
<td>-0.253***</td>
<td>Supported</td>
</tr>
<tr>
<td>Project based organization capability* External crisis</td>
<td>0.111***</td>
<td>Supported</td>
</tr>
</tbody>
</table>
Figure 3: Path diagram

IT= Internal technical crisis, ET= External technical crisis, IS= Internal social crisis, ES= External social crisis
PP= Project performance, SP= Stakeholder performance
SC= Strategic capability, FC= Functional capability, PC= Project capability
Tsize=Team size, PDur=Project duration, OrSize=Organization size, Orgage= Organization age, Intype=Industry type
### Table 9: Path coefficients

<table>
<thead>
<tr>
<th>Path</th>
<th>Coefficient</th>
<th>Hypothesis supported/ not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal social crisis- Project performance</td>
<td>-0.130***</td>
<td>Supported</td>
</tr>
<tr>
<td>Internal social crisis- Stakeholder performance</td>
<td>-0.177***</td>
<td>Supported</td>
</tr>
<tr>
<td>Internal technical crisis- Project performance</td>
<td>-0.072*</td>
<td>Supported</td>
</tr>
<tr>
<td>Internal technical crisis- Stakeholder performance</td>
<td>0.132***</td>
<td>Not supported</td>
</tr>
<tr>
<td>External social crisis- Project performance</td>
<td>0.050</td>
<td>Not significant</td>
</tr>
<tr>
<td>External social crisis- Stakeholder performance</td>
<td>0.011</td>
<td>Not significant</td>
</tr>
<tr>
<td>External technical crisis- Project performance</td>
<td>0.218***</td>
<td>Not supported</td>
</tr>
<tr>
<td>External technical crisis- Stakeholder performance</td>
<td>0.201***</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

**Control variables**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coefficient</th>
<th>Hypothesis supported/ not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team size- Project performance</td>
<td>-0.002</td>
<td></td>
</tr>
<tr>
<td>Team size- Stakeholder performance</td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td>Project duration- Project performance</td>
<td>-0.077*</td>
<td></td>
</tr>
<tr>
<td>Project duration- Stakeholder performance</td>
<td>-0.033</td>
<td></td>
</tr>
<tr>
<td>Organization size- Project performance</td>
<td>-0.029</td>
<td></td>
</tr>
<tr>
<td>Organization size- Stakeholder performance</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Organization age- Project performance</td>
<td>0.074*</td>
<td></td>
</tr>
<tr>
<td>Organization age- Stakeholder performance</td>
<td>0.061</td>
<td></td>
</tr>
<tr>
<td>Industry type- Project performance</td>
<td>-0.133***</td>
<td></td>
</tr>
<tr>
<td>Industry type- Stakeholder performance</td>
<td>-0.232***</td>
<td></td>
</tr>
</tbody>
</table>

**Moderating affects- project performance**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coefficient</th>
<th>Hypothesis supported/ not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic capability* Internal social crisis</td>
<td>0.235***</td>
<td>Supported</td>
</tr>
<tr>
<td>Strategic capability* Internal technical crisis</td>
<td>-0.006</td>
<td>Not significant</td>
</tr>
<tr>
<td>Strategic capability* External social crisis</td>
<td>-0.071</td>
<td>Not significant</td>
</tr>
<tr>
<td>Strategic capability* External technical crisis</td>
<td>0.101**</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* Internal social crisis</td>
<td>-0.244***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* Internal technical crisis</td>
<td>-0.138***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* External social crisis</td>
<td>-0.286***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* External technical crisis</td>
<td>-0.266***</td>
<td>Supported</td>
</tr>
<tr>
<td>Project capability* Internal social crisis</td>
<td>0.035</td>
<td>Not significant</td>
</tr>
<tr>
<td>Project capability* Internal technical crisis</td>
<td>-0.103**</td>
<td>Supported</td>
</tr>
<tr>
<td>Project capability* External social crisis</td>
<td>-0.058</td>
<td>Not significant</td>
</tr>
<tr>
<td>Project capability* External technical crisis</td>
<td>-0.016</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

**Moderating affects- stakeholder performance**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coefficient</th>
<th>Hypothesis supported/ not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic capability* Internal social crisis</td>
<td>0.251***</td>
<td>Supported</td>
</tr>
<tr>
<td>Strategic capability* Internal technical crisis</td>
<td>-0.056</td>
<td>Not significant</td>
</tr>
<tr>
<td>Strategic capability* External social crisis</td>
<td>0.050</td>
<td>Not significant</td>
</tr>
<tr>
<td>Strategic capability* External technical crisis</td>
<td>0.016</td>
<td>Not significant</td>
</tr>
<tr>
<td>Functional capability* Internal social crisis</td>
<td>0.338***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* Internal technical crisis</td>
<td>0.213***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* External social crisis</td>
<td>-0.195***</td>
<td>Supported</td>
</tr>
<tr>
<td>Functional capability* External technical crisis</td>
<td>-0.255***</td>
<td>Supported</td>
</tr>
<tr>
<td>Project capability* Internal social crisis</td>
<td>-0.182***</td>
<td>Supported</td>
</tr>
<tr>
<td>Project capability* Internal technical crisis</td>
<td>0.011</td>
<td>Not significant</td>
</tr>
<tr>
<td>Project capability* External social crisis</td>
<td>0.008</td>
<td>Not significant</td>
</tr>
<tr>
<td>Project capability* External technical crisis</td>
<td>-0.215***</td>
<td>Supported</td>
</tr>
</tbody>
</table>
Chapter 4

Sense making process in mega projects: The case of new International Islamabad airport

Rehab Iftikhar
Luiss Guido Carli University

Andrea Prencipe
Luiss Guido Carli University

Abstract: This study is about sense making of crisis in mega projects. Prior research has focused on sense making in organizations. The context we examined is new International Islamabad airport in Pakistan, a mega project. We used grounded theory method. We collected data using interviews, observations, archival data and newspaper articles. We find three dimensions of sense making i.e. information gathering (through internal and external sources), crisis interpretation (exogenous/ endogenous, social and technical crises) and response (reactive response). In general, responses are up-gradation, advance procurement, hire specialized HR, formation of committee, negotiation, reinstatement and legal actions. However, few of the responses are direct i.e. advance procurement, hire specialized HR, formation of committee and negotiation (for controllable crisis) and others are indirect i.e. up-gradation, formation of committee, negotiation, reinstatement and legal actions (for uncontrollable crisis). We also find element of sense giving mode i.e. report/record (to influence the understanding of uncontrollable crisis and to ask for compensation, forward it to other organizations/ stakeholders or escalate to higher level of hierarchy within organization who can respond it).

Introduction
This is not a normal project. At least in my life I am going through this first time. It is awful. This is a strange project. I have never come across. Unbelievable what happened. On one hand I would say that, in my opinion, it’s a very good example of not to do a project. That sums it all.
This is an excellent example of why not to do a project. I mean the results speak for themselves.
(Head of project, Contractor 6 & 8)

The quotation above is from one of the contractors’ reactions to a project. Plethora of contemporary studies on sense making (i) unfolds a crisis, in a wide range of contexts including mining disasters (Wicks, 2001), and Weick’s work on the Bhopal accident (Weick, 2010), the Tenerife air crash (Weick, 1990), the Mann Gulch fire (Weick, 1993), and the medical disasters of Bristol Royal Infirmary (Weick & Sutcliffe, 2003); (ii) examined how sense is made in organizations (Clark & Geppert, 2011; Cornelissen, 2012; Monin et al., 2013; Navis & Glynn, 2011; Rudolph, et al., 2009; Sonenshein, 2007; Whiteman & Cooper, 2011). On the other hand, common trend in these studies are (i) they have focused on situations in which there are some pressures (and sometimes immense pressure) to make sense, (ii) they examine relatively tightly coupled social systems, such as fire crews, flight deck teams, and industrial disasters, where members’ interpretations and actions typically have direct and relatively immediate consequences and (iii) addressed high-reliability environments, such as firefighting and aircraft carrier flight decks, for sense-making that provides members with shared accounts that facilitate tightly coordinated collective action (Maitlis, 2005). However, recent research in mega projects mostly focused on decision making (Premius et al., 2008; Premius, 2010; Peters, 2010) and has identified the challenges and unexpected events associated with managing mega projects (Flyvbjerg et al., 2000; Flyvbjerg et al., 2003b; Locatelli & Mancini, 2010).

Mega projects always struggle with unforeseen events. Megaprojects are large-scale, complex projects (Flyvbjerg et al., 2000). We believed that mega projects due to their complexity and large scale may be somewhat distinct in their demands for sense making, for example, there are three elements for organizational sense making: information gathering, interpretation and response (Gioia & Thomas, 1996; Smircich & Stubbart, 1985; Thomas, Clark, & Gioia, 1993; Gephart, 1993; Daft & Weick, 1984; Milliken, 1990; Rudolph et al., 2009; Weber & Glynn, 2006; Weick, 1979; 1995); it might be possible that these elements would not be pivotal in context of mega project or there could be some other elements important to consider. Organizational disasters and crises have also provided a fruitful context for research into sense making (Brown, 2000; Gephart, 1993). Usually prior researchers focused on one specific crisis
event such as Mann Gulch disaster etc., high reliability environment (such as firefighting team etc.) and organizational sense making process. In this study we are not focusing on one particular crisis because usually projects and organizations may face several crises like in our context of airport project. We are considering performance based environment rather than high reliability environment, since sense making is not devoted only for high reliability environment. Crisis triggers a sense making process (Weick, 1995) but this type of situation is not only necessarily representative of organizational sense making. Our study focused on sense making in mega project. Less attention has been paid to the sense making that occurs among large group of diverse organizational stakeholders as they address a range of issues (Weick, 1995). Previous studies largely ignore the dynamics of sense making when different parties engage simultaneously (Maitlis, 2005). By looking into prior research, we can say that the topic we study is underdeveloped. Our study on mega project, which provide an access to multiple stakeholders and organizations, like in our case of airport project there are client, contractors, sub-contractors, design consultants and project management consultant. Each stakeholder belongs to an organization, and some of the stakeholders belong to different organizations for example there are several contractors and sub-contractors which belong to different organizations. It means that mega project gives access to environment where we have multiple organizational stakeholders. So we address the abovementioned gap by studying mega project. We are studying overall sense making process in mega projects when multiple organizations are involved but we are not studying sense making from organizational or stakeholder point of view. The center of study is mega project, not organizations. Thus, we can say in this paper we shift the focus of sense making process from organizations to mega projects. We do so by examining the context of new International Islamabad airport and analyze how to make sense of crisis.

We are trying to answer following research question

How (multiple organizational stakeholders) make sense of crisis in mega projects?

The primary purpose of this paper is to investigate and understand the sense making process of crisis in mega projects. The unit of analysis is a mega project. Our study makes three contributions. The first contribution is investigating sense making process of crisis in mega project, which has been largely ignored. Prior research has focused on sense making in
organizations, in our case we consider mega project a case of airport project in Pakistan. Second, we developed a model of sense making process; specifically we build a framework that considers sense making process in mega projects. The development of sophisticated model is an effort to refines and extends sense making process for mega projects. Our research provides empirical support and refine the existing findings (information gathering, interpretations and response) but also extends it (crisis interpretation, report/record and direct/indirect response). Finally, we offer explanation for sense making process of crisis, we used the definition of crisis i.e. crisis is low probability and high impact events. So any other events e.g. risk, issues, challenges, etc., are out of the scope in this paper.

The paper is organized as follows: the next section provides a review of the relevant literature; this is followed by the research context and the methodology section. Subsequently we describe data collection and analysis, provide findings and discussion. Last but not least we draw conclusions of the paper.

Theory

Mega project

A "megaproject" is defined as the most expensive infrastructure and investment projects, typically costs per project from several hundred million to several billion dollars (Locatelli & Manicini, 2010). Mega project typically costs at least $ 250 million dollars to $ 1 billion (Altshuler & Luberoff, 2003:2). It is to build the physical infrastructures that enable people, resources, and information to move within buildings and between locations throughout the world which may be roads, railways, dykes, airports, bridges, energy transport, electronic communication, drinking water, sewage and waste (Priemus, 2010). Mega project is usually commissioned by government and implemented by private enterprises, characterized by uncertainty, complexity and political sensitivity. It involves a wide range of business partners, industry, politicians (Clegg et al., 2002), and has strong economic and environmental impact (Bruzelius et al., 2002). Flyvbjerg et al. (2003a) and Altshuler & Luberoff (2003) described that mega projects have a bad track record in keeping to budget and time schedules. Cost escalations happen in almost nine out of ten projects with a cost increase of 28 per cent on average (Flyvbjerg et al., 2003a). As Davies et al. (2009) illustrate that when Denver’s $5B international
airport opened in 1995, it was almost 200 per cent over the original budget, 16 months late, and passenger traffic achieved only half the predicted revenues. The opening of the airport was plagued by problems with the baggage handling system, which was eventually abandoned in August 2005. Although Hong Kong’s $20B Chek Lap Kok airport opened on time in July 1998, severe disruptions were experienced for six months after opening due to computer problems with the baggage handling system (Davies et al., 2009). Flyvbjerg et al. (2003b) suggested that a main cause of such overruns are over-optimism/ optimism bias (the fact that people are naturally inclined to estimate things more positively than one could objectively derive from practice e.g. lack of realism in initial cost estimates, length and cost are underestimated, contingencies are set too low etc.) and strategic misrepresentation (deliberately under-estimating cost and time for political and strategic reasons, the rationale here is that if you will show the real cost, the project would never be built; however, once you start building infrastructure it is difficult to stop even if the costs are far higher than previously expected) (Flyvbjerg, 2008).

**Crisis**

The most widely cited definition is proposed by Pearson and Clair, they view crisis as "a low-probability, high impact event that threatens the viability of the organization (in our case it is a mega project) and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly" (1998: 60).

The definition highlights three important aspects of a crisis. First, a crisis is a major, unpredictable event that is likely to interfere with normal business operations and has the potential to threaten survival. Second, a crisis has a low probability of occurring and includes an element of surprise. Finally, a crisis is characterized by time pressures, requiring a quick decision/response in order to minimize its impact (Bonn & Rundle-Thiele, 2007). Examining the above definition, there are few characteristics. First, a crisis is an unplanned event that has the potential of dismantling the internal and external structure of an organization. A crisis may affect not only the employees and other members internal to the organization, but also key stakeholders external to the organization. Second, a crisis may occur in any organization (small, medium and large and national or international) and in any industry, each will see their potential demise (Coleman, 2004; Keeffe & Darling, 2008; Fink, 1986). For example, non-profit organizations,
governmental agencies, houses of worship, utilities, cooperatives, multinational organizations, and so forth are all susceptible to a crisis (Barton, 1993). Finally, a crisis may affect the legitimacy of an organization. In the event of a crisis, the media’s influence on public perception may affect the livelihood of an organization. Media can influence public perception in regards to issues involving cause, blame, response, resolution, and consequences. Presented in a negative light, the legitimacy of an organization may be threatened (Ray, 1999).

**Sense making**

Sense making, a term introduced by Karl Weick; the term means simply “the making of sense”. It refers to how we structure the unknown to be able to act in it (Weick, 1995: 4). Sense making is the process through which people work to understand issues or events that are novel, ambiguous, confusing, or in some other way violate expectations. Sense making is triggered by cues, such as issues, events, or situations, for which the meaning is ambiguous and outcome is uncertain (Meyer, 1982) and events, issues, and actions are somehow surprising and confusing (Gioia & Thomas, 1996; Weick, 1993, 1995; Maitlis, 2005: 21). According to Cornelissen (2012), “Sense making refers to processes of meaning construction whereby people interpret events and issues within and outside of their organizations that are somehow surprising, complex, or confusing to them”.

The foremost step is sensing the problem. The basic point is that a problem is perceived when a discrepancy or gap is perceived between the existing state (perceived reality, initial state) and a desired state (goal, standard of how things should be terminal state). Sensing a discrepancy between the existing state and one’s standard is a first step in the process. When the situation feels “different,” this circumstance is experienced as a situation of discrepancy (Orlikowski & Gash, 1994), breakdown (Patriotta, 2003), surprise (Louis, 1980), disconfirmation (Weick & Sutcliffe, 2001), opportunity (Dutton, 1993), or interruption (Mandler, 1984: 180-189). There are three main “sense making moves” or key processes i.e. scanning/ information seeking, interpreting/ creating interpretations, and responding/ taking action. These are all important aspects of the more general notion of sense making (cf. Gioia & Chittipeddi, 1991; Daft & Weick, 1984; Rudolph et al., 2009; Milliken, 1990; Thomas et al., 1993; Weber & Glynn, 2006). According to Weick et al., (2005), sense making is about how does something come to be an
event for organizational members? Second, sense making is about the question: What does an event mean? In the context of everyday life, when people confront something unintelligible and ask “what’s the story here?” then people ask “now what should I do?” (Weick et al., 2005).

Research context

(New Islamabad) International Airport, Pakistan

The new Islamabad International Airport is located at Pind Ranjha near Fateh Jang, about 25 km from zero point Islamabad, 28 km from Saddar, Rawalpindi and 30 km from the existing airport at Chaklala. The airport project was conceived in 1984, for which the first development strategy/feasibility of the new International Islamabad Airport (NIIA) was prepared by the French firm M/s Aeroport De Paris (ADPI) in association with NESPAK in October, 1984. The study concluded that construction of the airport at a new site will be more feasible and economical than the expansion and up-gradation of the existing International Airport at Chaklala. The new site selected/studied was located at Pindh Ranjha in Attock and Rawalpindi districts. After a lapse of 22 years, the need for another feasibility study was felt necessary and therefore in 2006 preparation of the master plan of the new airport was assigned to M/s Louis Berger Group (LBG) and M/s ECIL as joint venture partners. The same group was also selected as the project management consultant (PMC) for NIIA. The master plan was submitted to civil aviation authority (CAA) in September 2006. In March 2007, the CAA board on the recommendations of PMC approved M/s CPG Airports, Singapore as design consultant for passenger terminal building (PTB) and the design work of other components of the project was assigned to M/s ADPI France & NESPAK (JV).

A planning commission-I Pro-forma (PC-I) was prepared by M/s LBG (USA) in association with ECIL (Pvt) Ltd. in February, 2008 at an estimated cost of Rs. 37 billion (352 million US). In March 2008, CAA board approved the PC-I of the project at a cost of Rs. 37 billion (352 million US), based on the master plan prepared by the M/s LBG. However, the ground breaking ceremony of the project was conducted well ahead on 7th April, 2007 jointly by then President and Prime Minister of Pakistan. The Prime Minister of Pakistan directed to complete the project in 30 months’ period. Original PC-I was approved by the CAA board in March 2008 at a capital cost of Rs. 37 billion (352 million US) and completion by December, 2010. It was envisaged that
the construction would be undertaken in a phased manner. The new airport with all essential facilities will cater for over 9 million domestic and international passengers and cargo handling of more than 150,000 metric tons per annum. The new airport comprises passenger and cargo terminal buildings, runways systems, taxiways, aprons, airfield lighting system, air traffic control tower, NAVAIDS, hangers, with necessary infrastructure/utilities and ancillary facilities such as roads, car parking facilities, power supply systems, storm water drainage and sewage treatment plant etc. The project is being executed by CAA headed by the director general whereby project is implemented by the project director assisted by the project management unit equipped with the technical and professional staff. The design consultant prepared the detailed engineering design work of passenger terminal, landside, airside infrastructure and support facilities including utilities and ancillary facilities whereas the project management consultants prepared the tender documents of works as package contracts. The original project was approved at a capital cost of Rs. 36,865 billion (352 million US). The revised capital cost of the project is Rs 81,171 billion (775 million US). Indicating an increase of 120% from the original approved PC-I (Supreme Court constitution petition, 2013; Revised PC-I Pro-forma). The project was announced in January 2005, construction began in April 2007 and it was expected that project would be completed in 30 months, end of 2009 however, there are still concern that airport will be operational in 2017. It is projected to be operational in 2017, 10 years after it was laid.

Method
We conduct a single case study to understand sense making process in mega project. The case study method is particularly suited to address research questions that require detailed understanding; this is because of the richness of data that can be collected in a case study context (Hartley, 2004). Our empirical study focuses on new International Islamabad airport in Pakistan. We selected this particular case in order to explore and understand sense making process in mega projects, focusing on how to make sense of crisis in mega projects. We address our research question through an inductive and in-depth study. To conduct our research, we followed the process of theoretical sampling (Glaser & Strauss, 1967). Airport staff members were given copies of our first and second order analyses (discussed in detail below) and were asked to provide corrections of facts. Their comments were incorporated into revisions of the final analysis.
Data Collection

We collected data using (a) interviews, (b) observation, (c) archival documents and (d) newspaper articles. We relied on interviews as the primary source of data. The archival data served as an important source of triangulating our interviews. Additional data from observation and newspaper were also used to triangulate the information gathered from the informants and to validate our interpretations of interview data.

Interviews

We conducted 35 interviews with 28 participants, ranging from 22 minutes to 98 minutes. We audio taping all interviews. Interviews were conducted in person whenever possible on dates ranging from October 2015 to December 2015 and follow-up interviews were held in July 2016 to August 2016. We conducted interviews with project directors, project managers, general managers, site managers and other team members (contract specialist, construction manager, deputy project manager, resident design coordinator, integration manager, project management officer, commercial manager and site superintendent). Informants included members of client, project management consultant, design consultant, contractors and sub-contractors. We tried to conduct interview from prior project management consultant group but they declined to be interviewed formally due to ongoing arbitration process.

Interviews were semi-structured (see appendix A for interview guide), informants were asked a core set of structured questions and allowed open-ended probes. We also encouraged informants to use their own terminology and to steer the interview toward issues and concepts that they felt best represented their own experiences. From initial interviews, we utilized a snowball technique asking each informant who they believed could help us understand sense making process in new International Islamabad airport. The initial interview protocol was wide ranging, as we sought to gain understanding of project. Subsequent interviews included more focused questions as themes began to emerge from the data. Interviews were recorded and transcribed in 358 pages of single spaced text.
Observation
We conducted multiple site visits to project but from different stakeholders i.e. client and contractors. We visited three times (September, October and November). These visits grounded us in the field and helped us to identify informants and verify our observations.

Archival data
We utilized archival sources of data acquired through searching on internet and provided by informants. Archival data consist of internal and publically available data. First, we searched the civil aviation authority (client) website for the terms “new Islamabad airport,” or “new International Islamabad airport.” Second, using google, we searched for “new Islamabad airport” or “new International Islamabad airport”. Third, we asked client, contractors and project management consultant to provide necessary documents that could help us to develop better understanding of the project.

Newspaper articles
In addition to archival data we engaged newspaper articles published in Dawn, The News, The Nation and The express turbine, comprises the main Pakistan newspapers between 2007 and 2015. These articles were identified through a search on the key terms “new Islamabad airport” and “new International Islamabad airport.”

Data Analysis
We utilized inductive grounded theory methodology for data analysis (Strauss & Corbin 1998; Gioia et al., 2012). Accordingly, we followed a three-step procedure aimed at identifying (i) general first-order categories, (ii) second order themes, and (iii) aggregate dimensions. We began by creating in-vivo and verbatim (Gioia et al., 2012; Glaser & Strauss, 1967), first-order codes utilizing the language of our informants. During the initial readings of the transcriptions, we identified numerous first-order (informant) terms and concepts. The first-order analysis sought to remain with the data and let the data speak for itself. We next began searching for relationships among our codes to group them into second-order themes (column 2 of Figure 1: Appendix B). The purpose of the second-order analysis was to develop a higher level of abstraction and conceptualize how the various codes may be related and labeled. We devoted subsequent
readings to assembling these concepts into categories that defined similar ideas, issues, or relationships that had relevance for the informants. For instance, initial line by line coding, such as, ‘reporting is done by staff/team member’, ‘reports/documents’, ‘meetings’ and ‘site visits’ were grouped together to form the sub-theme labelled ‘Information from team members’. We derived these labels either by developing a more general label that subsumed the first-order categories or by reference to the existing literature that described the emergent themes well (e.g., internal social crisis, internal technical/economic crisis, external social crisis and external technical/economic crisis). Finally, second-order themes were aggregated into analytical dimensions to provide a framework for organizing the emergent findings. Figure 1 (Appendix B) illustrates the relationship between first-order and second order findings, and the aggregate dimensions that formed the foundation of sense making process model.

***Insert Figure 1 about here***

**Findings**

In this section, we describe the sense making process as it emerged from our data, starting with the summary of our findings. The sense making process is based on four elements. The first element is information gathering: stakeholders try to seek for relevant information of different crises. We labeled the second element as crisis interpretation: how different stakeholders interpret and give meaning to certain crisis event. We called the third element report/record: in which stakeholders report and record crisis to those stakeholders who have authority to respond. Fourth element is response, in which stakeholders take actions to mitigate crisis. The presentation of findings is organized around four emergent themes (1) information gathering, (2) crisis interpretation, (3) report and record crisis and (4) response. Under each of the themes, the subthemes that emerge the findings are presented. Below, we describe these elements and emergent theoretical dimensions in more details, with illustrative quotations that are used to support the argument of the participants (see table 2 in Appendix E for additional representative quotes).
Information gathering

Keeping in view importance of information gathering we asked key stakeholders (client, consultant and contractors) how they gathered information. Information gathering was manifested in both internal and external environment of the organizations i.e. expression of information from team members and information from different stakeholders. Information seeking will help them to assign meanings to crisis events, also keep them updated about the surroundings situations and oriented information toward crisis, pivotal for mega project.

Information from team members

As name implies team members facilitate information gathering process. It is organizational internal way of information seeking. The mean for gathering information is staff, team members, reports/documents, meetings and site visits. Interaction among staff and team members is the most common way of gathering information; staff is available on site, working in form of teams and prepares specific reports, documents, collect proofs of problem like picture etc., and inform other team members. So they are aware of abrupt events and have information regarding these events.

We are always available on site. We are there from 9 to 5. We have to get our team to do our work..... Therefore information is coming to us by a staff member as well he takes snapshots of the thing and consults us..... We are daily on sites, on phone, this is the era of communication, we have provided our employees with phones and Skype is installed, they inform us about the issue. (Integration manager, Contractor 7)

There is a proper full hierarchy, I am PD then there is project manager then civil project manager, MEP work project manager, architects project manager is there then under their further site engineer, under site engineer sub engineers then foreman then under foremen labor works.... so whatever the relevant matter is the manager immediately send me SMS that sir this has happened tell now what to do, means what need to be done..... To runs any organization effectively you should have 10 ears and 20 eyes. For information there is a system which is silently comes to me..... The moment when something happens then I tell the matter to manager
by phone call that this has happened to your site, before he gets to know it. He asked, you know it before me. My ears and eyes are spread. (Project director, Contractor 9)

The normal way of getting information is when it comes through progress, the report coming from the site manager.... It is a daily activity report that we send out to the engineer of each package. In 8c1 we send the contractor, to tell them that this is what we mobilize on site, this activity we delivered, this requires more time, and that is our constraints so that is reported every day..... (Head of project, Contractor 6 & 8)

However, meetings within organizations are also way to obtain relevant information; usually information is coming from different internal sources such as team members, but sometimes, some of the team members are not aware of situation, so they get information from meetings. Moreover, information can be obtained from site visits; it verifies authenticity of information, i.e. information, project managers and project directors are getting from organizational sources (team members/ staff) is right. Site visits are useful to see things from eyes view in order to grasp and fully aware of the situation. It is important to gather relevant information highlighted as one must have “sufficient information, no matter what kind of channel”.

Generally, there are two channels to get the information from the site. The first one is our coordination meetings, we have frequent coordination meetings, and I mean the internal meetings. The other channel is site visit. I usually go to site and visit every day. So I can see each and everything. First step is to collect sufficient information from different channels, no matter what kind of channel. (Project director, Contractor 2)

**Information from different stakeholders**

The other sub-theme that emerges from data is information gathering from different stakeholders. There are different stakeholders like client, contractors and consultants (designer and project management consultant) in airport project, so one possible way for information gathering is through stakeholders. This is external way of information gathering as the stakeholders belong to different organizations. Formal means (letter and meeting) and informal
means (email and phone call) are used to gathered information. The following quotes illustrate how information is gathered.

*There are certain issues just like a baggage handling system, it is a special item, we are not expert of that one but we have to collect the data from vendor/contractor, we have to meet them than they brief us and then we take a note and send back to our specialist... because we are the interface, we have to get maximum data requirement from contractor and client. You can say we have to deal with client and contractor.* (Resident design coordinator, Design consultant)

There are defined procedures of information flow, contractors need to contact project management consultant since they are the engineers of the project, and they can’t directly contact client. So in order to get information engineers are the intermediary between contractors and client.

*We collect information from consultant. In project contractor has more relations with consultant as compare to client. Every activity is done with the approval of consultant. Basically consultant is a third party who works on behalf of client. We got information from there, for example, status of activity, why it is delayed etc.* (Deputy Project manager, Contractor 1)

Sometimes stakeholders had relevant information in advance and often they get instruction and/or response to query as information. Which helps them to be aware of the ongoing and upcoming situations and they usually get confirmation from other stakeholders, it also raises the accuracy of information. As informants described:

*When we communicate with the designer through emails or phone calls; we can get advance information from them, before PMC issues the formal letter to us.... We have to wait for their formal instruction, but by that time we have already got the advance information from CPG.* (Project director, Contractor 2)
Our client gives us information that the engineer is changed and who is the new one? This one is for this time and other will be for this time period. So for that time we have to coordinate with them. (Site manager, Contractor 8)

We discovered when the engineer walked outside. First indication to us, we heard of this informally, we do talk to the various parties and you would know more or less what’s coming. (Head of project, Contractor 6 & 8)

Crisis interpretation

We asked interviewees, to describe 2-3, low probability, high impact events, by which we mean crisis in the project. Key stakeholders’ mentioned the crises they faced and provide detail descriptions what happened during crises so representatives of key stakeholders told their stories regarding each crises they faced. Crisis interpretation is to ascribed meaning to crisis events by stakeholders of the project; human (stakeholders) understanding based on the interpretation of crisis event by the people (stakeholders) experiencing them. How they (stakeholders) interpret and perceive the event as crisis. Different stakeholders, interpret different events as crises, so we identified various crises. After having identified several crises from key stakeholders i.e. client, consultant, contractors, we grouped them into themes of internal social crisis, internal technical/economic crisis, external social and external technical/economic crisis to make them meaningful and understandable.

Internal social crisis

The internal social crisis is dealing with crises; those occur in internal environment of project and by social we mean that these crises are caused by humans and organizations, so there are social elements to raise these crises. Normally, as per standard practice for development of airports, the construction activity is usually divided into two major parts, one Airfield infrastructure (taxiways, utilities, water, drainage, fuel farm and lighting etc.), and second Landside Infrastructure (terminal and all ancillary facilities). The work is then awarded for execution to one or two internationally renowned and experienced firms. However, this project is divided into 17 different packages which lead to crises such as coordination issues, interface
problems, area hand over from one contractor to another and wrong sequence of package award. As following quotes illustrate:

*There are 17 packages in the scope, rather than one major package. Coordination is a big issue…. Coordination across 17 packages, can you imagine 17 contract packages, rather than 1…. If you had a general contractor out there, 1 company, then you could go to them on every subject and they would have their different departments internally coordinated, it would be much easier. In this case we have 17 in our scope; it’s much more than 17 contracts probably 30, 40 outside of our scope…. We communicate with contractors one on one. 17 different contractors so it demands time to get all 17 in one room and discuss their individual problems. A with Z and Z with B etc, so all of these have different issues with one another… All this has to be done systematically. Otherwise you got chaos. (Project manager, PMC)*

*There is interface problem among different contractors about area…. Basically in this project we are not only contractor working, apart from us there are other contractors…. Whenever there are so many contractors working, the work is distributed, the leveling and grading of the area was responsibility of another contractor, we were to be given our area on certain level on which we could start our work, that particular area was not given to us as per initial program…. Now this was all coordination… the last area which they give us was hardly three months back which we have completed and still there are some of the areas which are still not clear. (Project manager, Contractor 4)*

*Co-ordination within this project, we are constructing this building (passenger terminal building), but still there are two to three parts, like equipment suggestion, security system, baggage handling system, assignation system, those are being performed by different contractors, but the contractual formalities of their packages were performed very late or you can say not in harmony with our construction speed, so the basic co-ordination were disturbed…. They haven’t started the projects yet and we have reached towards the finishing of the project…. If those people were in time and told us regarding their issues… Let’s say if somebody comes and … says that I have to bring another 2-3 wires and I have to change the
monitoring scheme, so these types of things, if they’re coordinating well in time, I would have finished adjusting. (Project manager, Contractor 9)

One of the crises is frequent change in key stakeholders, either change in team or replacement with another organization. Usually the stakeholders who are changed several times during the project are client, project management consultant and designer. It is not desirable to change key stakeholders frequently and definitely it does have adverse effects on other stakeholders like contractors etc. Stakeholders are interdependent when a new stakeholder came in; they might follow different procedures and will take new decisions instead of following previous decisions, which is difficult to adopt by the followers. Handing over from old stakeholder to new stakeholder also create gaps which leads to performance inadequacy. It is also time taking for them to understand the history of project. As the following quotes illustrate:

This project has different directors, from the beginning. I mean project directors from client side. Imagine there is a new director of anything; it does not necessarily need to be this project, but let’s take for an example, a new director of a car factory. If he is changing after every few months, you come to the position you actually get to know/ need to know what’s going on. You need to know your contractors, suppliers, and your staff so and so on. So this is like basic time consuming exercise. I am saying changing every few months is not good for such a project... It slows down the process. (Project manager, Sub-contractor 1)

There were 2 principal design consultants; CPG from Singapore doing the major building-terminal building and ADPI from France in partnership with NESPAK doing all other works, like runways, the civil engineering, drainage, utilities, roads, air traffic control tower, Nav-aids, all of the non-passenger terminal building contract, they are responsible for that. They left the project a year ago. They just left; they didn’t get paid so they left. Well they did get paid in Pakistani rupees and they wanted Euros and it couldn’t be done. (Project manager, PMC)

Design consultants were changed many times. Contractor in the world cannot move on until and unless he gets the approval, if client will not approve that which color contractor has to apply and which type of bulb you have to use... he cannot move on... So design consultants were
changed so many times which directly stopped the work. It had big impact, that’s why this project has to complete into 2012 but we are going to complete it in 2015. (Deputy Project manager, Contractor 1)

Your consultants which are the prime consultants which is the backbone of any project and the consultant which planned, which almost executed this project for more than four years, they just walked away from this project due to some of the reasons of non-payment, non-compliance and some of the issues with the employer or employer also had some serious issues with them… They actually de-hired all those people which were employed here at this site including expatriates, and local people…. It was unusual situation… I had all the fears that project would stop and in government procedures you just cannot appoint anybody overnight. You had to go to the complete process of procurement; it takes 3 to 4 months. (Project director, Client)

Now this happened here that management consultants changed several times. First Louis Berger group, then OTE team take over, now MMP. When people came here, as I came here from year, I remember things on figure tips. When someone new comes in he takes around 1.5-2 months to understand history and present status…. After that every consultant has their own procedures and requirements so we are bound to fulfill those requirements. I will say change of procedure, handling and taking of information from old consultant to new consultant all these things affect. If someone says that we have to change them and brought someone new, then they will take 1.5 years to make it something. (Project manager, Contractor 1)

In addition to aforementioned crises the project had faced; two of the main contractors, their services were either terminated or suspended. Client’s point of view is that they are underperforming while contractor point of view is that it was illogical client’s reaction after Supreme Court intervention. During this time when their services were not rendered, client cannot look for other contractors as the contractors went to court, it affects the project badly. As informants expressed:

In January 2011 to onward we started work here. We worked here around 2 to 2 and half years, after that in mid our contract was terminated. At that time, progress of the building was around
49% when our contract was terminated…. We left everything and went back to our head office. You can say around 1.5 year the project was deadlock. We got a notice straight away… and we depart from here… In our case everything was forced to close… CAA guard comes in and say leave the office. We depart, at that time if table is there, and a tea cup is there it was there for 1.5 year. In 2 hours’ notice they sealed the office. This is not a way. If you want someone to leave, then give them 2-3 days and give them proper reason and give them time of a week. (Project manager, Contractor 1)

This project was suspended for long time… It all together creates a situation where no one knows what was going in the past, there is a long period of inactivity, then we started and it is problematic for people to understand the history of project, and whole timeline, like what we did to get to this point and so on and there are some issues which are going for years actually…. For example, taking an easiest example, you are building a house, you get it to the stage where the main structure is done and then it gets suspended for 2 years then you bring in new people, new engineer and new team. So the new team has to assess what’s been done by the previous teams according to drawings, according to specifications, they need to get the whole knowledge, and see the documentation what’s been done, to be able to proceed further. So bringing a new team after such a time means that these people have to get this knowledge as the beginning knowledge or as background knowledge. (Project manager, Sub-contractor 1)

Internal technical/economic crisis
Defining crises as internal technical/economic crises means they are caused by organizations involved in project and they are technical and economical in nature. One of the crises highlighted by stakeholders is design issue, either designer’s design is imprecise or they are taking more time to approve the drawings submitted by contractors. Illustrative quotes are provided below:

Initial design is dreadful…. One particular problem which is running now the architecture passes all the technical rooms and data centers altogether. It sounds good idea, because it will save a lot of money on cabling, but it’s an absolute disaster. It means no resilience… if you have fire in central area not only rooms were damaged but all the cabling feeding in these rooms will be destroyed, that would effectively kill your airport or shut down the airport for may be 6
months or may be year…. I told client that I don’t hand over the airport, which is a time bomb, if there would be fire… It will basically wipe out the whole airport… It goanna be disaster, normally the data centers are one kilometer apart…. Looking up the whole design what’s going on, in the last 6 years it’s an absolute disaster. (Manager, PMC)

We faced design issues…. According to specification we send our submittals but there is not decision on it. 6-7 months we did not get go ahead on design. A small example even if you saw air traffic control (ATC), the tower is here, it’s a ten story tower, the cable of earthling will be placed on it which is basically a foreign based item. I did not get approval of it from last 6-7 months. That’s why folding pipes are still there… There are pending approvals… We all have to understand that I am an engineer and I am an executer, I am not a designer, I have to follow certain drawings… I need approval of design. If I don’t have approval, I can’t continue. (Project manager, Contractor 1)

Designers are foreign based companies, ADPI from France and CPG from Singapore; they are working from their respective countries. Due to which several stakeholders i.e. contractors and consultants did not get rapid response to their queries which leads to project prolongation. As following quote described:

Designer is sitting in Singapore. For every small petty thing, we have to talk to them… When we are implementing a designer design, then so many variations came in. Therefore, to address these variations you have to refer the designer… I can tell you by sitting here that, in washrooms the false ceiling is on 9 feet in design but we are doing it on 8 feet, you know, architecture has precautions… For example, false ceiling here is at 7 or 7 and a half foot but if we fix below it then this may be instead of giving a look of hall it gives the look of a grave, that we are sitting in the grave. So the designers who are sitting there or their reps here, it is very tough to conceive such things. If I want to bring it down 1 foot then they would say no. They asked to send 3D view, send shop drawing, or draw this or that and send it to me… so, instead of approving, they would ask for further actions… further actions and make lassi of your brain that you cannot proceed further… They will use wired terms like your RFI is not there, your request is not there, at times I see that if everything is provided but they want us to chase the light of truck. They asked so
many questions and I would say to myself why I asked them about this. It is better to do it by myself. As far designer is concern, prompt resolution of a problem is not there because of the non-availability of the designer next door. (Project director, Contractor 9)

One of the technical crises is either systems are missing or not installed, without which the airport can’t be operational. Since these systems run the operation of the airport, without these systems you can’t run the airport. It is important to think and plan for system integration from the initial stage of the project; however, it is not the case in this project. As illustrated below:

50% of the systems are missing; the main core system air traffic control building (ATCB) is missing. The IT system is probably 50% incomplete and the integration is missing altogether. So there are small elements that need to be integrated yet. There must be system integration part, main theme for us is to make the airport operate efficiently, to approve the aircraft turnaround time, to approve the bidding cost for the systems and to manage the system efficiently, but all missing at the moment, so it’s a challenge. (Manager, PMC)

You can’t land planes without systems operating, tested, commissioned, and seems to be function properly… We call them “mission critical systems”, that’s a very important word that means without which you do not have an airport. You don’t have a data center. You are unable to control who come through that door and who can’t… It’s really that important. Without these systems you cannot perform anything. You just have several assets out there that look like airport but they don’t do anything. System integration is really what drives this airport, what will make it work. Everything is related, you cannot check-in without some system... Bag needs to check-in, cameras are watching you, and you can’t go through a door unless you have a secure clearance. Everything is system related. (Project manager, PMC)

External social crisis
External social crises occur in external environment of mega project and by social we mean that they are caused due to human and organization; there are social elements involved in crises. One of the crises is that after passing so many years, the airport project is standing without basic amenities of access road, water and electricity. These basic facilities are needed to be considered
at the initial stage of project. The reason behind this crisis is that most of these facilities have to be provided by other government agencies and institutes as stated: “NHA is involved in road access. Different agencies are involved, for water definitely water resource department would be involved” (Construction manager, Contractor 3). So the domain is not under the key stakeholders of project. However, to run any project these basic facilities are essential. As illustrated below:

There would 9 million passengers. It is a huge number of people... Water is very essential item. And for us where you have to offer 5 times prayers also on the airport you can multiply at least by 2 the quantity of water that you need. No one study water yet. There is no ground water. Initially there was a plan to bring it from Shahpur dam but now they are thinking of ad hoc arrangement like dams. It is ALLAH’s will to give you water or don’t not to give you water. There could be a dearth. There might be no rain in certain point in time. How you will manage.... If you don’t have water how you will run this airport, if you don’t have electricity how would you run this airport?... In long run you need to have firm supply of electricity, you need to have firm water supply. (Director, Contractor 3)

At present, we don’t have a proper road that is free of hindrance which should’ve been constructed by CAA to facilitate the project for smooth construction and timely completion, so this condition is very critical for construction of any project, you must have a proper undisturbed approach. We come here and they tell us that this is a colony and we aren’t allowed to enter there, we unload some of the vehicles or go there to negotiate with them, so that is one factor. If we don’t have approach for such kind of project it will be delayed. (Project manager, Contractor 9)

One of the external social crises is interference and investigation from judicial and monitoring agencies such as Supreme Court and FIA (federal investigation authority). This also affects the credibility of people working on project and due to these interferences; several actions were taken such as termination, PMC’s change and replacement of client’s project director, to resolve the allegations and eliminate malpractices of the project, however these actions also affect the project badly. As one of the informant described:
It was reported to Supreme Court that in this mega project there were some mismanagement, corruption, and allegations were made. There were some reports in the media about some malpractices over there. That’s why there was intervention from the supreme court of Pakistan. They took suo-moto action and they directed to start investigation to some of the allegations made by various people, press and all that. So once in such mega projects enquiry starts, courts start intervening into such things so that was a major negative impact. First, project was delayed…. Second, confidence of those employees which were working there was seriously shattered… Expatriates were reluctant to come here and start working over there. They started going out. They developed fear of so many queries; project directors were shuffled very frequently. It has work negatively…. Although the outcome was very positive from Supreme Court side so some of the actions were taken against to resolve problems but as an optic it was very disturbing, that Supreme Court is having inquiry and it was not in public interest so the impression was very bad. (Project director, Client)

Land was acquired in piece meal, it took 22 years to acquire land, and still it is not considered sufficient for the airport. It’s not possible to build anything when you don’t have land. Resources like money and time were wasted on it. It affects the project adversely. As expressed by informant in following quote:

Land was not procured in entirety; it has taken more than 20 years to procure the land. It was primarily due to improper assessment by the government agencies especially civil administration. Entire responsibility is at civil government, our intervention is only to give them the area, area means proper embarkation, get them paid and get acquisition… They have taken long time. So every time they take more time, rates were revised so there is a lot of variety of the rates paid to the people who are the owners… Land acquisition started in 1986. It was finally concluded in 2012 and 2013, if you spend so much time in land acquisition it impacts on the delays and off course cost impact over there. (Project director, Client)

**External Technical/ economic crisis**
External technical/economic crises occurred in external environment (outside) of project but they are technical and economic in nature. One of the crises is payment issues/ exchange rate. Some
of the contractors have to buy equipment from foreign countries and for that they have to transfer money abroad for the equipment; they need to ask from regulatory authority in respective country for this project, which is State Bank of Pakistan and they have to pay in dollars but due to prolongation of project, the exchange rate fluctuates, which had huge adverse impact on contractors. As informant described:

One of the major dilemmas we have seen in this project is payment terms, 50% in local rupees and 50% in US dollar. How you can predict dollar rates in 2011 till the infinity time... Then at that time (2011) what was the rate, they are giving that rate... Still we are getting 50% US dollars, 50% local... If that time dollar was 84 or 87 rupees, now we are purchasing at 107 rupees, then we are selling at 90 rupees... So far for that particular reason, we bear loss of 36 corers... It was mentioned in the tender document that this project will be completed in ten months. So we have calculated our bids accordingly and submitted our rates for particularly 10 months... but now fourth year is about to end, from November 30th 2011 November 30, 2015.... It affects company’s reputation in terms of bankers, international banks are not drafting loan to GECI for Pakistan, even they are not drafting for others projects, because some commitments were made by GECI to return back their money in terms of bank guarantees and LC but not fulfilled. (Project manager, Contractor 5)

Another important crisis is international procurement, most of the items have to come from different countries and it took much time than expected so at the end project suffers. One of the informants put it like this “Erroneous procurement strategy, the procurement strategy was either missing or wrong”. It is much more desirable to use items and equipments from the local market. As one of the informants stated:

There is a shortage of resources from the local market in Pakistan, so generally we have to go for the international procurement. Cement, steel parts or crashes and aggregates are available in the local market. For the rest of the materials we have to go for the international procurement. Because according to the design... specifications are based on the British standards or the American standards. So those materials are not available here... We have to do a lot of international procurements... It is also time consuming because the agents of those
manufacturers are not here. They are not based in Pakistan so we have to communicate with them through emails or phone calls. Most of the material or equipment will be delivered through shipment but some of the items will be delivered by air. That is the reason why project execution time in Pakistan is too long and it prolonged. Sometimes, products have already been loaded for the shipment but there are some unpredictable factors, impact delivery time. There is a lot of force majeure such as sometimes your roads will be blocked. (Project director, Contractor 2)

Due to prolongation of project from 3 years to 10 years approx, the technology and systems has been changed or obsolete, so it is not possible to use old technology and systems, which is less expensive than today’s modern technology. However, if the old systems would be used, its maintenance would cost so much and people will criticize by not having airport with modern facilities. As an informant described:

We are providing IT systems, 5 years ago technology and the technology today varies, specs which were made 10 years ago, have changed now... Due to advancement, the project is lingered on. If I provide you systems that were planned 10 years ago from today, they will be come to end of life in next three years, or even if they did not come to end of life, at least they’ll be on the end of sales, from where I will bring spare parts’ warranty after 3 years. If a system is planned and fixed now, I can support it for next 10 years probably. A system planned 5 years ago will only get support for few years and after that what civil aviation will do, either to change it or get its support on very high rates, so this could be an issue. (Integration manager, Contractor 7)

Report/record crisis

This element is about influencing the understanding of stakeholders (client and others), as other stakeholders i.e. consultant and contractors are facing crisis so they are well aware of crisis and they bring them into attention of stakeholders (client and others) who can mitigate crisis. It is not only about influencing the understanding but also to develop common understanding. Report crisis as its name implies, is to forward crisis details to the higher level within organization and to stakeholders those who can mitigate crisis, since stakeholders like consultant and contractors sometime don’t have control and they can’t take actions against crisis. Record is to make crisis
event documented so in case stakeholders have to look back, they can get all the relevant details and can use recorded event for compensation. The aim is to influence other stakeholders’ perception and understanding of crisis. Report/record are basically composed of sub-themes of request for compensation, report to different stakeholders and report within organization.

**Request for compensation**

Request for compensation is a way to ask for claim and escalations. The important facet is if crises occurred and controlling authorities (stakeholder A) did not take any response against crisis, and it caused delay and cost escalation which affect stakeholder B, in this case stakeholder B (contractors) are liable to ask for claims for time and cost escalations; compensation is due on stakeholder A i.e. client and consultant. Different methods are used for asking for compensation i.e. letters (highlight contract clause for compensation) and meetings. If the event caused delay and cost escalation then contractors write a letter and highlight the particular clause, “if it is act of God then different clause is applicable, for rain different clauses and for material different clauses etc.” On the other hand meetings are also useful for discussion. As below quotes illustrated:

*As per contracts any delays that occurred we recorded them. There is a provision, if any delays that occurred from client side or from consultant then contractor will get compensation for that delay. Whatever are the issues? If they are from the client end, we will ask for claim and put up the prolongation request EOT (extension of time)... There are steps regarding how we established our claim how we highlighted the point and our concerns.... we provide them in writing through letters. In meeting we also highlight and discuss everything. But affective way is to communicate in writing and check for contract clauses... so we record our concern, we corresponds on issue and highlight its clauses as well.... (Project manager, Contractor 6)*

*If cost has increased, this cost has to be paid by CAA at the end of the day as we already defined contractually in letters that our major work has finished and due to your work we are stopped. We are asking for extension of time. Extension of time for our time that is wasted in pending design issues we claim for that. In variations when we quote rates we claim the escalation.... So on the basis of that we claim escalation. (Project manager, Contractor 1)*
Report to different stakeholders

This theme highlights the participant’s description that report/record crisis i.e. low probability and high impact event, can’t be controlled or mitigated by all stakeholders, so you have to report to those stakeholders who are able to control crisis event. This can influence and develop the understanding of stakeholders regarding crisis event. There is preset channel to report. Contractors can report to engineer/project management consultant; they can’t go directly to client. One other interesting finding is that reporting is predominately done via formal communication i.e. letters, request for information and meetings. As an informant described:

*Our mode of communication is through consultant, PMC. I can’t go directly to designer, our official mode of communication is through consultant, if I am finding a problem like Miss Rabia work, which is part of package 4 work creating hurdle in our work, it comes in my way, so I didn’t contact directly to Miss Rabia, I will report it in RFI (Request for Information) and send to PMC, and then PMC will be responsible to call me and then to execute that thing. Through them we communicate these things, we didn’t go directly, because I would not accept your dominance and neither you as a contractor will accept my dominance. But there is party which sat with two of us and resolves the issue. (Project director, Contractor 9)*

When crisis is not in contractors’ control the best thing to do is to record crisis, it will be useful to have a proper documentation of event, so in case someone asks then they can show recorded event as proof. This also confirms the point in last quote that there is a preset channel for reporting.

*Either the designer or the engineer or somebody else has to take action normally; we are dependent on when it happened. We write a letter to the employer…. We always talk to PMC formally. Remember! We do not talk to ADPI. Contract say to deal with PMC. We correspond formally with the customer or the engineer to speak and convey our concerns..... So usually we write letter... in which we let them know about the problem... For example work is suspended. So we record it. They know about it but we had to put it formally to them. So at the end of the day, a major event, you would have to record it formally to them. If you have to go back a year*
later, a day when they have seen the contractor was stopped, for having or not having an engineer on site on that particular date...(Head of project, Contractor 6 & 8)

One informant bluntly said that we can only record our concern; we are not in position to take actions. Actions need to be taken by client since they are the master of the project so they are capable of taking actions and making decisions.

We just follow the decision of PMC and CA because the contractor is basically a follower.... Letters were used to communicate our concerns. For example, if a pipe was damaged then letter was written. We record our concern.... We can only report, we don’t have control on situations, as actions need to be taken by client civil aviation.... Design, drawings and decision comes from client side, contractor is only the follower we only follow their instructions, follow their drawing and design. We only have to provide services nothing more. We are a contractor, we just inform about problem and client needs to take action. (Construction manager, Contractor 3)

Report/record is done through different ways as mentioned above. Meeting is also one of the ways to report/record concern and to discuss with the stakeholders who have domain to mitigate crisis. Usually after sending letters and RFIs, stakeholders highlight the issues in meetings.

We arranged meetings but not on daily basis but when we arrange meeting we point out issues and also give in writing, issues are discussed in coordination meetings too which held regularly.... Civil aviation’s project director was there, he used to chair those meetings.... Meetings were also called in any problematic issue.... PD held those meetings; we highlight issues in meetings. We used to communicate.... Mostly letters are delivered to engineer because engineer role is like mediator, we have to address them. Letters are posted to civil aviation only when any letter is received from their side or we need to address anything directly to them. (Project manager, Contractor 4)

Since a preset channel is followed in which usually concerns are reported/recorded to consultant, however they can’t resolve the issues, they act as intermediate. After getting concerns, they just forward them to client to take actions.
We are not allowed to do the design, as we are project management consultant, so we write letter of references to CAA, to go out and tell them to get the design, and contact with the contractor to prepare the system integration and for all missing systems, on the airport. They will go to tender, our job is to assist CAA, we are not allowed to do design, our company is quite admin, we are not getting involved in design, we can’t do anything in design, we are doing procurement documents following specifications so that they can go out to tender and get in the missing IT systems and the system integrator. (Manager, PMC)

Sometimes it might happen that a stakeholder that is reason of crisis also contains the solution. Usually it is applicable in case of designers. If there is any design issue, it can be solved by none other than designer. Since designers are the specialist for design issues so they are the one who will solve them. As one informant described:

*There are designs issues on passenger terminal building that can only be resolved by designer, contractually they are responsible..... So what we can do, well we get back to the designer- CPG and ask them.... They have to decide, we showed them the setup, the situation and problem.* (Project manager, PMC)

**Report within organization**

“If you tell them (client) or not, you will say it and they will listen to you, and time passes by. Things will get delayed”. It shows that sometimes even if you report issues to stakeholders they did not give same sense of urgency. Different stakeholders have vested interest, and they usually concentrate on crisis which have adverse impact to their interest. In that instance, it is vital to report within organization and escalates to higher authority. So that issues can be dealt at the higher level. Moreover, report within organization is predominantly done through meetings and face to face discussions. As illustrated blow:

*We usually discuss with head of project manager. We have to escalate from a designate above us. So you can find things you need to get. We have technical and legal people also with us at corporate level. If things are in our control we can manage it somehow. But who will take
decision on issues; mostly client and consultant are involved in decision. (Project manager, Contractor 8)

For some issues, you need to interact with specific authority so that things will move according to contract. Sometimes crises occurred but contract remained silent, in that case employee reports to head office, and then head office looks into possible solutions of issues.

We have a contract administrator on site, of course he is the first line of the chain that you speak to operate a contract. Like in the case of termination, it goes beyond, go to the termination, which means we are outside of the contract, immediately we report back to our head office, of course to head office in Germany. So what happens then is that we feed them information to deal with a current situation…. We have a general counselor in Siemens Pakistan. We engage them and then they might engage outside counsel. So there is a process. (Head of project, Contractor 6 & 8)

Response
Response is action to crises in a way that could mitigate them. Different stakeholders i.e. client, consultants and contractors took actions to respond to crisis they faced in airport project. While talking about response we need to keep this in our minds that not all crises are responded some of them are reported and recorded. Different kinds of response were made, few of them are for technology and design up-gradation, and some are related to do things in advance like procurement, some responses are to hire specialized human resource and formation of committee. However, negotiation with different stakeholders was also taking place which later reinstated few of the stakeholders and also few legal actions were taken.

Up-gradation
One of the crises was change in technology due to project prolongation. The systems and design that were planned to implement are no longer viable due to prolongation of project and it is realized by client itself, so it is pivotal to go for up-date system and also to incorporate changes. As informant described:
Civil aviation figured out itself that things are now out dated, like there’s METV case, when they asked for it they asked for an analog system which is obsolete in the world, but now civil aviation themselves redo that we need IP based solution which are latest… Few things we have automatically updated on our own like for example there’s a wireless LAN… Similarly, in ACS there were some old locks and mechanism we update them and inform them that this is latest and have this one. We upgrade changes for example the Cisco equipment without cost increase, because we understand that whatever we are going to deliver should be updated as we have to provide support to it. If we have to get some old thing, then providing support to it will be costly. So we prefer putting up a new item or updated things which will have less support cost. (Integration manager, Contractor 7)

One the other hand, moving from project timeline of 3 years to 10 years approx; with system, design also gets obsolete, it is essential to incorporate changes in order to have a modern airport. As one informant described:

When there is certain change, client formally informs that to the consultant that this is my requirement then being a consultant, we just analyze that what they are saying whether it is possible or not… if this happens then what will be the impact…. So if client has to makes certain changes then they have to inform us in a written form then our management go back to original design consultant and ask is it possible?…. So we incorporate the design changes and forwarded to the client for approval… Designer presents the design to the client and client reviews that design and give their comments, after getting comments designers incorporate those comments in their design and final design comes out. (Resident Design Engineer, Designer)

**Advance procurement**

Long lead items that need to be imported, took more time than expected and without having long lead items, site execution would not be completed. So in this regard, contractors did advance procurement by establishing contacts with vendors and suppliers and schedule for procurement in advance.
We tackled procurement of long lead item by planning in advance, we somehow increased our relationship, and we established our contact…. We perceive our procurement well in advance instead of nick of time we start running. We established contacts with vendors and suppliers in other countries, who have to provide those items. In Pakistan there are many people those have contacts in China, UK and USA, and those people are professionally supplier and they just supply things, we locate those who had capacity, financial as well as awareness capacity and contact capacity, we locate them and then we bring them in our panel and they are now made purchases for us. (Project director, Contractor 9)

**Hire specialized HR**

One of the actions taken by stakeholders is to hire specialized HR. This helps smooth running of project and also to resolve some legal disputes among stakeholders. Hire prior PMC employee, helps to continue project day to day operations. As one informant explained:

*We hire LBG employees and technical staff on emergent basis and continued with services without any interruption, and work has not stop for single day, work usually stopped when you stop contractor’s bills and cheque request of contractors, but these things were continued. We hired most of these people, paying them from our pockets from project funds. (Project director, Client)*

To resolve crisis like termination and suspension, contractors hired lawyers to fight their cases in court. The lawyers study the cases and prove that their client is innocent. As one informant reflected:

*We hire lawyers, and they studied correspondence we had with consultant. They were saying from your side, the project is late; but project is late because we don’t have design approvals, when these things go to court, they understand things, it was not our fault, and it was basically a designer fault. We won it. Things get settled because lawyer’s work will start when our dispute go to court. (Project manager, Contractor 1)*
Formation of committee

Committees are formed to further investigate issues raised by different parties and stakeholders and then suggest the way to proceed. After Supreme Court intervention client decide to build “Apex committee”, which reviewed all the reports in which allegations were made and then suggested a way forward.

Supreme Court decisions were boiled down by FIA inquiry, then our management took a decision in which we request to make a APEX committee, a high power committee approved by Prime Minister of Pakistan, that was consist of 3 members..... They reviewed the whole case in which they review Supreme Court report, FIA report, Shahid Niaz’s committee report, and suggest a way forward. The report is already submitted to prime minister and still outcome of that report is unknown, when we know its outcome then we can say anything. (Project director, Client)

A specialized design committee was formed to respond to design issues of late approvals and imprecision, highlighted by different stakeholders. Meanwhile, the local designer (Nespak) was also involved to facilitate field design support system (FDSS). As one informant described:

Design consultant is not responding so CAA involved Nespak. Nespak on their behalf give approval on drawing..... Then further they made FDSS team, that FDSS team starts giving us approval. FDSS when looked to our design issue there were 25 issues; they said out of 25 we can clear 8-10 issues. Which were not clear from last 6 months and there is no work. They cleared 8-10 and we started work. There are certain issues they can’t clear for that we ask Nespak to consult again they were remained our old consultant. May be Nespak clear and few will be left for that we have to get approval from somewhere. (Project manager, Contractor 1)

Negotiation

Negotiation is about conciliating with different stakeholders working on project. Usually it is done in meetings with different stakeholders in order to discuss, listen to each party and then come up with the solution or suggestion to take actions. As an informant described:
We have regular coordination meetings in every week..... Mostly contractors are experienced so they call a coordination meeting themselves in which all the concerning parties present and share their problems with each other and make a decision after meeting, or it can also happen they physically visit the site so they tried to resolve the problem. (General Manager, Contractor 3)

Meetings were organized especially only for the purpose of negotiation with key stakeholders like designers in order to resolve their concerns so that they can provide their services which are imperative for project. As the quote illustrates:

1st we resolved with the CPG. We had a meeting; we go through with the correspondence and all the contractual issues. We revoked their confidence into this project so we invited them for their proposals. We negotiated and the contract was extended, their contract extension has already taken place. They are working normally. There was a hiccup which was removed. As far as second ADPI was concerned again similar methodology was adopted. Issues have mostly been resolved but finally their extension contract is not yet formalized but they are rendering their services, there is still a gap of services from ADPI. I negotiated with both the consultants for coming back to the site and resume their services. The issues were resolved and they are back into the limelight. (Project director, Client)

Reinstatement

Different stakeholders like designers and contractors were not rendering their services, which adversely affect the project so the client revived their contacts in the interest of project. Usually client resolves old problems and takes assurance that the problem which was reasons to deprive their services will not be repeated. As illustrated in quotes:

I restored and talked with Nespak. I talked with Nespak’s MD, whatever the old issues and disputes were. He was kind enough and I asked him to depute their people, we invited them for a meeting, we solved problem, restore them and they are providing their services.
When I came, Beixin again approach to CA Headquarter that they want to work with new management and with new conditions and they will refill their weaknesses and shortfalls, revise their targets and will do work in proper manner. Like this Siemens also assured us.... Finally, we made agreement then we told both of them to withdraw cases from court. It is one of the pre-condition with them to revive the contract that whatever are the claims for both of the contractors, they provide us in writing and withdraw cases then they are mobilized on site. (Project director, Client)

Even after getting clear instructions of reinstatement from court, client was trying to play escape game, they come with high handed approach but then it was negotiated, as an informant described:

We were fighting in the high court, and we won. So now we have to be reinstated. CAA says we have to reinstate or we would consider it for review.... So they just stuck in the high court; high court, of course being as a sub juristic, they could not appoint anyone else or do anything else, any further move they can’t take, so they can ask from contractor and sub-contractor. We start talking to them in this regard that you know you might not get anywhere with this… We would suggest that to solve this matter, you have to reinstate us.... So we negotiated from then onwards on to March of 2014 and then we were reinstated. (Head of project, Contractor 6 & 8)

Legal actions

For termination and suspension, the contractors went to court and took legal actions, to prove that the decision made by client was not correct. However, after termination client wants to encash performance bond, it is 5% of contract; contractors have to put down that amount. In case if contractors don’t perform then paying master can encash this bond, but it was stopped by high court orders. As illustrated below:

The Employer, after notification of termination, attempted to encash the performance bond. We successfully countered this attempt through an urgent High court order. We go to the High Court with an urgent court order to stop. We stopped them from encashment. So high court ended up
stating that termination was illegal. It took 2-3 months mainly to get an approval from High Court which says that Siemens should be reinstated. (Head of project, Contractor 6 & 8)

On the other hand, sometimes, certain employees can’t take actions as they don’t have authority so they can convey it to higher authority so that the serious problem (termination and suspension) can be discussed in broader level and then high authority react to it. As informant described:

Termination in package 8b for which we took legal action, we used our general counselor and we took advice from outside. Obviously, that type of action is not in my authority. So I needed to escalate this. Escalate it to the CEO, he of course will take it to the higher level and then based on that we thought of taking actions and some of the actions were just legal actions. We did the same thing for suspension of sub-contract… so that’s how we dealt with these crises. (Head of project, Contractor 6 & 8)

**Sense making process in mega project: A model**

Our findings summarized in figure 1 (Appendix B), outline the sense making process of information gathering, crisis interpretation, report/record and response. In this section, we draw on the concepts we have identified during analysis and present a model of sense making process of crisis in mega projects, showing how the process unfolds and relationship between key concepts. We proposed a model shown in figure 2 (Appendix C), serving to explain our findings and extend the existing theory of sense making.

***Insert Figure 2 about here***

According to our model sense making process is the outcome of interplay of information gathering, crisis interpretation, report/record and response. Our model began at the point of information gathering, which is assumed to trigger sense making process. There are two types of information gathering that we highlighted in our model (i) information gathered from team members and (ii) information gathered from different stakeholder. Moreover, information gathering may lead to crisis interpretation with respect of key stakeholders (i.e. client,
contractors and consultant). There are four types of crisis interpretations: (i) internal social, (ii) internal technical/economic, (iii) external social and (iv) external technical/economic. Crisis interpretation on the part of mega project is an effort to give meanings to crisis. Second, it might happen that new information may change the current interpretations and give new meanings to crisis. Moreover, crisis interpretation also leads to information gathering. Crisis interpretations, may require further information gathering (to respond), or some times, key stakeholders go back to information gathering phase in order to find that crisis still persist with same interpretation, or it does have new meanings.

Crisis interpretation has two different implications. First it may lead to direct response, in which the stakeholders have to take actions in order to respond to crises. Direct response is usually for crises those are controllable (possible to mitigate crises so organizational stakeholders have to respond crises, irrespective to their dimensions). Second, our model connects crisis interpretation with report/record. The important thing to consider here is that it might happen that a crisis for stakeholder A is not necessarily crisis for stakeholder B but stakeholder B has authority to respond or it might happen that a crisis is produced by stakeholder B (i.e. contractor, client, consultant or any other agency indirectly involved in project) but it directly affects stakeholder A (contractor, consultant and client), and stakeholder A does not have authority to respond to crisis, or it is not in their domain so they (contractor, consultant and client) have to report/record crisis to stakeholder B. Usually report/record is done when crises are uncontrollable (crisis is out of control to mitigate or to take action so it is reported/recorded to those who can respond). The interesting thing is that report/record is crisis specific. For internal social crisis, report/record is done through request for compensation, report crisis to different stakeholders (i.e. client, consultant), and report within organization (to record concern at higher level). However, request for compensation and report to different stakeholders are the reporting mechanism for internal technical/economic crisis. Last but not least, reporting for both external social and external technical/economic crises is done through different stakeholders.

Report/record will also lead to indirect response to crisis, if the response is in the domain of stakeholders (client and consultant) and higher level of hierarchy (to decide what response to take), they will respond to it. On the other hand, there might be few crises that are merely
reported/recorded, response was not made. As mentioned above it might happen that a crisis for one stakeholder is not considered crisis for another stakeholders, for example contractors’ crisis might not be considered crisis by another stakeholder i.e. client (those who have to take actions) because they will not get the same sense of urgency. Client might not respond to crisis and contractors can merely report/record crisis. So in this case report/record is considered to be final stage of model.

First link we propose is between report/record crisis and information gathering, as indicated in dotted arrow. Once crisis was reported and recorded by those who can’t respond to it then stakeholders or high level hierarchy who are in position to respond crises might need to gather information, give meaning to crisis and respond to it (a conventional sense making process). Next we propose another connection between report/record and crisis interpretation. Once crisis was reported and recorded, the stakeholders and higher authority already have complete set of information so they just start from crisis interpretations, in order to give meaning to crisis, to develop common understanding and then respond to crisis.

A classic sense-making model is linear with having information gathering, crisis interpretation and response, while we refined the emergent model and suggested cyclic model as indicated in figure 2 (Appendix C). Second we elaborate interpretation to crisis interpretation and identify a new element of report/record and dissect response into direct and indirect response in sense-making process.

**Sense making process matrix**

From table 1 (Appendix D), we try to give insight to our readers about sense making process. First we have four different types of crisis interpretations: (i) internal social, (ii) internal technical/economic, (iii) external social and (iv) external technical/economic. The information gathering element i.e. information from team members and information from different stakeholders, is same for all crises. However, report/record does have dissection and crisis specifications. For internal social crisis, report/record are done with all three mechanism of request for compensation, report to different stakeholders and report within organization; for internal technical/economic crisis reporting is done through request for compensation and report
to different stakeholders while for external crises both social and technical/economic crises reporting are done through different stakeholders. Response is also crisis specific, we identify seven responses i.e. up-gradation, advance procurement, hire specialized HR, formation of committee, negotiation, reinstatement and legal actions. For internal social crisis responses are hire specialized HR, formation of committee, negotiation, reinstatement and legal actions, for internal technical/economic crisis up-gradation and formation of committee are the response, while for external social crisis formation of committee is the only response and lastly for external technical/economic crisis up-gradation and advance procurement are the responses.

***Insert Table 1 about here***

Responses like up-gradation overlapped for internal and external technical/economic crises and formation of committee overlapped for internal social, internal technical/economic and external social crises. So we can say that responses are not similar for all types of crises except up-gradation and formation of committee.

Furthermore, we split response into two categories (1) direct response (2) indirect response. Direct responses are specific for controllable crisis. Put it simply, it means that crises are responded immediately after interpretations. Direct response consist on advance procurement, hire specialized HR, formation of committee and negotiation for internal social, external social and external technical/economic crises. These responses are crises specific i.e. hire specialized HR and negotiation are responses for internal social crisis; advance procurement and formation of committee is only responses for external technical/economic and external social crisis respectively. However, indirect response is required for uncontrollable crisis, or for the crisis that are responded after report/record element. In our case, we find out the up-gradation, formation of committee, negotiation, reinstatement and legal actions are the indirect responses.

Formation of committee, negotiation, reinstatement and legal actions are responses for internal social crisis; up-gradation and formation of committee are responses for internal technical/economic crisis and up-gradation is only response for external technical/economic crisis. Up-gradation as indirect response is overlapped in internal technical/economic and
external technical/economic crises. Whereas formation of committee and negotiation are overlapped both in direct and indirect responses, formation of committee as direct response for external social crisis and indirect response for internal social and technical/economic crisis. Negotiation is direct and indirect response for internal social crisis. However, we did not find direct response for internal technical/economic and indirect response for external social crisis. So for direct and indirect responses we can say not all responses are equally relevant for all types of crises expect formation of committee.

Discussion
We considered sense making in mega project thus we expand the existing literature on sense making that has largely focused on organizations. The wider implications of grounded view generated by this study stem mainly from understanding the emergence of sense making/giving process in mega project, especially as it pertains to the management of crisis. This research complements previous studies that have explored the role of sense making and sense giving (Gioia & Chittippeddi, 1991; Maitlis & Lawrence, 2007; Rouleau, 2005; Stigliani & Ravasi, 2012) and contributes to the theoretical perspective of sense making and sense giving (Gioia & Chittippeddi, 1991; Weick, 1995), which means how people think (sense making), and how people attempt to influence how others think (sense giving). However, our study extends understanding of the sense making process and goes beyond the observation of emerging sense making elements. In doing so, we provide empirical verification and extend prior work of Daft & Weick, 1984; Milliken, 1990; Rudolph et al., 2009; Thomas, Clark, & Gioia, 1993; Weber & Glynn, 2006; Weick, 1979; Weick, 1995; for information gathering, interpretation and response and we introduced the concept of report/record. These elements can be differentiated into two basic categories, we called them sense making and sense giving. Sense making consists of three elements: information gathering, crisis interpretation and response. Sense making refers to interpretation of environment through interactions with others, constructing accounts that allow to, comprehend the world and act (Isabella, 1990; Sackmann, 1991; Weick & Roberts, 1993 (p. 21)). Sense giving was associated with report/record crisis. It is a process by which individuals attempt to influence sense making and meaning construction of others (Gioia & Chittippeddi, 1991; Maitlis & Lawrence, 2007). This brings into focus not only make sense of environment (for self), but it is equally important to influence others’ meaning constructions (for others)
through sense giving. However, this study represents that sense making and sense giving are closely related; one implies the other and cannot exist without it (Hopkinson, 2001: 1415). In this section, we discuss the contributions this study makes toward sense making/giving process in mega project.

**Information gathering**

The environment contains some level of uncertainty, so it is pivotal to obtain information from the environment (Braybrooke, 1964). Information gathering is defined as the process of monitoring the environment and providing environmental data to managers (Daft & Weick, 1984). Information can come from external or internal sources, and from personal or impersonal sources (Aguilar, 1967; Keegan, 1974). Sources are external when managers have direct contact with information outside the organization and searching the external environment to identify important events or issues (Daft & Weick, 1984; Kiesler & Sproull, 1982; Milliken, 1990). Internal sources pertain to information collected about the environment by other people in the organization and then provided to managers through internal channels (Daft & Weick, 1984). However, personal sources involve direct contact with other individuals. Impersonal sources pertain to written documentation such as newspapers and magazines or reports from the organization's information system (Daft & Weick, 1984). Our finding is consistent with the literature of information gathering since we find out external (information from different stakeholders)/internal (information from team members) and personal (from stakeholders and team members)/impersonal (reports/documents) sources for information gathering. However, contemporary researches are looking into information gathering from organizational perspective but we scrutinized mega project environment, so our contribution extend current literature on information gathering from organizations to mega projects.

**Crisis interpretation**

Interpretation is formally defined as the process of translating events and developing shared understanding, but it occurs before action (Daft & Weick, 1984). Interpretation is one of the most important functions to perform. Crisis is ominous, in our case of airport project we considered crisis as “a low-probability, high impact event” (Pearson & Clair, 1998: 60), we did not study similar concepts of risks and issues, we only study crises, that’s why we used the term of crisis
interpretation rather than interpretation or issue interpretation. Moreover, prior research on sense making like Mann Gulch disaster (Weick, 1993), Union Carbide gas leak that occurred in Bhopal (Shrivastava, 1987) and Columbia shuttle disaster (Dunbar & Garud’s, 2009), they mostly focused on the exogenous and life threatening events. Other scholars emphasized on technological factors, such as technical faults during crises or technological implementation difficulties (Orlikowski, 1996; Orlikowski & Gash, 1994). Nevertheless, we contribute into this gap by considering exogenous/endogenous and social/technological crisis events and our research is focusing on broader concept of crisis not only life threatening events, since we believe that crisis is not necessarily life threatening. Additionally, crisis is either controllable or uncontrollable; it is consistent with dimensions of interpretation (Jackson & Dutton, 1988). Contrary to existing literature, our findings suggest that crisis interpretation only leads to response for controllable crisis and leads report/record for uncontrollable crisis.

Furthermore, organizational crisis typology is introduced by Mitroff et al., 1987; Shrivastava & Mitroff, 1987. In which they categorize crises into two dimensions, an internal-external and technical-social dimension. We made several contributions in this regard. First, we grouped crises into typology of Mitroff et al., 1987; Shrivastava & Mitroff, 1987; i.e. internal social, internal technical/economic, external social and external technical/economic crises. We identified crises in project context so we extend application of their typology of organizational crisis to project crisis. Meanwhile, we also find some new crises (i.e. land acquisition, unavailability of basic amenities, Supreme Court intervention/ monitoring agencies, international procurement and others). We can say that we extend study of organizational crisis (Weick, 1988, 1993; Wicks, 2001; Pearson & Clair, 1998; Turner, 1976) to projects’ crisis. In addition, the most obvious contribution we believe is development of refined and finer categories i.e. internal social, internal technical/economic, external social and external technical/economic.

**Report/record**

One of our main contributions is that we extend sense making and sense giving modes with the element of report/record. Gioia and Chittipeddi (1991) described both sense making (envisioning and re-visioning) and sense giving (signaling and energizing) modes for strategic change. Prior studies on sense giving studied non crisis situation where attention is given to organizational
leaders (Gioia & Chittipeddi, 1991; Gioia & Thomas, 1996; Gioia et al., 1994; Bartunek et al., 1999) and middle managers (Dutton & Ashford, 1993; Dutton et al., 1997). Looking into prior research we made several contributions. First, we extend prior research by studying crisis situation since we believe that studying non crisis situation is different than studying crisis situation. Our findings consolidate this argument by identifying a new sense giving elements of report/record for crisis. Second, our study focused on mega project, where diverse organizational stakeholders involve in sense making simultaneously, rather than focusing on individual role of leadership and managers. Moreover, getting back to Jackson and Dutton (1988) dimensions of interpretation, crisis can be controllable and uncontrollable; our findings show that the sense giving mode only emerges when crises are perceived to be uncontrollable. In nutshell, report/record crisis is connected to informants’ perceptions that crisis is out of control or either in external control (crisis is controllable by others); it means they do not have capacity to do something about crisis (Weick, 1988). However, the element of report/record is about to give sense (influence understanding); by developing collective and shared meaning of crisis to those who would have capacity to respond. Report/record itself does not resolve crises, but rather trigger sense giving mode. We find out that there are three ways to report/record crisis, request for compensation, report to different stakeholders and report within organization.

Conventional reporting literature deals with error and mistakes (La Porte, 1996; Buchanan & Denyer, 2013). There are different levels of reporting (i) reporting to a higher level of hierarchy (Hermann, 1963); there are often a number of formally designated positions for reporting (La Porte & Thomas, 1995); and (ii) reporting to different stakeholders (e.g., investors/ regulatory agency) who might not know about event (Pirson & Malhotra, 2011; La Porte & Thomas, 1995). After reporting, if crisis negatively impact stakeholders and its impacts can’t be mitigated then compensation is required (Williams, 2003; Joseph et al., 2015). Our finding is consistent with two level of reporting i.e. within organization and to different stakeholders. However, our contribution is that reporting is not merely required to make higher authority and stakeholders aware of crisis event. Usually not all stakeholders (including higher level authority) interpret crisis in the same way although they are aware of crisis. Reporting to key stakeholders and higher authority can be used to influence their interpretation of crisis and to underline the urgency of crises to them. Its primary motive is to get decision (response). Higher authority and
stakeholder like client can take actions, since lower middle staff and stakeholder like contractors don’t have capacity to respond so in this regard crisis can only be reported. Furthermore, reporting to stakeholders also means recording crisis event, so that key stakeholders can get details of crisis if needed. Once the crisis is reported and recorded, response must be taken. We can say report/record is a driving force for actions. In addition, any delay in response will lead to compensation. If crises occur due to client or consultant, then contractor gets compensation. There are several contributions here. First step is to report crises to different stakeholders or to higher level of hierarchy. Afterwards, any of three conditions are applicable for compensation: (i) action is not taken and (ii) action is taken lately and (iii) action does not mitigate crisis.

Response

Weick (1988) asserts that action is an integral part of sense making. Actions could alter the very environment under consideration (Porac et al., 1989) and even alter the trajectory of events or precipitate crises (Abolafia & Kilduff, 1988; Weick, 1988). Response is a capacity that people feel they can do something about crisis (Weick, 1988). Usually response is studied in environmental changes context (Daft and Weick, 1984) and the literature talks about proactive and reactive response for abrupt events (Barber & Warn, 2005). Our contribution to prior research is that (i) we studied response to crises not to environmental change and (ii) our findings support that all the responses to crises are reactive; for example actions taken in our case study are up-gradation, advance procurement, hire specialized HR, formation of committee, negotiation, reinstatement and legal actions, they all represent that responses are taken after crises aroused. In crisis situation, it is almost impossible for people to know in advance the form a crisis would take, what its source would be, or which stakeholders it might involve. Since crisis is low probability and high impact event, so it is not possible to set contingency for these events. Reactive response can only be taken.

Another important contribution is that we find two different kinds of responses i.e. direct and indirect responses. Direct responses are taken immediately after crisis interpretation and indirect responses are taken after giving sense to crisis. It means that direct responses are taken when crisis is controllable and indirect responses are taken when crises are uncontrollable. This extends the prior research on response that often depends on scanning strategies and subsequent
interpretations (Ranson et al., 1980). Furthermore, we find out that not all responses are equally relevant for all types of crises. Few of the responses are direct like advance procurement hire specialized HR, formation of committee and negotiation while up-gradation, formation of committee, negotiation, reinstatement and legal actions are indirect. Formation of committee and negotiation are mutually exclusive. So we link crisis response to the type of crisis. Moreover, our findings show that the response is usually taken by one or two of stakeholders. Since response to, crisis will be influenced by position, relations and resources.

One of the important findings that the case of airport shows, it seems that attention is given to report/record rather than response; response is either not taken or taken very late. The possible reasons are (i) the organizations are not passive recipients of meanings but instead engage in their own sense making and adopt, alter, resist, or reject the sense they have been given (Gioia & Chittipeddi, 1991; Gioia et al., 1994; Pratt, 2000; Sonenshein, 2010), (ii) response uncertainty that a decision maker is not confident about how to respond, because he or she is either not sure what the response options are or is unsure about the effectiveness of each possible response for achieving desired outcomes (Milliken, 1987) and (iii) stakeholders have distinct vested interests (Clarkson, 1995; Freeman, 1984) what is important for one actor might be insignificant for other (Greenle & Foxall, 1997; Hillman & Keim, 2001). However if crises would not be responded, it will impact stakeholders, organizations and projects, so it is pivotal to take actions. When stakeholders and organizations fail to understand the crisis, they left crises unattended. Sense giving is important but it does not mean that stakeholders stop making sense.

**Conclusion**

In previous sections, we presented four elements of sense making/giving. It becomes evident that the phases in sense making and sense giving modes correspond to understanding and influence respectively (i.e. sense making phases are dealing primarily with understanding of processes and sense giving phases are concern attempts to influence the way that another party understands or makes sense). Consequently, our study complements existing literature on sense making/ sense giving processes by providing new insights. Sense making and sense giving with four elements of information gathering, crisis interpretation, report/record and response, complement each
other, and sometimes sense giving mode is required to proceed with sense making. The study drives that neither crisis nor sense making is organizational specific or context specific.

This study makes several important contributions to the sense making/sense giving literature. First, it extends three dimensions that describe the sense making process: information gathering, crisis interpretation and response specifically direct and indirect response. Second, finding of sense giving elements of report/record is among the most revealing. Given our findings about report/record we can conclude that sense making process engages sense giving process in it. Third, sense making and sense giving might not occur is linear fashion but they occur in reciprocal and recursive fashion; the four elements enrich the understanding of sense making/sense giving. Sense making and sense giving occur simultaneously and stakeholders integrate sense making and sense giving mode altogether and moving from sense making to sense giving and vice versa is rapid; it seems like a natural process. Fourth, this study identifies four elements for sense making/giving among a pool of diverse stakeholders and variety of organizations addressing a range of crises in mega project. This contribution is important for sense making/giving research because it demonstrates that sense making is neither a singular, nor a random process. Last but not least, we believe that our grounded, emergent model is a refined form that can serve as a basis for further research concerning some of the distinctive features of sense making in mega projects. We hope that other researchers will find our model useful as they augment thinking in this important area of inquiry.

Our study opens several new avenues for further research. Here, we present few of the most promising. First, we conduct study on aggregate level by looking into mega project in which diverse organizations and stakeholders are performing their tasks; so the role of each individual organizations and stakeholders in sense making is devaluated. Stakeholders engage in sense making from variety of organizational positions, histories, and personal backgrounds that create divergent frames of reference and lead them to take on different roles in sense making processes (Dutton & Dukerich, 1991; Gephart, 1993; Weick, 1995). However, we consider mega project as unit of analysis and it gives access to multiple organizations engage simultaneously in sense making process but we are not looking into organizational sense making process, future research might consider organizations and stakeholders as unit of analysis and to compare sense making
process of different organizations and key stakeholders (client, contractors, sub-contractors and consultants) in mega projects. Second, our study was conducted in mega project considering the internal stakeholders. Potential future research might look into role of external stakeholders for sense making/giving process in mega project. Third, we believed that new international Islamabad airport is an excellent setting for refining theory about sense making. As such, it represents an extreme setting that offers an especially good example of sense making/giving. At the same time, it raises questions about the transferability of our theory. Put simply, is our case so unique that the theory applies only to airport project? While caution is always necessary with single-case studies, we believe that our framework can be transferred beyond our mega project since data is collected from a heterogeneous set of organizations. Finally, further research could investigate how cultural variations affect the sense making process. Indeed, the case study in this research was a project in Pakistan, which is a distinctive environment. As such, the phenomena associated with sense making in mega project that we analyzed in this study may be a manifestation of country and cultural background. Further research will deepen our knowledge of such context-specific influences.

Reference


Civil aviation authority, 2014. Revised PC-1 Pro-forma.


Retrieved: [September 9, 2015]


Appendix A

Interview guide

Project background
Tell me about yourself: Background, role, responsibility of interviewee.

Description of project organization

Crisis
Crisis is refers to as event that is a low-probability, high impact event that threatens the viability of the project and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly”

Please describe main crises (2-3) that took place during the project?

Do you think of crisis in term of positive/negative outcomes? You experienced similar crisis in the past?

Sense Making
Tell me how this crisis arose (please describe in detail)

What happened during crisis? (Your perceptions, feelings and etc.)

In crisis, what information would be most helpful? How did you gather this information?

Tell me about a time when you had to analyze something without existing guidelines or examples. How did you approach the crisis?

What were you trying to do in crisis? How did you respond to crisis? What actions you take?

Tell me about the most difficult crisis situation you have ever handled. What did you do, and what was the outcome?

Give me an example of a time when you responded quickly to a crisis. What was the crisis? What was the outcome?

Is there anything else that you see as important that we have not covered?


**First order categories**
- Reporting is done by staff/team members
  - Reports/documents
  - Meetings
  - Site visits
- Collect data from contractor
  - Collect information from consultant
  - Communicate with designer
  - Communicate with client
- Coordination issue (Multiple package/area hand over/package award)
  - Change of management from client side
  - Change in design consultant/designers left project
  - Frequent change in PMC/PMC walked away
- Design issues
  - Design remoteness
  - System integration issues
- Unavailability of basic facilities of water and electricity
  - Unavailability of access road
  - Supreme Court intervention/monitoring agencies
- Payment issues/exchange rates
  - International procurement
  - Change in technology
- Ask for claim
  - Ask for extension of time
- Communicate through consultant
  - Meetings/inform client
  - Ask from CPG-designer
- Discuss with head of project manager
  - Report to head quarter
  - Engage general counsel
- Update
  - Incorporate changes

**Second order themes**
- Information from team members
- Information from different stakeholders
- Internal social crisis
- Internal technical/economic crisis
- External social crisis
- External technical/economic crisis
- Request for compensation
- Report to diff. stakeholders
- Report within organization

**Aggregate dimension**
- Up-gradation
- Advance procurement
- Hire specialized HR
- Formation of committee
- Negotiation
- Reinstatement
- Legal actions

**Crisis interpretation**

**Report/record crisis**

**Response**

**Appendix B**

**Figure 1: Data structure**
Figure 2: Sense making process in mega projects

Information gathering
- Information from team members
- Information from different stakeholders

Crisis interpretations
- Internal social crisis
- Internal technical/ economic crisis
- External social crisis
- External technical/ economic crisis

Direct response
- Advance procurement
- Hire specialized HR
- Formation of committee
- Negotiation

Indirect response
- Upgradation
- Formation of committee
- Negotiation
- Reinstatement
- Legal actions

Report/record
- Request for compensation
- Report to different stakeholders
- Report within organization

Appendix C
Table 1: Sense making process matrix

<table>
<thead>
<tr>
<th>Crisis interpretations</th>
<th>Internal social crisis</th>
<th>Internal technical/ economic crisis</th>
<th>External social crisis</th>
<th>External technical/ economic crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information gathering</strong></td>
<td>Information from team members</td>
<td>Information from team members</td>
<td>Information from team members</td>
<td>Information from team members</td>
</tr>
<tr>
<td></td>
<td>Information from different stakeholders</td>
<td>Information from different stakeholders</td>
<td>Information from different stakeholders</td>
<td>Information from different stakeholders</td>
</tr>
<tr>
<td><strong>Report/record</strong></td>
<td>Request for compensation</td>
<td>Request for compensation</td>
<td>Report to diff. stakeholders</td>
<td>Report to diff. stakeholders</td>
</tr>
<tr>
<td></td>
<td>Report to diff. stakeholders</td>
<td>Report to diff. stakeholders</td>
<td>Report to diff. stakeholders</td>
<td>Report to diff. stakeholders</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>Hire specialized HR</td>
<td>Up-gradation</td>
<td>Formation of committee</td>
<td>Up-gradation</td>
</tr>
<tr>
<td></td>
<td>Formation of committee</td>
<td>Formation of committee</td>
<td>Formation of committee</td>
<td>Advance procurement</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinstatement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legal actions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Direct response</strong></td>
<td>Hire specialized HR</td>
<td>-</td>
<td>Formation of committee</td>
<td>Advance procurement</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Indirect response</strong></td>
<td>Formation of committee</td>
<td>Up-gradation</td>
<td>-</td>
<td>Up-gradation</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td>Formation of committee</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reinstatement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legal actions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2: Additional representative quotes

| Information gathering | Information from team members | I have a good team here, so I am informed about the rising issues on site, by my site managers and engineers on frequent basis and daily basis. Of course I have my own justifications, I see what’s going on at site, and I see what’s going on with the documents and submittals. (Project manager, Sub-contractor 1) |
|-----------------------|-------------------------------| I looked into documents, site, and drawings to gather information, and in case contract is silent, I gathered information from documents and sites. (Manager, PMC) |
|                       |                               | Info is complete and came to us immediately because our own people were working on site. Our staff came to office daily, in the evening we have regular meeting with our staff they told us about the problems. Information was gathered from site meetings. Construction staff was there. Problems were told to us and we check that we have to take it to PMC. Site staff informs us. (Project manager, Contractor 4) |
|                       |                               | If something happened on site, you see our office and site are so close. Every day we have to go to site to check all these things. If something happens, I mean accident occurs we will have some meetings in no time to discuss why these things happened and how to handle, how to resolve these things within team. If I am not on site then they will call me, they will report me and I will go to site. (Site superintend, Contractor 2) |
| Information from Stakeholders | Information is necessarily coming from employer or contractor...We communicate always with engineer… In this case it’s Mott MacDonald, Pakistan. They are coordinating everything. Civil Aviation is employer, information comes via engineer. Sometime, employer would cc us in their letter to engineer, three of us, we, the employer and the engineer. So they would cc us and we get a critics copy in advance but we don’t react to it. At least we know that, where it is. (Head of project, Contractor 6 & 8) |
|                       |                               | Some part of information could be instruction or a response to a submission. When we submit material for example we would like to use foreign material then they approve, we give justifications, they look at it, comment and approve with comments, reject, revise and re-submit. Something like that, that’s ADPI, then of course a designer has to act on it or we have to go back to designer, if they need shop drawings, if they need design to approve, they need to provide comments, the designer need to approve. (Head of project, Contractor 6 & 8) |
|                       |                               | The only way we can get information is to talk to people. So it’s communication with contractors, consultants and clients. (Project manager, PMC) |
| Crisis interpretation | Internal social | Basically, package 3 is executing for passenger terminal building which includes internal works but there are other packages like package 4, 5 and 9 which have some interfacing works, since this whole project has been divided into so many small packages so it would be very difficult for us to manage and resolve interfacing issues because so many contractors are involved.... It is very difficult to coordinate. According to my own experience in the foreign market, generally such kind of big projects should not be divided into so many small packages. Because it will be very time consuming for the interfacing issues, resolution and
coordination…. Generally speaking such kind of terminal building should be a comprehensive system. It should be a comprehensive work to be done. (Project director, Contractor 2)

This package should be awarded at time when client was awarding package 3, because we are facing so many issues, work on package 3 has done, and we didn’t even start. The impact of our work might destroy their work. Like for example, if they have lain the floor and we have to lay some wires, we have to break the floor and lay the wires. The packages which were supposed to come earlier on, they came later…. If you visit the airport, false ceiling has been fixed but you will be surprised that cabling is not yet started. Now if I do cabling, I’ll probably have to destroy everything, because I have to fix stairs and get people on it. False ceiling is such a weak thing if someone falls, 50 more will be destroyed which are close to it. It has to stay open until cabling part would not be completed… So this is the problem. It was not in sequence. At the time we should’ve engaged, we didn’t. (Integration manager, Contractor 7)

The PD was removed, there is a new PD and then another 4-5 PDs came after this. Change of management in a couple of hours, lot of changing, especially on the employer’s side….. So that’s crisis when current PD is removed and new PD came in, some of these communications you do is where you discuss the matter with him in a formal or informal meeting, but you come to an agreement that what should be done, how it should be done, when it should be done….. Any agreement that you had with prior PD and understanding that you had with him, all was lost. (Head of project, Contractor 6 & 8)

The designer, who is ADPI, they even stopped working. They give drawings and it goes to the engineer, they approve it and they make comments and then send it back. That was stopped because they were not being paid... They were being not operational for quite some time. So ADPI was eventually replaced by what they call FDSS but they couldn’t make decisions because they didn’t have the necessary discipline with them. Since this airport is not a house building, there are complex systems so you need the skills to make decisions for design... New designer is apparently less good and they were reinstated 2-3 weeks ago. (Head of project, Contractor 6 & 8)

LBG Group, they’re also a project management consultant and they were the original engineer of this project… They were not terminated, they were just not paid. The CA stopped paying them and eventually they said that’s enough and walked away…. There were few weeks where there was no engineer on site. Then they appointed what you call OTE, Office of the Engineer, I call it the midterm engineer, and they were in operation I can’t remember but I think 4-5 months. Anyway, after OTE, then Mott McDonald was appointed from mid of June. (Head of project, Contractor 6 & 8)

Termination of Package 8B contract and suspension of Package 8C-1 sub contract, we were suspended as sub-contractor. Both these events where entirely unexpected and could be ascribed to irrational behavior by the Employer. A Writ Petition was handed to the Supreme Court in Pakistan by an unknown person with a claim that things are not correct on this project. They made different statements and one of those statements they made that there is corruption on this project. The Supreme Court had to act on it and of course their jurisdiction was to call in witnesses so that they come and make statements, we made a statement from our point of view for package 8b. Of course we could not make a statement for package 8c1 because we are sub-contractors, Beixin had to do it. The project director of Civil Aviation, he
blamed it on the contractor. Of course the judge asked, so what did you do about it, because you have to do something about it and the next day we were terminated. Project Director of CAA Pakistan issued a notice of termination to Package 8B and Package 8C-1 for reasons only known to him. That was a knee jerk reaction from him. (Head of project, Contractor 6 & 8)

<table>
<thead>
<tr>
<th>Internal technical/economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>In contract it is written that we have to issue you construction drawings; from construction drawings you will make shop drawings. In fact, those construction drawings are the metric drawings; they have written metric drawing as construction drawings. Now from construction drawings you have to make shop drawing. In fact, you have to develop construction drawing because of that you have lot of burden. At one side you have to execute and on the other side you have to make construction drawings for that you don’t have proper time. Design consultant should do this work. Our view is that metric drawings are issued as construction drawings and after that we have to do a lot of work. (General manager, Contractor 3)</td>
</tr>
</tbody>
</table>

Still some of the drawings are under approval. It means the drawings which we have submitted are under approval... When this drawing will be approved then we will go for the procurement. Then construction...at a moment we are totally on halt. Since 2013 we have substantially completed our work and we are sitting over here, we are spending some amount on to keep up this office and this infrastructure. Although it’s a small infrastructure but we spend something, whenever a contractor envision that I have to complete this project in 14 months’ or 18 months’ time..... So for contingency he can only keep 10% of his amount but now this project has rolled over to 5th year. It’s a 5th year. It’s not completed so how can one contractor survive in these circumstances, so we are in loss. (Project manager, Contractor 4)

PMC is engineer, we sign off inspection reports and submittal designs. Design is not handled by this office, design is handled by consultants in Singapore and one here in Pakistan, we have to make sure that they do their job and it is quite difficult because of the remoteness. We don’t have the immediate face to face availability to just go there and say, “Look we need a quick action on this from you, it’s really serious”. We have to send the documents to them by email, they don’t get the same sense of urgency that we have so it takes 2 weeks to turn it around and contractors are not happy with it. Communication can be done by email and by correspondence with designer in Singapore because the designer is there but we would prefer to have them on site here so that we can go and talk to them face to face, sit around drawings and discuss things rationally, get things done on the spot. Now all of this delay in communication is very frustrating. (Project manager, PMC)

Normally you design the building around baggage handling system; in this case the building is standing up without a baggage handling system. Systems integration will drive the success or failure of this airport. There are up to 250 different systems. It has to go with facilities, from sub-stations controlling power, power distribution to the major terminal building and flight information displays, the CCTV, the access control systems... Normally you plan for these things as you are planning to build the airport. You plan to build the terminal building; you plan for the baggage handling system and you plan for the systems to be operated. In this case they didn’t do that. They were thinking of assets only, facilities only; air traffic control tower, passenger terminal building, utilities, roads, car parks and runways etc. the hard assets. They were not very much focus on these hidden aspects which really drives an airport.... First thing is that, we really need to think about systems as it really is the driver of this airport. All of the rest is the hard asset on which the systems sit or located. (Project manager, PMC)
| External social | Selection of the project site was faulty and to date there is no water availability for the project. Initially, it was planned that water would be brought from nearby Shahpur Dam which is approximately twenty-one (21) kilometers away from the project site. More perplexingly, there is not enough water in Shahpur Dam. Hence, the plan now is to construct small dams by harvesting rain water. (Archival data)  
You need to have some linkages for example it’s another high impact event, there is no access road; you are spending 100 billion rupees with an area of 4 kilo meters. It’s high intensity expenditure. You build the road with same money probably you will be able to build 200 KMs. But then you spend this money on high-tech state of the art, so intensity has increased. Access road is high impact issue for this airport. It does not have entry we are working on ad hoc system. How can we work on ad hoc system? And end up building state of the art airport. That is actually the first thing that you should do so that you have most economical entry and exit. (Director, Contractor 3)  
Due to Supreme Court interference our project faced 2 years of delay. It has to complete in year 2013 but Supreme Court took Suo moto action… the main issue is that all equipment has been used on ATC tower, Airport traffic control tower… but everything was closed, ATC should be complete as a clean room, then we can install our equipments, our equipment would be install on all storeys, all 9 stories of ATC tower… it needs 8 months more to be done. We were told at the time of pre-beginning meeting, first meeting was held on 21st October of 2011 that ATC tower will be completed in next 6 months on 31st of March 2012… but from that day to today, it is not completed. (Project manager, Contractor 5)  
We did not create comprehensive futuristic airport. In 84, land was acquired, it was acquired in pockets. When you acquire in pockets then you lack comprehensive plan and you have short of plan, it develops as and when. When you work in bits and pieces you have problem, I always believe that once you do things in larger concept, it’s easy to manage smaller issue within the larger concept but when you start with smaller then it’s difficult to accommodate the large concept…. Now once we do this airport, its lead some linkages, some vendor industry would come up, some businesses would come up, and some high quality societies would come up so you have to look beyond the airport. How surroundings are going to be impacted, this would not be like, by the time this airport is done, you have a congested airport. You have as good airport as you have in Chaklala. It needs some long term planning and certain outer peripheries have to be taken care off. Colonies have been made; now that policy is coming out that there is no building about one kilo meter. How can you do that now, people had done it already. (Director, Contractor 3) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>External technical/ economic crises</td>
<td>There is problem of payment. What is a meaning of problem of payment? For us to be able to purchase material from abroad which is not available here in Pakistan. We need to get payment and we need to transfer abroad. To do all this process, there are rules in Pakistan that to transfer money from a local account to abroad you should have the permission of the State Bank of Pakistan. To get the permission from the State Bank of Pakistan (SBP), client should secure a so called foreign exchange allocation budget. Client was not aware of it, so when we went to our bank and they started to say, “Okay before you will receive your money let’s ask SBP what they need” and then SBP expressed their concern saying, “It is client who should have an allocation for us to allow you to get that money abroad”. So client realized this thing in end of July when we told them. Then they worked with the finance ministry I believe and just lately at the end of November they obtained this foreign allocation budget. They</td>
</tr>
</tbody>
</table>
communicated to us. “We have obtained this and please proceed with payment”. They say they have obtained it but once we will get the payment we will go to SBP and will see if SBP will agree for that. (Project manager, Contractor 7)

Significance of this particular project is that we have 95% of foreign procured, foreign brand items…. Transportation logistic time is so much and then you have to be extremely careful, that, if I have to import tiles, import 200 tiles or 400 or 100, how much? How much time before I have to place the order and plus what would be its wastage factor? …. For example, we received glass. I was unaware that there can be 08 rector scales earthquake and glass would be broken but if the same glass is available in the local market then there was no problem, we placed the order once again... Now what we can do, they told us that you should have it, when it breaks, order it, now two glass are broken, So, you can say that the most significant thing about this project is foreign brand approved… which delays the work significantly….. For example I have to bring things from china that is extra effort that I have to buy from them. Assume that if I get a thing in Pakistan from Karachi, Lahore, Multan or somewhere here, so no one can win in race with me. (Project director, Contractor 9)

From 2008, design has changed since then and technology has moved on. If you realize you have florescent lights, they are outdated technology wise. Right now we’re using LED lights which consume less power, they are more efficient but they cost more, even the holder, the basic unit is different, so procurement changes…. It is an old airport planning to be in good shape, it doesn’t have very modern systems. It has some; you obviously check in, your bags get taken care of, there is security, probably CCTV cameras and all kinds of systems are there but they are at very low level. This is going to be a modern facility up to date to international standards so we could hope we will up to the standards of most modernize airports. (Project manager, PMC)

Report/Record

<table>
<thead>
<tr>
<th>Request for compensation</th>
<th>People moved towards the claim, we ask for claim as well and we ask for Extension of time (EOT). (Site manager, Contractor 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contractor will work out for extension of time. At the end, contractor said that my team is here, my staff is here, we have lot of things for mobilization how we will give salary to our staff if you did not hand over areas, you are not approving our drawings, you are not approving the technical submittals. We are bound according to our contract that we have staff here. We are in trouble..... Contractors record the delay event. So that extension of time can be asked, and events like termination and LD will go in favor of contractor. (Site manager, Sub-contractor 1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Report to diff. stakeholders</th>
<th>We communicate to civil aviation or to PMC. There is not a single thing which we did not address. Through letters, normally through letters and in meetings also. Evidently we aren’t the master, civil aviation is the master, you don’t have any control, from where you will bring power house, how you will arrange the tube well, how you will construct the road, you will not go to purchase land for that. (General manager, Contractor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>We communicate with client and we resolve issues by meeting with them. We report and communicate them. We discuss issues in weekly meetings that we do with PMC and representative of clients, even representative of CPG also involves in this. We don’t do decision making there but we report these things every week that these are the delays and issues, resolve them. I just have to tell them about our concern and issues, written or verbal</td>
</tr>
</tbody>
</table>
then it’s up to them how they handle it. (Project management officer, Contractor 7)

We recorded issues to PMC and to CA, we also send them letters. We recorded every point. It is a long process. Let’s see, whenever review board will sit, those records are justifiable, because whenever you are writing something or saying something then you have to prove, on what basis you have given these numbers. The problem we faced, we can prove them. (Project manager, Contractor 5)

You communicate your problem. You communicate your concern to PMC and PMC will communicate to client. Client has to respond it. You can only communicate. The way of communication is face to face meeting, verbal and letters….. We can communicate and correspond on issues. We can't take action by ourselves; it is not in our domain. (Project manager, Contractor 4)

We have a coordination meeting with our HOP. Project manager, site manager, quality manager, commercial officer, and contract person, they are there… and we call meetings on project. They will take an expert opinion advice from HoP. (Site manager, Sub-contractor 1)

As a site engineer I can’t do anything. The senior project management is involved and I can only tell them about the delay and what is needed. (Site manager, Contractor 6)

Response

Up-gradation  Technology is changing 8 years back its different even a year back it's different… Client made a decision that standard 2 is for domestic but standard 3 is for international flights. They upgraded for international flights… Generally speaking we’re trying to build on design that was done in 2008,9,10 by the designers... Those design dates are passed now but we’re sticking to it and improving the technology where it’s appropriate. We could build it as it was designed in 2008 and then CAA might have to upgrade. It’s more efficient to upgrade during the design and construction phase. We will be doing and recommending to be done such as LED lights. LED lights, lighting is one which over an airport represents a lot of cost. The terminal building and highways have got so many different forms of lighting. If we can go to LED technology as it exists today, we will be doing them a favor. By the time this airport opens and they’re still using hydrogen technology, people will be saying, “well think of the running cost of using this inefficient system. Why didn’t they use today’s technology?” There will be a lot of criticism, so we’re trying to introduce that now; today’s technology as much as possible. (Project manager, PMC)

Advance procurement  We have details schedule for all purchasing and all payment from Civil Aviation. Actually the normal time in which the material is delivered to site may be in just 3 months but in my schedule I will give it 5 months. In advance we plan because I know anything can happen so I give it some extra time. (Site superintendent, Contractor 2)

For international procurement, generally I make the schedule for procurement in advance in order to assure that site execution will not be impacted. In order to avoid unpredictable delays during a delivery, we can only schedule our procurement in advance like 5 months before. I want to emphasize that to make a very good schedule in advance is very important for the project, because schedule is a comprehensive system. You need to consider all aspects. So if you can make a very good schedule in advance, no matter what kind of unpredictable incident
<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hire specialized HR</td>
<td>I hired the most important was the contract specialist. There was nobody over here so this gentleman just over here, we hired a very senior contract specialist. He is helping us to frame an opinion. I hired two three managers over here so and I got the best people in the civil aviation authority to head our electronic sections, to head the electrical sections, head the civil section over there. (Project director, Client) We appointed a very good man Mr. Iftikhar Haider, he is Bridger. He is employed by MMP Mott MacDonald Pakistan, and he is a liaison between us and client. He understands the mentality out there. They are all ex-military people and he was in military many years ago so he knows how it works, how the mindset works. I guess they still run along military lines, they give an order they want you to follow it. (Project manager, PMC)</td>
</tr>
</tbody>
</table>
| Formation of committee      | We have emergency arrangements. We have formed a committee we call it field design support system FDSS, so we are resolving design issues. (Project director, Client)  
Civil aviation makes its own team that called FDSS committee. They will look after the design issues… Civil aviation has hire some Nespak engineer (Site manager, Sub-contractor1) |
| Negotiation                 | All the advantages are with the old contractors that you should negotiate with them, review terms and conditions, with new fresh team. Terminating the tender is never a wise decision unless it is a too bad contractor, but usually they are not that bad. Negotiation is always wise, and these things are more successful rather than you brought them in confrontational mode. (Project director, Client)  
Coordination issues are there, but the good thing we did is, that we use to meet every Thursday and our team package 4, package 3 and whatever relationship we have with related packages, you know we meet and try to resolve issues. We do those daily meetings. Despite that we do interval meetings as well so that we can have coordinated efforts. (Project management officer, Contractor 7) |
| Reinstatement               | We were sent back here after one and half year. This contract was revived in December 2014. I cleared sub-contractor amounts and bring them back to a mode where they came to work and I paid their escalations. I cleared their differences. I gather them and work on things then slowly work has started. (Project manager, Contractor 1) |
| Legal actions               | For termination and suspension you took approval from your management. Went to high Court and start legal process. You challenged the decision of termination and suspension... Basically you follow legal process. (Project manager, Contractor 8)  
We have case in court and afterwards we won the case from court again, because we were not wrong. (Project manager, Contractor 1) |
Reference (for chapter 1)


