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Impact of Project Uncertainity on Project Success

[1] **Tariq Manzoor**

[2] **Dr. Usman Haider**

[3] **Muhammad Aslam**

[4] **Ali Hassan**

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[1] Business and Management sciences, The Superior College Lahore

[2] University of engineering and technology Lahore Civil Department

[3] Institute of pure & applied zoology, University of okara

[4] MPhil zoology, Ghazi university dera ghazi khan

Abstract: This study focuses on the relationship between Project uncertainty (PU) and project success with the mediating role of Project Control (PC) and moderating role of Uncertainty Avoidance (UA). The specific context of the study is the project-based organization in Pakistan. Data were collected using questionnaire from 300 employees working on various projects across Pakistan. Results indicate that Project Uncertainty is negatively associated with project success. Moreover, mediating role of Project Control is also established. In addition to the above, results also confirm the moderating role of Uncertainty avoidance and practical implications are discussed.

Key words: project uncertainty, project control, uncertainty avoidance, project success.

Chapter 1

Introduction

1.1 Background of the study:

Project is a temporary endeavor of any organization which is designed to achieve any specific objective. According to PMI (2013), projects have two unique characteristics. First, the projects are temporary in nature and should be having a finite time. Secondly the projects must have some new and unique objective to achieve. In the modern world project-based working is getting popularity in global organization. Companies are investing in medium and large-scale projects in different functions such as innovation, new technology, new process, and construction s-based activities. Studies in the domain of project management have emphasized the need of project management practices and its growing as a profession and wide range of studies are also being published (Crawford, 20016).

The practices related to project management are applied to several industries and organizations now consider project management tools as strategically important to achieve organizational objectives. These tools are not only used on the strategic and decision making but also at the operational level as well. In general projects are assumed to achieve three major parameters such as time, cost, and performance. These parameters classify project -based activities distinct from day- to-day routine activities. The major challenges faced by project managers in the modern era are to deal uncertainty in different functions. The uncertainties can surround the projects in many ways such as time estimations, cost, and resource deployment. These uncertainties sometimes are controllable and sometimes the uncertainties are unknown and uncontrollable to the project managers. Such uncertainties affect the progress of the project and may also hinder the project outcomes. (Hubbard, 2009).

It is critical for managers to monitor these risks, assess and identify contingency plans to mitigate it effectively (Hillson, 2002). Project uncertainty has received attention in studies related to project management, (Meredith and Mantel, 2010) and authors have reported different approaches to address this issue (Harris and Woolley, 2009). In project management, uncertainty refers to the factors related to several kinds of risks associated and studies also have been published to differentiate risk and uncertainty (Perminova et al., 2008; Sanderson, 2012). Several authors have studied uncertainty and the factors related to uncertainty which hinder project success (Lihong al., 2008; Nakatsu and Iacovou, 2009). It is evident to mention that uncertainty depends on the type of project done, the kind of technical complexity involved inside and the nature of experience the management possesses. Studies have also mentioned that the uncertainties in a project are not avoidable (Hubbard, 2007).

Traditional project management tools also recommend identifying the kind of risks and converting into opportunity instead of a threat (Siebert, 2005). A key argument that uncertainty is either inherent or exterior in the actual world or it's nothing more than a literature perception is yet a topic of discussion. The findings in the literature of project management accentuate that the source of this term is uncertain as this phenomenon is noticed because of the development of the interrelation among the bodies which are part of the system (Benbya and McKelvey, 2006).

Uncertainty has been studied in different knowledge domains such as psychology, economics and mathematics (Bammer & Smithson, 2009; Osman, 2010). In addition to the knowledge domains uncertainty relates to human life as well. Perminova et al, (2008) defined project uncertainty as a situation where the manager has incomplete information regarding a particular situation of a project. In addition to it, Association of Project Management (2006) also presented a definition of project uncertainty where it referred to a state of knowledge which may not be complete and believed that it is related to the risks and threats related to a project. Studies have shed light on the sources of risks that may arise in a project (Martinsuo et al., 2014 Saunders et al., 2015) and presented several techniques to prevent these uncertainties from achieving success (Vidal, 2015).

The arena of project literature has gone over several research which have examined the sources which may be the reason for emergence of uncertainty in projects. The consumer requirement and the scope definition may subject complexity. Winch, (2010) gave an account of the genre of technology tools used by the body. Moreover, the external factors st as the regulatory authorities linked with project and the process sanctioned, can cause uncertainty to be arose (Aaltonen, 2011; Winch, 2010). Another factor can be observed at the managerial position, where the type and style of manager accountable for the project can give rise to uncertainty (Madsen & Pries Heje, 2009).

Uncertainty because of its subjective nature is sometimes tough to evaluate (Perminova et al., 2008).Chapman and Ward, (2011) analyzed the fact that several factors on the project can give rise to uncertainty such as who are linked with the project directly or indirectly. Environmental factor, technical factors and lack of resources are some various factors which can add uncertainty (Colarelli O'Connor &Rice, 2013 and Lechler et al., 2014) or the natural factors like changing economy, design of the project and the interdependence of the functions on each other (Ramesh & Browning 2014).

Risk management is one more studied sphere of project management literature. Risk pertains to the general occasions. Managers consult traditional risk management techniques for planning and other functions to avoid and single out solutions to uncertainty (De Meyer et al., 2002). Risk management and uncertainty observe no harmony in their definition. Hence authors also go for using the term broader uncertainty rather than risk management which also copes with inside and outside fears and threats (Cleden, 2009). An uncertajnty doesn't refer simply to develop a management plan for the problems and chances which obstruct the performance of the project but also the root cause analysis of the problem (Ward &Chapman, 2003).

There are numerous typologies used for project uncertainty. Out of different, one of the typologies established based on various factors which may give rise to uncertainty are financial in type, organizational operations and policies and technical specifications too. Ward and Chapman (2003) and Leifer et al. (2000) endorsed this typology. Moreover, another typology was recommended by De Meyer et al. (2002) and Loch et al. (2006) for the uncertainty factors based on the nature of project itself. Every activity contrived may deal with different types of deviations in range of the planned values. In accordance to the variations observed ineach project, the managers can plan the upcoming activities.

The time duration of every activity differs in accordance with the range of deviation a manager observes. Uncertainties are different in nature, some are predictable and certain, such uncertainties are like those risks which can be easily identified. On the contrary, there are uncertainties which are unpredictable in nature and the likelihood is unknown. Such kinds of uncertainties arise without any prediction (De Meyer et al., 2002). It is something mandatory to assess the difference between the project uncertainty and project chaos based on its stability factor because projects with uncertainty in any of its functions may outset with equitable stability while projects with chaos have uncertain outset, uncertain execution, and uncertain end.

Furthermore, projects having uncertainty may deal with obstacles and finish up in a different way but the i inceptive intention somehow is obvious (De Meyer et al., 2002). There are numerous aspects discussed in project uncertainty literature, out of which the first dimension into certainty is concerned with environmental approach and can be sourced from outer environment. These factors are leveraged by the macro environment such as ruling bodies and other organizations making rules and strategies, incompatible demands of the related stakeholders and competitors stress too (Aaltonen, 2011; Winch, 2010). Besides, the conception of uncertainty evolving from individuals based upon numerouss factors such as bounded rationality and various psychological and physical characteristics. Bounded rationality basically refers to the assumption that while making decision managers are bounded by their ability to process information due to resource constraints like incomplete knowledge about situation, inability to consider all the alternatives and limited time and money as well (March and Simon, 1958).

Furthermore, the discrepancies betweens and the differences among individuals are dissimilar due to the diversity in culture, experiences and mindset (Madsen and Pries-Heje, 2009). The factors which may increase uncertainty can be asserted from the functionalities or requirement specification of the client. Such consumers may escalate project complexity by asking for enhanced technological

factors (Danilovic and Sandkull, 2005). Complexity of the project varies as the progress is made over the course of time (Cleden, 2009).

Assumption is that the uncertainty is of low level at the initial planning stage of the project as the managers made quite a certain estimate because not a lot of fluctuations are involved in cost and time trade off and the objective remains unchanged (Atkinson et *al*., 2006; Ward and Chapman, 2003). Other than that increased conflict may not be observed by the stakeholders concerned with this phase as well. The different forms of uncertainty related outcomes and the contingencies projects got to deal with have become a prominent domain in literature (Lu and Suh, 2009; Whitty and Maylor, 2009).

1.2 Research Gap and present study:

Saunders et *al*., (2016) studied various dimensions of project uncertainty and recommended to study project uncertainty in other sectors as well. The six primary determinants studied by Saunders et *al* were Information, Complexity, Individual, Environment, Time, and Capability. Taking the advance directives of Fiona et al (2016) for examining the various project environments and the constructs of project uncertainty associated respectively, the study consolidated the changeable factors of the project uncertainty with the complete model and considered as independent variable. Control systems is another factor studied in project management literature and is also endorsed as a critical factor in project success by some studies due to negligible behavior of researchers towards control tools (Yakubu Olawale & Ming Sun, 2015). Maxwell et al (2014) analyzed the cultural ethics and values and their impact on efficiency and execution of the project with various dimensions and they observed a positive and powerful impact of culture on project performance. Extending the suggestions by Maxwell et al. (2014) to examine the moderating impact of culture or its facets, this study inspects the middling role of uncertainty prevention betwixt prjecct uncertainty and poject success.

Problem Statement

The studies on project management generally indicate a concern for assessing factors which causes issues in implementation of successful projects. One of the major factors which affects any type of organization is risk associated due to uncertainty about events. However, we find limited evidence that how this uncertainty can affect project success. This study mainly addressers this dearth in body of knowledge. Uncertainty is unfavorable factor which lessens the control of decision makers and project managers in implementation of a successful project. Thus, we argue that its mediating role is important to assess in this relationship. Moreover, abundance of studies in US/Western contexts on project management limit their generalizability to another cultural context like Pakistan. What will be combined effect of uncertainty is a culture with uncertainty avoidance? The answer to this question is missing in extant literature, which current study is going to address.

1.3 Research Questions

At its core, the present study is intended to find answers for some briefly summarized questions which are as follows.

Question 1: What is the effect of project uncertainty on project success?

Question2: What is project control, and does it mediate the relationship between project uncertainty and project success?

Question 3: What is the effect of culture on project, and whether it moderates the relationship between uncertainty and success?

1.4 Research Objectives

The core objective of the current study is threefold. First, this study aims to examine the relationship between project uncertainty and project success. Second, the present study aims to examine the mediating role of project control between project uncertainty and project success and the moderating role of uncertainty avoidance between project uncertainty and project control. Finally, most of the organizational theories were developed and tested in the Western setting. The overall objective of the study is to develop and test anticipated models to find out the relationship among project uncertainty, project control and project success of project. Additionally, uncertainty avoidance is added the possible moderator for the relationship of the mentioned variables in the research model (project uncertainty, project control and project success).

1.5 Significance of the study:

The study will serve the project practitioners in Pakistan and to the body of knowledge in numerous manners. The study at first will highlight the significance of uncertainties and their impact on the success of a project. Besides, the study will outline the various uncertainties and their nature mentioned in literature. Furthermore, it will also delineate how uncertainty and complexity are different in theory and practice. Pakistan being still in its developing phase and the victim of political and economic uncertainty demands for more and more research in this ambience for the sake of studying the type and severity of uncertainty on project life cycle encompassing its planning, execution and closure.

Thus, this study will also serve the literature concerning developmental projects as this domain is not focused on much. Moreover, it is important to consider that projects are time limited activities with high complexity, high tolerance to ambiguity and results are not easy to quantify. In accordance with this notion, it is thus essential to go through the management processes and learning in various cultural settings having high uncertainty. Two prominent authors in organizational culture Hofstede and Fons Trompenaars have provided with approaches and thought it true that culture gets to play a most important part in establishing the value system. Since the projects are executed in specific settings, it is therefore essential to study the culture and related dimensions so that the impact can be assessed.

Pakistan has got a huge investment in projects from government and foreign bodies like USAID, United Nations and different NGOs in different provinces but affected negatively on large scale by the socio-cultural status. The study will hence investigate and make practitioners focused on modifying their strategies to enhance the performance of the project by providing them with empirical evidence of cultural impact. Lastly regarding academic research, Project

Management observes a rise and growing interest in Pakistan too.

Thus, this study will serve the project management literature and fill the gap with the smaller number of studies conducted in this domain and opens new ways for the up- coming researchers as well. The study is lined up in the following breakup: Chapter 2 describes the previous literature support to the variables chosen for this study and theoretical support to enrich the assumptions the section will provide the literature related to project uncertainty and its effect on project success. In addition, it will cover the relevance of culture and its dimension i.e. uncertainty avoidance and role of project control on success. Chapter 3 will provide detailed information on the research methodology related to data collection sampling and data analysis techniques deployed for this study. Chapter 4 will provide the results produced after the data collection which will includes tables and statistical tests. Chapter 5 will provide discussion of the results, recommendations, limitations of the study and future lines for upcoming researchers.

Support Theory

The conventional organizational control theory (Eisenhardt, 1985; Ouchi, 1977, Rustagi et al., 2008) models the choices of control modes including output, behavior, clan, and input controls as independent of each other. The framework's focus is on the choice of control modes and not on effects of control modes on performance, and it ignores potential interactions among the control modes (Liu et al., 2010; Tiwana, 2010; Tiwana and K eil, 2007). There is evidence however that performance is enhanced where different control modes are employed simultaneously, with significant correlations reported among control modes (Long et al., 2002). For example, Snell (1992) concludes: "...the advantages and disadvantages of each type of control might suggest their combined use in human resource management". And Turner and Makhija, (2006) in their study recommend that organizations can use more than one control mode and can make a combination of control mechanisms inorder to increase performance. More recently, Cardinal et al., (2004) proposed the concept of balance of control modes.

Their central argument, which builds upon Long et al. (2002), is that the use of output control, input control and behavior control simultaneously outperform the use of a single control mode. However, the balance is vaguely defined as "harmonious use of multiple forms of control". This stream of research, including Snell (1992), Turner and Makhija (2006), implicitly assumes interaction among control modes but does not examine how control modes interact.

While utilizing multiple control modes could also lead to unsatisfactory results (Tiwana, 2010; Tiwana and Keil, 2007). Understanding how the various control modes interact is critical to understanding how combinations could improve performance. A further limitation of control theory is that it historically assumed the perspective of managers "controlling" subordinates (Krisch et al., 2002).

Chapter 2

Literature Review

2.1Project Uncertainty And ProjEct Success

The concept of uncertainty is broad regarding its meaning. Uncertainty can evoke fear or warn about future options and chances that can be examined, based upon the context. An entrepreneur may take uncertainties generously within a specific market which he can exploit. Being a multi- dimensional concept, it has been studied among wide scholarly disciplines such as physics, mathematics, and psychology.

A mathematician takes uncertainty as a concept which may entail the likelihood of outcome (Attewell, 2009); A psychologist thinks uncertainty as a concept which is broadly discussed as an objective or subjective phenomena (Kahnemann and Tversky, 1982) and a businessman thinks uncertainties serves as the basis for many strategic decisions (Harrison, 1992). Numerous scholars have made distinct probable sources of uncertainty in projects. Among all, the complications appear because of product requirement, choices made regarding use of technology or involvement of different characters in the project (Cleden 2009; Martinsuo et al., 2014).

Weick, (1995) further mentioned two more sources of uncertainty that is the information overcharged with vagueness and the rate at which the changes arise in project and randomness in timing and direction of change. Uncertainty may also arise due to the factors incorporated by the external environment, for example, decision making processes of a system, or from the outer market or by the actions of a competitor (Aaltonen, 2011; Winch, 2010).

Another major source of project uncertainty is observed at an individual level, like uncertainty may be taken and interpreted differently by various employees depending upon the nature of

respective personality (Madsen and Pries-Heje, 2009), thus uncertainty is tough to determine when taken as a subjective phenomenon (Perminova et al., 2008). Project uncertainty is assumed to have a negative impact on project success (Jiang et al., 2002).

The lack of awareness regarding needs of a client or absenteeism of skills in the application domain of the project developer team leads it towards complexity to completely define the clear and accurate requirement, and that may cause client's need not to be met properly and hence be the reason for fall in the performance. Using unknown technologies may cause software related problems and thus lessen the performance of software natured product (Nidumolu, 1995). Numerous studies indicate the inter-relation of project uncertainty with project success (Rai and Al-Hindi, 2000; Sussman and Guinan, 1999).

Level of project success is defined differently by different schools of thoughts. Literature concerned with information technology defines project success as conformance with the minimum technological requirements necessary to complete the project (Schultz and Slevin, 1975). On the other hand, project success is also measured in terms of how effectively the constraints of cost, quality standards and time, etc are met (Slevin and Pinto, 1986). Referring to scholars of information system Rai and Al-Hindi, (2000), the success of projects can also be measured in terms of efficiency of process and effectiveness of project.

2.2 Project Uncertainty And Project Control

By Mehta et al., (2014), just collecting a large volume of information is not enough when level of uncertainty is high. To resolve uncertainty, it is required that team members collect complete information and interpret it clearly to make accurate use of it in decision making. Team members remain involved throughout the project life cycle by the interactive use of information, it thus can be seen as a reserved and organized mechanism that permits project managers to not just collect bulk of information, but also stimulate the mutual understanding of the gathered information (Kerzner, 2006; Henry et al., 2007).

It is important to mention here that studies related to the domain of management control has observed that environment with high uncertainty asks for more interactive use of control system, like organizational restructuring and innovations (Bisbe and Otley, 2004). Interactive use of control system demands proper focus of the participants and manager, presence at formal in person meetings, gathering and sharing of information, and hence it calls for substantial time and effort (Widener, 2007). This recommends that this type of use is beneficial in the environment with high uncertainty but adds costs and outweighs the benefits of system when uncertainty is low and thus results *in* poor performance.

As use of this system inflict unneeded meetings and interactions which may cause surcharge of information and thus made it unable to meet the cost and time constraint specified for the project (Chong, 1996).This notion has also been studied by Sakka et al., (2013) who saw interactive systems that it affects the performance positively. As mentioned by Koufteros et al., (2002, p. 339), ambiguousness demands the structural mechanism that not just provide the bulk of data but escalate discussion, clarification and execution, which recommends that contexts with high level of ambiguity calls for interactive use of control systems because the implementation of this system adds extra costs, it would be fair enough to consider that it will be suitable to enhance performance of projects to be executed in environment with high ambiguity but not with low ambiguity. Sakka et al., (2013) is an exception who figured out that when technical complexity is of high level, the interactive use of control system improves project performance.

H2: Project uncertainty is negatively associated with project control.

2.3 Project control and proect success

Project control basically refers to completion of project by meeting effectively the time and cost constraint by analyzing the actual performance and progress of the project and applying different techniques. To determine the actual performance of the project regarding time and budget, the starting point is evaluated by the baseline schedule or PV (planned value). These concepts of Earned Value Management in particular (Fleming and Koppelman, 2005; Vanhoucke, 20Da) and project management and control (Kerzner, 2013) *in* general are described in books on project management. Effective control in real time is based on two types of information: (a) a list of tasks to be executed on the respective day and (b) measurement of the actual performance in the sameterms.

Most of the project control models and techniques related studies have devised computer supported project control systems embodying quantitative project management concepts (Acebes et al., 2014). Such studies are intended to simplify the project control models regarding their practical implementation, as cited by Jung and Kang, (2007), Kim and Liu, (2007), Benjaoran, (2009) and Marco et al., (2009). Gorog, (2009) and Cho et al., (2010) established various models which integrates the information about resources with information about cost and schedule so that effectual planning for construction process can be achieved. Such studies do not target control process during implementation but project planning process. Projects demands monitoring and control processes because they are of vigorous nature and are executed in dynamic environments. Barraza and Bueno, (2007) criticized the ignorance of such dynamic characteristics of projects by the present project control studies.

2.4 Mediating role of project control between project uncertainty and project success

Jacob, (2006) and Kane, (2004) stated that the much utilized and apprehended output scales are the true measures for project performance such that they are employed on the activity level rather than higher WBS levels or control account level but Van Houcke, (2011) presented the idea of examining the project top-down, i.e., intwo ways, based in earned value metrics. Preferably, we pursue the idea put forward by Vanhoucke, (2010) which asserts that at higher WBS levels, well performing activities (ahead of planned time) mask the negative impacts of underperforming activities (delays).

This can result in hiding any potential obstacles. He argues that for practitionersto lower WBS levels in case of complications, only project-based approach can be considered. Lipke et al., (2009) observed that a thorough inspection of a comprehensive schedule can contribute to a disrupting effect on the project team and can prove to be quite stressful. The second approach isbottom-up approach which is in total contrast to top-down approach and depends on subset of project activities to stimulate the corrective action process. Subset of activities has a giant impression on the overall performance and progress of the project, thus it is pivotal to serve analysis of schedule risk for examine the sensitivity of activity information to drive the manager's focus towards activities' subset.

These activities because of their extremely sensitive nature are the basis for exhaustive control; on the contrary other activities do not demand much attention during the execution of project. Vanhoucke, (2012)tried to figure out the cause for effective results by earned value method and schedule risk analysis in few projects than in others. Hazir and Shtub, (2011) analyzed the association between project control and information presentation and they create simulation software to deal with uncertain environments. Using Monte Carlo simulation, the cost related part-basis for a new framework (House et al. 2004) or comparators for alternative dimensions

(Schwartz, 1994b). Although Hofstede's framework is accompanied by a lot of short comes, it is taken in to determine what impact cultural values make success or failure factors of the project. Fifth dimension is excluded from the study because it is less accepted and applied comparative to the four original dimensions (Fang, 2003) and not tested much.

HS:Uncertainty avoidance moderates the relationship between project uncertainty and project control.

2.5 Research Model:

The complete model tested in this study is shown in Figure 1:

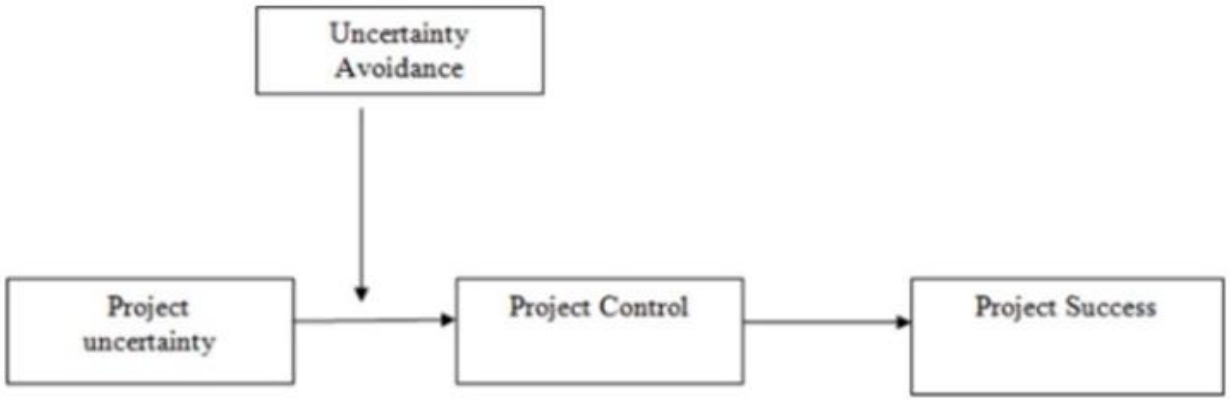

Figure 1: Research Model

Chapter 3

Research Methodology

3.1 Introduction

In this chapter, the methodology is described which is used to find out relationship of uncertainty and project success, with the mediating role of project control and moderating role of uncertainty avoidance. The methodology chapter deals with research design, covers all data collection techniques (population and sample), and also highlights measurement and instrument reliability analysis

3.2 Research Design

Research design is a framework of research plan of action. Zikmund (2003) defines research design as a plan of the researcher that defines the procedure and method for collecting and analyzing the necessary information. Research design includes time horizon, types of setting and unit of analysis which are discussed below.

3.2.1. Types of study

This is a causal study where the impact of a project uncertainty on project success with the mediating role of protects control and moderating role of uncertainty avoidance was measured on basis of self- reported perception.

3.2.2. Study setting

The participant for study from the field because the supervisor and their subordinate contacted in project base public and private organization was contacted to fill the questionnaire in their natural work environment.

3.2.3. Time Horizon

The data were collected in one month for this study, the data in nature cross sectional and collected at one time.

3.2.4. Unit of Analysis

Unit of analysis can be an object or individual whose character and features is to be analyzed.

Unit of analysis can be either dyad, individual, group, industry, organization, country or cultural from the where data are collected. For this study unit of analysis was individual public and private project base organizations employees from Islamabad, Rawalpindi, Gilgit Baltistan.

3.2.5. Population

Population is a set of peoples, events, things connected with interest that the researcher wants to investigate (Sekaran, 2001). The current study population is employees of the project base organization from Islamabad, Rawalpindi and Gilglit Baltistan.

3.2.6. Sample

The data collection was done from development sector of twin cities and Gilgit Baltistan of Pakistan. It is somehow hard to identify the total number of employees working in this sector but this sector has shown significant growth in the past 5 years. This sector has contributed significantly in different parts of Pakistan as well. Due to the large number of populations of this sector, it is not possible to cover all employees due to different constraints such as time scarcity, resource scarcity and cost. Hence a sample was selected to collect data from this industry. The sample size selected for this study was 300. The total numbers of 360 questionnaires were distributed in twin cities in different NGO's. Some of the NGO's included Hashoo Foundation, Aga Khan Rural Support Program, Aurat Foundation, Lead, Positive Pakistan, Islamic Relief and Al-Khidmat Foundation etc. For this research 360 questionnaires were distributed, and 315 questionnaires were received back for data analysis, 15 of them were incomplete and discarded. The respondent response rate was 86.9% out of 100% which is highly positive response. Thus, data analysis used the final sample size of 300. In order to collect data from the selected sample, it was important to select a sampling strategy as well. The sampling strategy used in this study is non probability sampling i.e. convenient and judmental sampling. The companies were first contacted with a reference person and the respondents were requested to take part in a survey. Questionnaires were sent through emails and hard copy for their convenience.

3.2.6.1 Gender

First table represents the gender composition of the sample in which 67.0% were male and 33.0% female. The male percentage is high.

Table 1: Gender frequency and percentage

	FreQuency	Valid Percent	CumulatiYe percent
Male	201	67.0	67.0
Female	99	33.0	100
Total	300	100	

3.2.6.2 Age

Table 2 represents the data characteristics for the age of respondents. The results show that that 40.3 % of the respondents were in the age group of 18-25, 37% respondents were in the age of 26-33, 13.7% employees were between 34-41, 7% respondents were in the age group of 42-49 and 2% were 50 or above.

Table 1: Age data of the respondents

	Frequency	Percent	Cumulative percent
18-25	111	40.3	40
26-33	111	37.0	77.3
34-41	41	13.7	91.0
42-49	21	7.0	98.0
50 above	6	2.0	100
Total	300	100	

Table 2 shows the composition of the sample with reference to age groups. 40.3% of respondents age were 18-25, 37.0% respondents age were 26-33 range, 13.7% respondents age were in 34- 41 range, 7.0% respondents age were in 42-49 range and just 2.0% respondents were more than 50 years. In that study, the percentage of 18-25 respondents is high.

Qualifications

Here's An Example Qualification Table With The Requested Headings:

Qualification	Frequency	Valid Percent	Cumulative Percent
Matric	50	25%	25%
Inter	70	35%	60%
Bachelor	40	20%	80%
Masters	20	10%	90%
M.Phil	10	5%	95%
PhD	5	5%	100%

In this example, the qualification categories include Matric, Inter, Bachelor, Masters, M.Phil, and PhD. The table includes columns for Frequency, representing the number of individuals with each qualification; Valid Percent, indicating the percentage of individuals with each qualification out of the total sample; and Cumulative Percent, showing the cumulative percentage of individuals up to that qualification category.

Work Experience :

Work Experience	Frequency	Valid Percent	Cumulative Percent
No Experience	30	15%	15%
1-3 Years	60	30%	45%
4-6 Years	40	20%	65%
7-10 Years	45	22.5%	87.5%
10+ Years	25	12.5%	100%

In this example, the work experience categories include "No Experience," "1-3 Years," "4-6 Years," "7-10 Years," and "10+ Years." The table includes columns for Frequency, representing the number of individuals with each level of work experience; Valid Percent, indicating the percentage of individuals with each level of work experience out of the total sample; and Cumulative Percent, showing the cumulative percentage of individuals up to that work experience category.

Measurement:

Measurement refers to the process of assigning numbers or values to variables or concepts in a systematic and reliable manner. It plays a crucial role in research and project management by providing a means to quantify and analyze data. Proper measurement ensures that data collected is accurate, consistent, and meaningful, allowing for valid interpretations and informed decision-making.

Project Uncertainty:

Project uncertainty refers to the degree of unpredictability or lack of information about various aspects of a project, such as goals, requirements, scope, resources, and risks. It often arises due to external factors or inherent complexities within the project. Managing project uncertainty involves identifying potential sources of uncertainty, assessing their impacts, and implementing strategies to mitigate risks and enhance project outcomes.

Project Control:

Project control involves the processes and activities aimed at monitoring, managing, and regulating project performance to ensure that it aligns with predefined objectives and criteria. It includes tracking project progress, managing resources, making adjustments, and maintaining overall project discipline. Effective project control facilitates timely decision-making, minimizes deviations, and improves overall project outcomes.

Uncertainty Avoidance:

Uncertainty avoidance refers to a cultural or organizational tendency to avoid or reduce ambiguity, unpredictability, and risk. In a project context, uncertainty avoidance can impact decision-making, risk tolerance, and the level of comfort with ambiguous or uncertain situations. High uncertainty avoidance cultures or organizations may exhibit a preference for detailed planning, rigid structures, and extensive control mechanisms.

Project Success:

Project success represents the achievement of project goals, meeting or exceeding stakeholder expectations, and delivering desired outcomes within the defined constraints of time, cost, and

quality. It is a multidimensional concept that encompasses factors such as meeting objectives, delivering value, stakeholder satisfaction, and overall project performance. Project success is influenced by various factors, including effective project management, stakeholder engagement, and the ability to adapt to changing circumstances.

Pilot Testing:

Pilot testing involves conducting a small-scale trial or test of a project, product, or process before its full-scale implementation. It allows for evaluating feasibility, identifying potential issues or improvements, and gathering feedback from users or stakeholders. Pilot testing helps validate assumptions, refine strategies, and make informed decisions before committing to a broader implementation, thereby increasing the likelihood of project success and reducing risks associated with full-scale deployment.

3.3 Means,median,mode and standard deviation.

Mean:

The mean, also known as the average, is a measure of central tendency that represents the sum of all values in a dataset divided by the total number of values. It provides an estimate of the "typical" value in the dataset by balancing out the contributions of all individual data points. The mean is sensitive to extreme values and is commonly used to summarize data with a roughly symmetrical distribution.

Median:

The median is a measure of central tendency that represents the middle value in a dataset when arranged in ascending or descending order. It divides the dataset into two equal halves, with 50% of the values below and 50% above it. The median is less affected by extreme values and is particularly useful when dealing with skewed or non-normally distributed data.

Mode:

The mode is a measure of central tendency that represents the value(s) that occur most frequently in a dataset. It is the value with the highest frequency or count. A dataset can have multiple modes (multimodal) if multiple values have the same highest frequency, or it can have no mode if all values occur with equal frequency. The mode is especially useful for categorical or discrete data.

Standard Deviation:

The standard deviation is a measure of dispersion or variability in a dataset. It quantifies how spread out the values are from the mean. A larger standard deviation indicates greater variability, while a smaller standard deviation indicates less variability. It is calculated by taking the square root of the average squared deviation of each value from the mean. The standard deviation is widely used in statistics to understand the spread of data and compare the variability between different datasets or groups.

Basic calculations

Certainly! Here's a table with variable names, N (sample size), minimum, maximum, mean, and standard deviation for a hypothetical dataset:

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Age	100	18	65	35.7	9.2
Income	100	$20,000	$100,000	$54,500	$18,700
Height	100	150 cm	190 cm	167.2 cm	7.8 cm
Weight	100	50 kg	90 kg	68.4 kg	12.3 kg

In this example, we have four variables: Age, Income, Height, and Weight. The sample size (N) for each variable is 100. The minimum and maximum values represent the range of values observed in the dataset for each variable. The mean represents the average value of the variable across the sample, and the standard deviation quantifies the spread or variability of the values around the mean for each variable.

Factor Analysis

Factor analysis is a statistical technique used to explore the underlying structure or dimensions of a set of observed variables. It aims to identify the latent factors that explain the interrelationships among the observed variables. These latent factors are not directly observable but are inferred based on patterns of correlations or covariances in the data. The goal of factor analysis is to reduce the complexity of a dataset by identifying a smaller number of underlying factors that account for the observed variability. It helps uncover the common sources of variation among the variables and provides insights into the underlying constructs or dimensions that influence the observed data. Factor analysis assumes that the observed variables are influenced by a smaller set of latent factors and that the observed variables can be represented as linear combinations of these latent factors. The technique estimates the factor loadings, whindicatescate the strength and direction of the relationship between each observed variable and the underlying factors. There are different types of factor analysis, including exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA is used when the goal is to explore and identify the underlying factors in a dataset, while CFA is used to confirm or test a pre-specified factor structure based on prior theoretical expectations. Factor analysis has applications in various fields, including psychology, social sciences, market research, and finance. It is commonly used to reduce data dimensionality, identify latent variables, develop measurement scales, and understand the structure of complex datasets.

Chapter 4

Results & Discussion

This chapter comprises of results of the present study. Descriptive statistics, correlations, alpha reliabilities, and results of linear mediated and moderated regression analysis are represented in both narrative form and tabular forms. Moreover, discussion of the study related findings, its theoretical and practical implications with strengths and limitations of the study, and directions for future research are also discussed.

4.1 Regression Analysis

The regression analysis was used to measure the effect and causal relationship between the independent and dependent variable. For the regression analysis, an ordinary least square method was used. For this method, the index for each variable was developed by summing up different

questions for each variable. And then the average was calculated from the index. The values of the beta coefficient, R-squared, and change in R-squared.

In addition to correlation analysis, regression analysis was also run between dependant and independent variables i.e. project uncertainty and project success. For this purpose the mean values for the variables selected. The results show that the r2was .56 which shows that the rate of change in the dependant value due to independent value is 56%. The r2 change in the results show .320 which means that if the bilases are excluded the effect decreases to .320. The results are given in Table 8.

Mediation With Bootstrapping

By using the Preacher and Hayes Analysis a multiple regression analysis was run with the bootstrap sample of 5000 as recommended by literature (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004).

4.5 Discussion

The model summary for the regression analysis is given in table 9. The results show that the correlation between Project Uncertainty and success is .566 and the R square value was .32. It means that one unit change in project uncertainty effects 32% in project success. The F value is also significant.

The coefficient table shows the beta value for the regression analysis. hypothesis 1 assumed that there is a negative relationship between project uncertainty and success. The hypothesis was accepted with the P value of .000 and beta of .356.

Hence Table 10 shows the mediation analysis was conducted by using the bootstrapping method presented by Preacher and Hayes (2008). Bootstrapping is a nonparametric method that generates an estimate of the indirect effect including 95% confidence interval. When zero is not in the confidence interval it means that indirect effect is significantly different from zero at $p<0.05$ (two-tailed). The bootstrapping method allows the researcher to avoid shortcomings of the earlier stepwise approach for testing mediation (Hayes, 2008). Furthermore, a better estimate can be drawn with the bootstrapping method because of its resampling with the existing results.

Here's an example table that demonstrates a hypothetical regression analysis for project success:

Project	Budget (in $)	Team Size	Project Duration (in months)	Prior Experience (in years)	Project Success
Project A	100,000	5	6	2	75%
Project B	200,000	8	10	4	90%
Project C	150,000	6	8	3	80%
Project D	120,000	4	5	1	70%
Project E	180,000	7	9	2	85%

Project success is measured as a percentage, representing the level of achievement or satisfaction obtained from each project. The predictors include budget, team size, project duration, and prior experience. Each project is assigned numerical values for these predictors, and the corresponding project success percentage is recorded.

By conducting a regression analysis on this data, one can determine the relationship between the predictors (budget, team size, project duration, prior experience) and project success. The analysis will

provide insights into the extent to which each predictor influences project success and whether these relationships are statistically significant.

4.2 Correlations Analysis

Correlation analysis is a statistical technique used to measure the strength and direction of the relationship between two variables. It helps to determine whether changes in one variable are associated with changes in another variable. In the context of project management, correlation analysis can be used to explore the relationship between project uncertainty, project control, project success, and uncertainty avoidance.

Here's an example table that demonstrates a hypothetical correlation analysis between these variables:

Project	Project Uncertainty (1-10)	Project Control (1-10)	Project Success (%)	Uncertainty Avoidance (1-10)
Project A	8	6	75	7
Project B	5	9	90	4
Project C	9	3	80	8
Project D	7	7	70	5
Project E	6	8	85	6

In this example, project uncertainty, project control, project success, and uncertainty avoidance are represented by numerical values on a scale from 1 to 10. Each project is assigned values for these variables, and the corresponding project success percentage is recorded.

By conducting a correlation analysis on this data, one can determine the relationships between project uncertainty, project control, project success, and uncertainty avoidance. The analysis will provide insights into the strength and direction of the correlations between these variables. For example, it can reveal whether higher levels of project control are associated with greater project success, or if there is a relationship between uncertainty avoidance and project success.

Moderation Analysis

Moderation analysis is a statistical technique used to examine how the relationship between two variables is influenced by a third variable. It helps to determine whether the relationship between the independent variable and dependent variable changes depending on the level of the moderating variable. In the context of project management, moderation analysis can be used to explore how a moderating variable affects the relationship between project uncertainty and project success.

Project	Project Uncertainty (1-10)	Project Success (%)	Team Size (Moderator)
Project A	8	75	Large
Project B	5	90	Small
Project C	9	80	Large
Project D	7	70	Small
Project E	6	85	Large

In this example, project uncertainty and project success are represented by numerical values on a scale from 1 to 10. The team size is included as the moderating variable, categorized as either "Large" or "Small." The corresponding project success percentage is recorded for each project.

By conducting a moderation analysis on this data, one can determine how the relationship between project uncertainty and project success is influenced by the moderating variable (team size). The analysis will provide insights into whether the effect of project uncertainty on project success varies depending on team size. For example, it can reveal whether project uncertainty has a stronger impact on project success for projects with a large team size compared to projects with a small team size.

Summary of Hypothesis Testing

Table 3: Summary of hypothesis testing

No.	Hypothesis Statement	Result
H1	There is a negative association between project uncertainty and project success.	Accepted
H2	There is a negative association between abusive project uncertainty and project control.	Accepted
H3	There is a positive association between project control and project success.	Accepted
H4	Project control plays a mediating role between project uncertainty and project success.	Accepted
H5	Uncertainty avoidance moderates the relationship between project uncertainty and project control.	Accepted

Chapter 5

Conclusions & Recommendations

This section relates to the detailed discussion of the hypothesis generated with literature support and explanation of the results in light of the theory and empirical evidence. The chapter is divided into three major parts where part l discusses the hypothesis results, second portion discusses the implication s to the theory and practitioners and last portion discusses the limitations and future research. The aim of this research was to investigate the direct and indirect relationships of project uncertainty on project success. In addition to the direct effects, the study also investigated the mediating effect of project control on project uncertainty and success.

The study in the conceptual model explored the moderating effect uncertainty avoidance on project uncertainty and project control in nongovernmental organizations working in twin cities. The results revealed a significant relationship between dependent and independent variables. The study serves evidence from the development sector of Pakistan and the findings can be used by the policy makers and managers for effectiveness in the project fields. The study developed 5 hypothesis and all hypothesis were supported by data findings and theory as well. Project uncertainty has attracted attention from different researchers over the past decade as one of the critical factors in project success. Project uncertainty is a result of unclear goals and objectives defined by the clients. (Lenfle, 2011. A study by Perminova et al (2008) suggested a new approach to risk management and believed that risk is one of the fears in project implementation. Uncertainty refers to the variation in the defined objectives (Chapman et al., 2006; Ward & Chapman , 2003). The hypothesis developed in this study assumed that project uncertainty has a negative relationship with project success.

The findings of current study are in line with the previous studies (Williams et al., 2012). Authors such as Wallace et al *2004) and Han Huang (2007) concluded that risk factors are negatively correlated to project success. This study only proves the negative relationship between uncertainty and success but does not identify what kind of uncertainties can be found in literature. Hence this can be a limitation of the study and future authors can address it to identify what major factors can lead to high uncertainty. The results of this study in regard to the investigation of project uncertainity on project success provide an extension to the debates in the literature.

5.1 Limitations and Future Directions

Even though this study has provided empirical evidence in regard to the relationship between the chosen variables but limitations in a study cannot be avoided. First the scope of the study is quiet limited and more dimensions to the culture (uncertainty avoidance, long term orientations vs. short term orientation , feminity vs masculinity, power distance) cannot be studied at once. Future researcher can look into this limitation by examining different dimensions of culture and its moderating role in Pakistani setting. The study was limited only to the nongovernmenta l sector in Pakistan, but more industries could not be selected due to the time and cost constraint. In future studies must try to explore cross industry and inter industry comparison of project uncertainty and other connected variables. This study only investigates the causal effect of uncertainty with success Lastly the sample size is small, the sample size has huge effects.

5.2 Conclusion

In A Developing Country Like Pakistan, Proj Ect Management Practices Are Not As Mature As Found In Developed Country And Weak Empirical Evidence Is Found In The Area Of Proj Ect Management Especially Non Government Organizations. It Is Pertinent To Mention That Proj Ect Management Is Growing Its Roots In Pakistan As Huge Amount Of Projects Are Observed In The Past Decade. This Study Focused On The Non Government Organizations (Ngo's) Working Intwin Cities And Has Tried To Find Empirical Evidence For The Negative Relationship Of Project Uncertainty On Success.

The project managers in this industry are responsible to deliver the promised results intime but this evidence will help the managers to better control the outcomes and forecast different kinds of risks in their respective projects. By identifying the relationship, it is also important to explore the kinds of uncertainties on specific projects in this industry which the future researchers should take into consideration. The study also concludes that culture and values play an important role in such relationship which must be taken in consideration by proj ect managers. Pakistani culture is more collectivist and managers tend to avoid uncertainty and risk-taking attitude is found less. Hence it can be said that due to such cultural difficulties and political dominance, managers may not have high control on project outcomes.

Approaches and causal effects of uncertainity on project success. The support for the direct relationship of uncertainity and success is found with the studies conducted by (Raz et al., 2002; Zwikael&Ahn, 2011). The results also synchronize the assumptionsprovided by complexity theory and suggest that projects must be explored for different kinds of uncertainties.

Hypothesis related to mediation in this study assumed that project control mediates the relationship between project uncertainty and success. The hypothesis was accepted with partial mediation where the c path and c' path observed slight changes in the coefficient values. The study extends the findings by MahmoudRajablu et al (2015), where the authors tested the mediating role of risk control and recommended that project overall control should also be investigated. As it has been described in PMI (20 13) that the strong control in the process leads to the better and desired results. Along with this line Yazici (2009), demonstrated that in the project success the culture, values that representants the importance of the shared goals, cohesion and commitment of the human resource, play a vital role. This

supports the stewardship theory, which advocates that the behavior of the individual is aligned with the organizational goal and supportive of achieving the collectivistic goals. The individual do not support the individualistic goals and the self-serving goals. As project managers are agents and their task is to complete the complex projects its deliverables, therefore the practices which help to achieve such goals are required by the principle (Turner & Muller, 2004).

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