CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Impact of Team Competency on Project Team Performance with Mediating Role of Project Team Commitment and Moderating Role of Project Complexity

by

Anum Khalid

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I dedicate this work to my deceased parents specially my mother who passed away right at the beginning of this degree. Even after she passed away her words of encouragement gave me strength to not give up and to complete what I started. Also, my siblings, who were a source of strength and support throughout. I also dedicate this accomplishment to my supervisor and teachers, because their guidance and instructions enabled me to complete it.

CERTIFICATE OF APPROVAL

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Anum Khalid

Abstract

The aim of this study was to examine the impact of team competency on project team performance, with a mediating role of team commitment and a moderating role of project complexity. This study made a contribution to the literature by linking the relationship of variables with Competency Motivation Theory. The study explained that there is a significant relationship between team competency and project team performance. This hypothesis is also supported by the literature review conducted in this study. Furthermore, this study demonstrates that project team competency is positively related to team commitment and team commitment is positively related to project team performance. However, the findings do not support the notion that project complexity as a moderator weakens the relationship between team competency and team commitment. Data was collected from 483 people working in Pakistani project-based IT companies. Quantitative research was conducted. A questionnaire survey method was used, and the responses were from project-based IT organizations in Pakistan. Process Macro by Andrew F. Hayes, version 4.0, was used in SPSS for analysis of data. For the analysis of the data, descriptive statistics tests, normality tests, correlations, mediation and moderation tests were run. Discussions are made about the results of data in detail, practical implications are discussed, limitations are discussed, and future directions for considering other variables are given. It is recommended that future research should consider time-lag studies with a large sample size.

Keywords: Team Competency, Team Commitment, Project Team Performance, Project Complexity.

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Abbreviations

EI	Emotional Intelligence
IT	Information Technology
PC	Project Complexity
PM	Project Manager
PMI	Project Management Institute
SPSS	Statistical Package for Social Sciences
TCMT	Team Commitment
TCOMP	Team Competency

Chapter 1

Introduction

1.1 Theoretical Background

Project management has become increasingly important in this fast-paced world, and meeting customers' demands for creative products is getting increasingly difficult. (Miterev et al., 2017). We live in an economic era where both public and private sector projects are broadly dispersed throughout society. Each year, trillions of dollars are invested in these projects. However, as project investment grows, so does the failure rate. Despite the fact that project team performance is continuously monitored and project reports are more easily accessible, it has been determined that the failure rate continues to rise. According to reports, the high failure rate has been consistent over time.

Projects are being used to coordinate operations in both the public and private sectors (The Standish Group, 2011). However, project-based companies encounter numerous hurdles to project effectiveness. They are complicated in nature because they are unique, goal-oriented systems that integrate technical, procedural, organizational, and human factors (Frame DJ, 1995). Projects have their own standards and difficulties that must be reduced in order to accomplish the type of project desired by the customers. Working on the causes of project complexity improves the project's chances of success (Gidado, 1996). Agile methods, which demonstrate one-on-one cooperation with consumers, are one method for reducing project complexity. Agile strategies are used to manage complexity in software development

projects (Mishra & Mishra, 2011). There is still a need to investigate how project complexity affects project success and how project complexity might be decreased. When it comes to human components, the characteristics and attitudes of project teams contribute to project performance. According to Rabey and Erdem (2003), in order to be internationally competitive and responsive to the competitive challenges that they confront, companies must make greater use of team-based and teamwork structures to assure their sustainability and success in an ever-changing environment. Organizations have recognized that effective and empowered teams provide a means to achieve organizational goals while also meeting the demands of a changing workforce (Schlechter & Strauss, 2008).

A team can be skilled but ineffective. That is, even if they are proficient in all areas, they may not win. There is a distinction to be made between competence and performance. Individuals are no exception. Many people are considered competent because they have passed examinations, yet they may not perform effectively in practice. Indeed, some individuals and teams thrive despite not being perceived as capable as others, because they work more, are more committed, and are determined not to be defeated. Any manager's job is to improve both competence and performance. This begins with team members expressing and comparing their perspectives on themselves and their team (Margerison, 2001). Furthermore, team commitment has been linked to extra role behavior (Becker & Billings, 1993, Gregersen, 1993; Shore & Wayne, 1993), job performance and satisfaction (White et al., 1993), lower turnover, desired team and organizational related outcomes and team performance (Bishop et al., 1997).

As a result, it is necessary to investigate why, despite being competent, teams fail to perform well. In this study, we examined how team competency affects project performance in the presence of project complexity as a moderator when team commitment bridge the relationship between the two. With the introduction of new technology and project-driven changes in the workplace, firms are increasingly depending on specialist teams to fulfil organizational goals. As a result, a company can no longer rely solely on the project manager's roles and control. Depending on the company's culture, project organisation members typically include the project

owner, project manager, project leader, and team member. The project owner is the business unit's director. Project managers are similar to project leaders in that they undertake tasks in accordance with the project's goals and scope and are in charge of executing, controlling, and coordinating overall project activities. The team members of the project are also in the best position to decide who should be in charge of various roles. On the basis of their technical knowledge and expertise, they interact and cooperate with one another. The ability of the project team members to affect the success factor of the project is the main focus of this study. The goal of this study is to examine how project team member competence affects project success factors like team commitment and performance.

Additionally, there is no difference between the project manager's and a team member's perceptions of how the team member's competencies affect the performance of the project team in this study. In addition, we made a few assumptions when conducting this study. First off, whenever project management is discussed in the context of this study, it always refers to agile project management. Second, since the project manager, project owner, and project participants all make up the project team, any discussion of team member or project manager competency in the context of this study is really a discussion of project team competency and should be treated as such.

1.2 Research Gap

In the previous study the effect of project managers' emotional intelligence on project team performance with project team commitment serving as a mediator and project complexity serving as a moderator is studied (Zhu, F., Wang, X., Wang, L., & Yu, M., 2021). However, gap in this study is identified that if the mediating relationship of team commitment is studied, it is necessary to examine how team level relationships like team EI, team competency, and such impact the project team performance. Additionally, the research used information from construction projects, another gap that was found. Software complexity and new product development projects can take different forms.

Dao et al., (2017) rightly highlighted the flaw that, despite being a crucial component of project management, project complexity is not well understood by practitioners. It is further stated that in order to manage or recognize the complexity factors, the project team must employ a specific methodology or technique. Agile methodology has been cited by many researchers as a crucial methodology for handling complexities and allowing the team to be adaptable in their approach to project execution, but its effect on project success has not yet been thoroughly researched. As a result, they advised looking at a team's reactions to ambiguity and how it manages complexity in a project environment.

Different team and managerial aspects of competencies to check how they affect multiple success factors of the projects and how innovation and adaptability are affected by the project complexity (Oh & Choi, 2020). However, on the basis of the shortcomings of the study, they identified few gaps and hence suggested to investigate the influence of moderating factors, such as project team size and project complexity, and the existence of a career development system in the company, concerning the link between team member's competencies and project success factors.

1.3 Problem Statement

Team building has always been a crucial part of the project because teams play a vital role in the execution and development of the projects. This is the reason; team performance has always been monitored closely. There are number of internal as well as external factors that effects the performance of a team, all these factors shall be considered while team building. However, in industry there are number of constraints that practitioners face due to which they ignore one or the other factors that effects team performance. In the industry, while building a team for a certain project, commitment is as important as the competency that a team member brings. But, the practitioners due to any reasons while building a team do not put equal emphasis on both project team competence and project team commitment, due to this lack of balance the project performance compromises. Furthermore, the project complexity is also one of the contributing factors that adversely affects

project team performance. The team's competence and commitment to the project are evaluated using a variety of scales in order to prevent a negative impact on the team's performance and, ultimately, the performance of the project, a good sum of money is also spent on recruitment, training and team development but the success of the project is still not ensured.

However, the issue is identified that the Project team competence and dedication do not guarantee project success because the teams do not have the right kind of competence, which helps them deal with the project complexity. In addition, either the team are not motivated enough to stay committed to a project in order to stay focus and deal with the project complexity. The lack of commitment is may be because the project environment is not empowering therefore, team members' do not feel motivated and hence team commitment is low. In number of instances present in the literature, the most competent and committed teams fail to deliver in complex projects and they are unable to handle project complexity effectively. Hence, overall team performance is remarkably low. Certain other factors that could be internal factors as well as external factors such as stakeholder requirements, state level objections and implications, overburdened teams, work-life balance, less involvement of teams in project affairs are also a contributing factor and certain other individual level variables as well as group-level relationships effect project team performance. Given the above stated problem, in this study we will examine how external factors affect the team variables, and how the issue of project failure could be eliminated through committed and competent teams. On the basis of the gaps identified, this study will examine the relationship of project team competence on project team performance through project team commitment while project complexity moderates the relationship of project team competence and project team commitment.

1.4 Research Questions

In the light of the identified problem statement and the supported literature, the research study will answer the following questions:

Research Question 1

What is the relationship between Project team competency and project performance?

Research Question 2

What is the relationship between project team competency and project team commitment?

Research Question 3

What is the relationship between project team commitment and project team performance?

Research Question 4

How Project Team Commitment intervene between project team competency and project team performance?

Research Question 5

How project complexity effects the relationship between project team competency and project team commitment?

Research Question 6

How Project Complexity effects the intervention of team commitment between team competency and project team performance?

1.5 Research Objectives

The goal of the study is to create and evaluate the predicted model to ascertain the relationships between the mediator (team commitment), independent variable (team competence), and dependent variable (project team performance). The study establishes that the project team competency will enhance the project team performance with mediating role of project team commitment and moderating role of project complexity. However, the below mentioned are the specific objectives of the study:

Research Objective 1:

To examine the relationship between the project team competence and project team performance.

Research Objective 2:

To investigate the relationship between project team competence and project team commitment.

Research Objective 3:

To investigate the relationship between project team commitment and project team performance.

Research Objective 4:

To examine the intervening effect of project team commitment on the relationship between project team competency and project team performance.

Research Objective 5:

To find out the influence of project complexity on the relationship between project team competency and project team commitment.

Research Objective 6:

To find out the influenced intervening effect of project team commitment on the relationship of project team competency and project team performance.

1.6 Underpinning Theory

Many theories that can apply to our study have been established in the past. The theory of competence, however, lends support to this particular study and will be used to uncover all of the components of our learning framework.

1.6.1 Competence Motivation Theory

The Competence Motivation Theory (Susan Harter., 1978) supports the study. According to the majority of researchers, the competence motivation theory was inspired by Robert White (1959) seminal paper on motivation reconsidered. White

(1959) first used the term effectance in this publication, where he defined it as a propensity to observe and shape one's surroundings. He said, interactions with their physical and social environments are intrinsically motivated for all living things. If such efforts are successful (produce an observable change in the environment), the person experiences intrinsic rewards such as feelings of efficacy and pleasure and is encouraged to keep up their effectance efforts (White 1959). It significantly differed from the theories previously presented by Sigmund Freud-proposed and -popularized psychoanalytic instinct theory and the conventional drive theories of human behavior, White's theory of competence motivation was regarded as a novel approach as compared to both of the theories.

Susan Harter expanded on White's theory in the late 1970s to create a more comprehensive framework that she initially identified as effectance motivation theory but later named it as competence motivation theory. Susan Harter presented the theory in her paper titled as Effecteance Motivation reconsidered in 1978.

In line with White (1959), the focus is on enjoyment as the driver of human interaction with the environment, but a number of other factors were also included in the study (Harter 1959). She began by introducing the notion that people's effectiveness or motivation can differ across achievement domains, the domains could be Cognitive, Physical, Social.

Individuals are driven to make mastery attempts within each domain in order to grow in their competence or demonstrate it. They will feel both perceptions of competence (belief in their abilities in that domain) and perceptions of performance control if their mastery attempts lead to success at an optimally challenging task and if they receive socioemotional support from significant individuals for such task success i.e.; belief in their ability to control their performance. High levels of perceived competence and control, in turn, produce pleasant emotions that maintain or boost effectance (competence) motivation (Harter, 1978). In contrast to White (1959), Susan Harter (1978) also put forth a path that was more negatively oriented, stating that people who make attempts at mastery but fail at optimally difficult tasks or receive little or no support from important social figures will feel less competent and in control in that achievement domain, as well as anxiety and

shame. The result of these circumstances together will be a reduction in effectivity motivation in that specific domain.

By arguing that individuals who are successful in their initial mastery attempts and who receive beneficial and effective reinforcement internalize both a self-reward system and a set of mastery goals, Harter also added a developmental component to her theoretical framework. Such adolescents will no longer rely on social agents to judge their performance or to inspire them to keep trying to master the subject because they have internalized the standards for the ideal challenge in that area. Accordingly, individuals who either repeatedly fail in their early mastery attempts or who receive unfavorable or no feedback will not only have low perceptions of competence and control in that achievement domain, but will also continue to rely on outside sources for both the evaluation of their performance and the inspiration to keep engaging in that domain.

The publication of Harter (1978) early work inspired a lot of research in the academic, social, and physical fields over the following 20 years. The construct of competence has likely been incorporated into other theories of motivation, such as achievement goal and self-determination, which is why interest in competence motivation theory has dwindled somewhat more recently. However, Elliot and Dweck (2005) suggested that competence play a more central role and that the term "accomplishment motivation" be changed to "competence motivation." They argued that competence motivation is (a) Widely present in daily activities, (b) Has a significant and influencing impact on people's emotional and psychosocial well-being, Operates across the lifespan (from infancy to older age), and (c) Is relevant across cultures.

The core idea behind the competence motivation theory is that people are motivated to participate in activities and stay committed, in which they perceive some level of competence or capability. Therefore, if the goal is to encourage people to engage in physical activity or strive for performance excellence, it will be necessary to design environments that will enhance people's perceptions of competence in the physical activity domains. Current research and theory suggest that when people succeed at tasks that are optimally challenging and when those around

them provide them with encouraging, motivating, consistent, and information-based feedback, their perceptions of their own competence can improve.

According to Spencer and Spencer (1993), competency is a trait that effectively addresses the criteria relevant to a job or circumstance and denotes a generally enduring behavior and mindset in a variety of contexts. Motives, traits, self-concept, knowledge, and skill are the five competencies that are listed. Competencies are regarded by managers as the individual items (Boyatzis et al. 2009). Outstanding performance is produced by six clusters of competencies: cognitive intelligence, emotional intelligence, self-management, social intelligence, social awareness, and relationship management. Case studies on the abilities of project team in the field of project management have been conducted gradually (Christenson & Walker, 2004). According to Crawford et al. (2005), project management should take into account not only the project team's competence but also the project management processes. The effectiveness of team and the accomplishment of various projects have been linked in other literature (Turner & Muller, 2006).

White (1959) saw competence as performance motivation, motivation itself is a prerequisite for performance, like competence, self-efficacy and the opportunity to perform. If competence is the capability to perform, motivation is the will to perform; self-efficacy is the trust in oneself to be able to perform adequately.

Based on the central view of the theory of Competence Motivation (Susan Harter, 1978), the framework of the study is developed. The theory supports that when a person is competent and has all the required skills to perform the task, then they tend to take deep interest in task and stay committed to it until it is not completely done. Hence, the performance is improved because they also struggle to master the skills that are required to perform a task.

1.7 Significance of Study

This study will not only expand the project management field's theoretical context, but it will also help project managers and practitioners manage challenging projects by effectively forming project teams. Despite having a capable team that

is dedicated to the project or organization, the study offers evidence and insights into the reasons why the project failed. The study shows that team commitment and competency alone are insufficient to guarantee the project's success because teams are affected by complexity and consequently do not perform as expected.

This study adds to the body of literature in a variety of ways. It starts by looking at how team competency affects the project's performance. Additionally, how does the relationship affect the project team's performance if the competent team is also committed? The study also demonstrates how the relationship between project team competency and project team commitment affects project team performance. Since it enables practitioners to learn various ways to enhance their business and project team performance, research on the topic of project team performance and the various factors affecting team performance is of significance importance.

The goal of this research is to understand how to create a solid team that is more capable and dedicated to overcoming project complexity. Teams are being impacted by the numerous advancements and shifts in project management trends brought about by the introduction of new technologies into the market, so project owners must place more emphasis on developing their team's competency so that it will always be able to succeed in challenging circumstances. In order to improve the competency of the project teams, various competency models are discussed in the study. Since the projects are becoming more complex due to changes in trends and technological advancements. In order to avoid performing poorly in challenging circumstances, this study advises practitioners to shift their attention to the challenges and complexities of the project as they choose the project team and bring on a group of people.

Chapter 2

Literature Review

2.1 Description of Variables

2.1.1 Team Competency

Team competency was defined by Ruuska and Teigland (2009) as the capacity of a group to collaborate, use its resources, and accomplish a common objective. Competence steers the organization in the right direction and moves projects forward steadily. Employees who are competent can accomplish the company's goals and objectives. Competency is a term that is difficult to understand and is frequently confused with skill. It is mainly because different terms have often been used interchangeably. Competencies are defined from a management perspective by two main streams: organizational or personal. The individual competencies are emphasized in the literature on human resource management (HRM).

According to McClelland (1973), the phrase serves as a symbol for a different method of conducting intelligence tests. According to the author, competence is a personal quality that is connected to exceptional performance, a display of unique talents in practice, and the application of knowledge necessary to carry out a job. For the purposes of this study, competence is understood as the sum of a person's knowledge, skills, and personal qualities applied to the accomplishment of a particular task or activity (Crawford, 2005; Müller & Turner, 2010).

2.1.2 Team Commitment

Team commitment can be defined as the degree to which team members are involved with and identify with the group (Bishop & Scott, 2000). When a team has a high level of commitment, the members are willing to put forth the effort necessary to uphold and sustain the relationship. As the team's interests and objectives become more significant, team members feel more duty-bound to support one another (Chang et al., 2013).

2.1.3 Project Complexity

A team member's understanding of the task at hand and how he manages the situation in which he must deal with the project's scope definition, objectives, and deadlines will determine how complex it is (Baccarini, 1996). The most important aspect of a project is its complexity, which was defined by Baccarini (1996) as "the number of different elements, such as tasks, specialists, and components; and interdependence or connectivity, the degree of interrelatedness between these elements." Hass and PMP (2008) states that the emphasis of a project's complexity is on interdependent tasks that are challenging to manage or complete. Complexity of the project has both positive and negative effects (Iles, 1997). Complexity is that characteristic of a model that makes it challenging to formulate its overall behavior in a given language, even when given reasonably complete information about its atomic components and their interrelations, according to (Edmonds, 1999).

2.1.4 Project Team Performance

According to Hoegl and Parboteeah (2003), team performance is the degree to which teams achieve predetermined quality, quantity, and flexibility objectives. To be considered effective, a team member must achieve the goal, be familiar with the task at hand, and complete it within the allotted time. The project team goes through various stages as well (Shao et al., 2016). Three criteria—cost performance, technical performance, and schedule performance—are used to assess

the effectiveness of project teams (Keller, 2006). In previous project management research, goal accomplishment by the team was highlighted as a key metric for evaluating project team performance (Lai et al., 2017).

2.2 Literature Review and Hypothesis Development

2.2.1 Team Competency & Project Team Performance

Despite efforts by project management societies to provide project teams with framework, standards, techniques, and methodologies to aid in daily activities, project failure rates remain high globally (Ramsey et al., 2011). Smith et al. (2011), who noted that despite efforts by project management societies to provide project teams with useful tools and methodologies to complete the task, the rate of project failures worldwide is still high, also support the argument. As a result, many projects spend a significant amount of money hiring qualified team members in the belief that doing so will inevitably improve project team performance. Projects frequently involve uncertainty and suspense, which together test the manager's and the project team's skills. Therefore, project success depends on the project team's expertise as well as the project manager's leadership and capacity to bring out the best in his or her team (Cheng et al., 2005). Ogunlana (2008) states that a number of factors affect how well a project performs, one of which is the team members' abilities, personalities, characteristics, and skills, which also have an impact on the project's results. Rose (2013) defines a project as a temporary endeavor with a defined start time, end time, resources, and scope that is carried out to accomplish particular goals. The scoping of a project is frequently influenced by the three iron triangle criteria of time, cost, and quality. However, these criteria are subsequently stated and discussed while evaluating the project and team's performance both during and after completion. Therefore, the management of projects and how they accomplish their objectives may determine whether they succeed or fail (Lehtonen and Martinsuo, 2006).

Additionally, it entails numerous interconnected tasks, making it complex. Complexity has many different associations between activities or tasks, making its definition challenging. The competency of team to deal with the complexity also influences the success and failure of a project. Typically, the term "competency" is used to describe the totality of a person's abilities, skills, behaviors, and knowledge that are directed toward effective performance in a specific working environment. Competencies describe the types of behavior that businesses need to exhibit in order to perform at a high level (Armstrong, 2002). It is emphasized that individual competencies are what determine an individual's performance as well as the success of the project (Savaneviien et al., 2008). Even among students who are preparing for their future working lives, the influence of a specific industry or company on competencies that are required for the job is well known (Duda and Kotrba, 2006). The concepts of hard and soft competency are distinguished in scientific literature. Professional competency, the challenging one, is based on organizational performance. Competency is therefore determined by an employee's behavioral traits and personal characteristics that are necessary for effective performance. These traits can be either social, professional, or conceptual. Business case studies have shown a variety of advantages related to competency usage, including decreased training costs, lower staff turnover, or increased employee productivity, which directly affects project team performance (Homer, 2001, Robinson et al., 2007). "The competency approach has the potential to outperform the other approaches for a number of reasons. First and foremost, it is behavior-focused; secondly, it is team-focused, emphasizing what they actually do rather than what they should or say they do; thirdly, it adheres to the Pareto principle (i.e., the 80/20 rule); finally, it focuses on the crucial tasks that ensure the success of the organization or the project; and finally, it is linked not only to the efficiency of individuals but also to the efficient performance of the entire department or team (Kubeš et al., 2004, Lišková and Tomšík, 2013).

Pate et al. (2003) distinguish between rationalist and objectivist individual competences. Competence is a particular set of qualities used in carrying out a job, according to the rationalist viewpoint. There is a difference between a job and a worker from a rationalist perspective. The concept of competence is linked to traits

of high-performing workers, such as character traits and social skills, which can be acquired through education, practical experience, or career training. On the other hand, the task-oriented aspect of competence is concerned with how certain people behave in a project setting. The relationship between project team competence and project success has recently been the subject of research (Turner & Muller, 2006). To maximize project performance, project team members must be able to accomplish the business strategic goal. Therefore, a project-based organization's success is heavily reliant on the abilities of its knowledgeable workers, the acquisition of new skills, and the creative applications of those skills and competencies (Davenport, 2006). In light of this, the idea of teamwork is crucial to the successful completion of project activities. Therefore, there is no question about the importance of teams and teamwork in project and product development. Researchers have been attempting to comprehend the conditions that promote teamwork for almost 50 years (Edmondson, 2009). It has been discovered that cross-functional teams make it easier to implement successful projects (Pinto, et al, 1993).

A deep understanding of the effectiveness and efficiency of teams and teamwork in project-based organizations is required due to the problem of ever-increasing performance expectations for projects and project teams. In temporary project organizations, the reliance on team structure is very high. This suggests that team members will come from various departments but work together (Goodman and Goodman, 1976). When examined in practice, it is discovered that the project teams resemble a group of people more so than they resemble an organizational unit. (2010) Bakker A project team made up of various organizations is even more of a dynamic mash-up of people from various backgrounds with various experiences and expectations for the project's goals. Numerous studies have demonstrated that a team member's leadership skills can be a crucial factor in the survival and expansion of the business. The majority of studies emphasize how important managers' administrative skills are to the success of projects within an organisation. Other individual competencies, such as knowledge, skills, and mindset, are, in contrast, presented in separate areas. To ensure ongoing innovation, businesses and organisation must work to maximize the skills and roles of every team member. A project team is made up of people from various fields who collaborate to achieve

the same objective. Members are typically assembled by obtaining resources from various organizational departments and functions. If necessary expertise is not present within the organisation, some project team members are hired as consultants from outside the organisation. After a project is finished, teams typically disengage or are assigned to other projects as deemed necessary.

Based on the above discussion from the literature, the following hypothesis is developed:

H1: Team competency has significant positive impact on Project Team Performance.

2.2.2 Team Competency & Team Commitment

Project teams operate in a very difficult environment (Chiocchio, Forgues, Paradis & Iordanova, 2011; Liu & Cross, 2016). For example, they are subjected to a high level of uncertainty (Walker, Davis, and Stevenson, 2017) strict time constraints (Nordqvist, Hovmark, Zika-Viktorsson, 2004) and the team development process is challenging due to the team's potential for variation over the course of the project life cycle (Eskerod & Blichfeldt, 2005). This makes it difficult to achieve high levels of group maturity and performance because project teams are expected to work under intense interpersonal pressure (Savelsbergh, Gevers, van der Heijden & Poell, 2012). Additionally, project teams should build teamwork skills through ongoing interactions throughout the course of the project (Veil & Turner, 2002), which can lead to either virtuous or vicious cycles of performance (Mathieu, Maynard, Rapp & Gilson, 2008). Project teams, in contrast to other types of teams, must continue to perform under demanding, difficult, uncertain or complex circumstances (Chiocchio et al., 2015; Walker et al., 2017).

Without a doubt, managerial skills alone are insufficient to foster team commitment in project settings (Jha & Iyer, 2007; Thamhain, 2013). However, the project manager is the link between the strategy and the team, according to the PMI (2013, p. 17). As a result, IT project managers can use particular competencies to encourage team members to work hard (Leung, Chen, & Yu, 2008; Thamhain, 2013). All in all, IT project team members must acquire skills that will enable

them to guide their peers in demanding, dynamic environments like those found in many IT project settings (Sumner et al., 2006). In actuality, successful IT team managers don't rely solely on their technical knowledge to succeed (Kerzner, 2009, p. 149). In order to keep the team committed as a part of the project organisation project managers must understand and shall be competent enough to know how to get the team committed to the project's goals and how to maximize team performance (Thamhain, 2011; 2013). Since research demonstrates that dedication is yet another crucial aspect of project management (Jha & Iyer, 2007). Researchers have shown that team commitment enhances team performance (Bishop, Scott, & Burroughs, 2000). Building commitment, however, is known to be a very challenging task to complete (Thamhain, 2013).

H2: Team competency has significant positive impact on Team Commitment.

2.2.3 Team Commitment & Project Team Performance

Commitment is defined as "a sense of loyalty to and connection with the organization, work, and group to which one belongs" in the literature. Identification is part of this notion of commitment. They may be more eager to learn and share pertinent information with the team as a result of this sense of commitment (Nijhof and colleagues, 1998) Attitudinal or Affective Organizational Commitment (AOC) is a phenomena that arises when the aims of individuals and organizations become increasingly integrated or when the individual's identity is linked to the organization, according to the literature (Mowday, 1979). According to Rikketa and Landerer (2002), Affective Commitment is thought to foster organizationally advantageous behaviors such as performance and intention to stay with the organization. Other types of commitment, such as continuation and normative commitment, have been postulated in the organizational literature. However, according to Mei-Yung et al. (2004), affective commitment is the one with the strongest and most consistent relationship to good outcomes.

According to the research, there are three dimensions of organizational commitment: 1) affective commitment; 2) continuous commitment; and 3) normative

commitment (Allen & Meyer, 1990). The "profile of commitment" of an individual is the degree to which she or he is dedicated to the many focuses (such as a supervisor, team, department, function, and organisation) that exist in the work environment (Becker & Billings, 1993). Individuals have varying amounts of devotion to each of these focuses (Becker & Billings, 1993; Bishop & Scott, 1996). Because teams, like organizations, develop goals and values that members may accept, members may choose to put forth varying degrees of effort on the teams' behalf, and members may have varying degrees of desire to maintain their team membership, teams and organizational commitment can be defined in the same way (Becker & Billings, 1993). It is possible to distinguish between the commitment construct (i.e., the degree of identification and engagement) and its emphasis (such as commitment to the manager, team, department, and/or organisation). Therefore, it is assumed that team commitment and organizational commitment are similar in character and differ only in terms of their focus in this study (in other words, to whom or what a person is committed). In the project management literature, there has been a lot of focus on the effect of commitment on project team performance. According to Mei-Yung et al. (2004), emotional commitment enhances the performance of the project team because employees become more attached to and invested in the project and also wish to remain in the company for the specific project. Therefore, in this study, we suggest the following hypothesis based on the aforementioned facts and literature.

H3: Team Commitment is positively related to Project Team Performance.

2.2.4 Team Commitment, Team Competency and Project Team Performance

People may have several types of obligations when working on a project, such as team commitments, project commitments, professional commitments, organizational commitments, etc. There haven't been many research on commitment of project teams, and we don't know much about how different focuses of commitment affect knowledge sharing (Tremblay et al., 2015). Project team commitment

(team commitment) is the areas of commitment that we specifically address in this study. The efforts of team members are likely to be influenced by commitment, which has also been linked to improved team performance (Hackman, 1990; Hoegl et al., 2004; McDonough, 2000). Project commitment substantially predicts team performance in cross-functional product development teams (Ehrhardt, Miller, Freeman, and Hom, 2013). Each team member is responsible for carrying out his or her assigned tasks in a timely manner and working toward the team's overall goal. The project team goes through various stages as well (Shao et al., 2016).

They can be expected to perceive themselves as accountable for both their individual performance and the general success of the project by identifying with the team and the project. On the other hand, team members who are not dedicated to the project are unlikely to put out the kind of effort required for project success. In order for a project to be successful, team members from various organizational departments and disciplines must cooperate, put aside conflicting interests, and dedicate themselves to the project's objectives. A key factor in determining commitment is trust. (Ehrhardt et al., 2013; Sethi & Nicholson, 2001).

Team members should be encouraged to establish an attachment to the team and connect with the team's aims and ideals when trust between team members is high and they believe one another to be competent, this will increase team commitment. When a team is focused on the ideal project goal, particularly on outcomes that are beneficial and successful, they are said to be performing well (Lai et al., 2017). The performance of project teams is the subject of numerous studies (Liu & Cross, 2016). Regarding dedication to a project, team members' faith in their colleagues may improve their desire to devote themselves to its achievement (McDonough, 2000). Team members may not be willing to put out the effort and energy required for project success if they lack faith in their coworkers and believe that they lack the skills essential to fulfil the assigned responsibilities. Based on the material mentioned above, we have postulated that:

H4: Team Commitment mediates the relationship between Team Competency and Project Team Performance.

2.2.5 Project Complexity, Team Competency & Project Team Commitment

The business environment has changed quickly and unpredictably as a result of globalization, digitization, and transformation, which has added to the complexity of the project environment. As a result, completion of the project is now required for the growth and survival of the business. Performance of the project team and project success have emerged as a key theme in project management, attracting significant attention from both researchers and practitioners. Any project's success or failure is strongly correlated with its level of complexity, which increases when the project team's performance is poorly managed and when tasks that have been dispersed or that will be performed soon are not properly carried out. The term "project complexity" has many different definitions, including "technical complexity" and "management complexity." Technical complexity includes the number of technologies used, the team's familiarity with those technologies, or technical interfaces. Management complexity includes "project staffing and management," "other change related issues," and "external issues related to the project.". The purpose of variations, the number of variations, the number of connected aspects, tasks, or experts, and the complexity involved in the project are all included in the concept of project complexity (Baccarini, 1996; Miller and Hobbs, 2005). Each project tends to be complex because projects are all different from one another. This project's complicated nature includes a degree of uncertainties and complexity that add to its unpredictability. Project management terminology frequently refers to complexity, which typically results in more challenges getting the desired result. There must be a method for controlling project complexity so that the team won't have trouble working on it (Kermanshachi et al., 2020). The project's complexity assessment is a crucial component that aids in efficient project management (Baccarini, 1996).

Project complexity introduces uncertainties that might alter the project's scope (Liu and Wang, 2014). It is the characteristic of a project that makes it challenging to comprehend, predict, and regulate its overall behavior even when provided with relatively full knowledge about the project system. Project scale, project variety,

project interdependence, and project context are its motivating aspects (Vidal and Marle, 2008). Because each project is unique, one of its evident features is complexity (Laine et al., 2016). The project's complexity hinders the performance of the project team, which delays the project (Hanisch and Wald. 2009). Projectized organizations' most noticeable characteristic is complexity, which is described as an interdependency between several diverse responsibilities. Whereas, complexity, according to Gidado (1996), is the ability to carry out a difficult process with numerous intricate pieces united in a working network for the work flow within time, cost, and quality to accomplish the intended output without any internal conflict in the process. In another instance in literature, complexity may be defined as the difficulty of putting planned, objective aims into action. According to Hass (2008), an accurate understanding of complexity may aid in identifying the underlying causes of project-related issues, which can improve the likelihood of project success.

The relevance of complexity as a key project component is investigated, as projects are discussed (Wood and Ashton, 2010). Understanding project complexity, how to handle project complexity, and how it affects people and organizations is crucial for both practitioners and scholars (Thomas et al., 2008). According to Daniel and Daniel (2018), as projects get more complex, management of the projects also becomes more challenging.

In this study's hypothesized model, the association between project competency and team commitment is moderated by project complexity, which also moderates the indirect effect of team competency and team commitment on project team performance. An individual's or a project team's commitment may motivate and inspire them to achieve great things. Additionally, it can build a culture of cooperation and group actions to achieve shared goals. All elements of project results and team performance, including a direct influence on the triple constraint project success criteria (i.e., on time, within budget, high quality, and meeting scope and customer expectations), can be affected by an individual's or a team's degree of motivation. Therefore, it is crucial to keep an eye on factors affecting the commitment. The performance of a project is influenced by its complexity. It is crucial to comprehend the relationship between project complexity, management decisions,

and project team performance (Long D. et al., 2019). Complex and unpredictable projects are challenging to work on and comprehend because of the advances in the industry, which make it hard to grasp and complex to handle the expectations of the client. Projects in the field of information technology frequently fail owing to their complexity and requirements. Because of the interruptions that complexity causes, which make the project challenging to implement, complexity has a negative influence on the project performance (Zhu and Mostafavi, 2017).

Project complexity has been widely examined in literature due to its role in project failure (Qazi et al., 2016). They said that the team's initial assessment of the project's difficulty was incorrect, which led to the project's failure. In order to successfully execute a complicated project and ensure project success, the organisation must utilize its resources, its resources' capabilities, and its participants' collaboration (Gao et al., 2018). Since it may influence planning, coordination, target identification, and project success, project management is commonly regarded to be complicated (San Cristóbal et al., 2018). According to (Vidal and Marle, 2008), complexity is present everywhere and is steadily rising. Additionally stated, the project manager manages perceived complexity because he is unable to comprehend and handle actual project complexity.

Baccarini, (1996) viewed technology and organizational complexity as essential elements of project complexity. Edmonds (1999) states that a key component of project management is project complexity (Tatikonda and Rosenthal, 2000) if the project complexity is not handled effectively, the project team performance will be effected despite then having the required competencies. According to published research, project complexity can lead to new project forecasts and have an impact on project outcomes (Bosch-Rekveldt et al., 2011; Gransberg and Shane, 2015; He et al., 2019). According to (Bjorvatn and Wald, 2018), project complexity overwhelms the team's capacities due to its nature and the fact that it might result from internal or external reasons. In another reference Geraldi et al., (2011) analyses the complexity of projects, tasks, organizational structure, and uncertainty as a whole. The project will grow closer to its intended goal using an iterative process that involves making a choice, acting, analyzing the results, and choosing

the next set of actions based on what has really occurred. The recognized aspects that have extra effects on the project are what cause the complexity of the project. The likelihood of the project succeeding may be lowered by a challenging project aim, tightening of the timetable, crucial resource shortages, and project team approach (Dao et al., 2017).

Project complexity is one of those important project characteristics, according to (Gidado, 1996), which can modify the project's baselines and have an impact on its success. The most recent developments in the sector have made projects more inventive and creative, and it has been hypothesized that this increased creativity has increased project complexity, which lowers team effectiveness. It has a detrimental impact on the projects as a whole (Lee et al., 2020). The right managerial and team level activities necessary to effectively execute a project are determined by certain project features. One such crucial project aspect is complexity. Bennett notes, "When discussing management difficulties, practitioners usually categorize their initiatives as simple or complicated. This demonstrates a pragmatic recognition that complexity affects how projects are managed ". It is not unexpected that complicated projects require a high degree of management and that using traditional techniques designed for routine tasks has shown to be ineffective for complex initiatives. Hence, the having traditional competencies and skillset will be in effective as well. When it comes to meeting deadlines and spending the appropriate amount of money, project complexity may be a significant factor in project team effectiveness. Because complexity requires "a large number of pieces that interact in a non-simple way," it lowers project team performance (Simon, 1962).

When an organisation supports conducive teamwork, project team performance increases. Task or contextual performance is what the project team refers to; task performance is when an employee completes tasks related to their job, and contextual performance is when they complete voluntary tasks like helping others or putting in extra time (Antognoni, 2017). When members of the project team complete their tasks effectively and efficiently, this is referred to as project team performance (Hsu et al., 2012). Because managers are more concerned with quantitative performance, such as budgets and schedules, Porter & Lilly (1996)

discovered that team members typically have plans that are linked with task processes.

H5 (a): Project complexity moderates the relationship between Team Competency and Project Team Commitment in such a way that this relationship will be weaker when Project Complexity is high.

H5 (b): The Indirect effect of team competency on project team performance through team commitment is higher when low project complexity and lower when higher project complexity.

2.3 Research Model

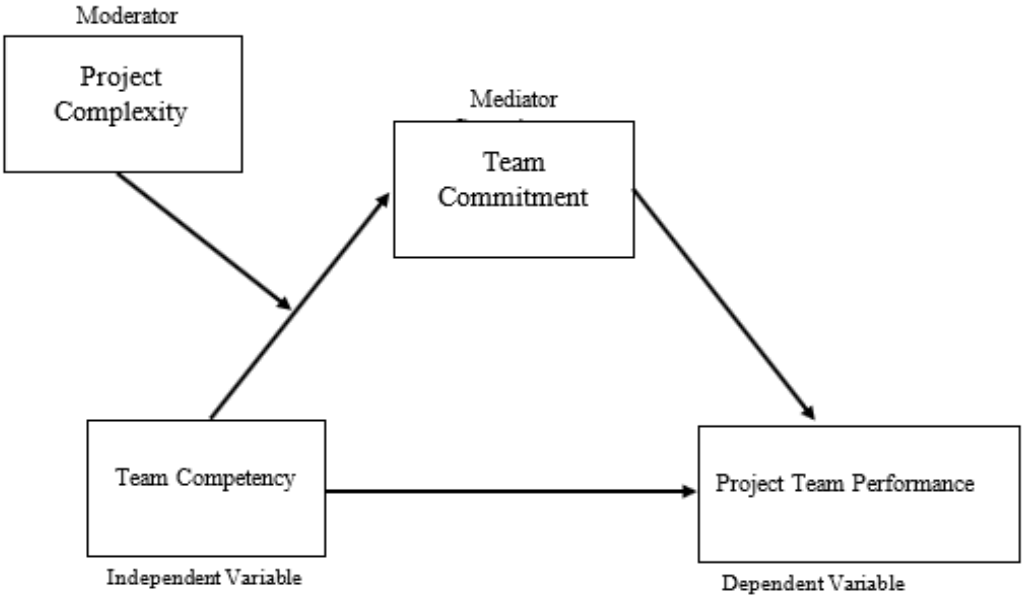

FIGURE 2.1: Research Model of Team Competency Impact on Project Team Performance through Project Team Commitment: Moderation of Project Complexity

2.4 Hypothesis of the Study

After developing the argument and on the basis of the literature provided above, there are six hypothesis has been developed for the purpose of the study where the core relationship is between Team competency and project team performance.

This relationship of team competence and project team performance is mediated by the team commitment. However, the relationship of team competence and team commitment is moderated by the project complexity. On the basis of the literature, it is hypothesized that project team performance will improve if the team members have competency and if there is right team competence then the team will be motivated hence the team commitment will also be enhanced. In table 2.1 below, the hypothesis statements of this study is presented.

Hypothesis	**Statements**
H1	Team competency has a significant positive impact on Project Team Performance.
H2	Team competency has a significant positive impact on Team Commitment.
H3	Team Commitment has a significant positive impact on Project Team Performance.
H4	Team Commitment mediates the relationship between Team Competency and Project Team Performance.
H5 (a)	Project complexity moderates the relationship between Team Competency and Project Team Commitment in such a way that this relationship is weak when Project Complexity is high.
H5 (b)	The Indirect effect of team competency on project team performance through team commitment is higher when low project complexity and lower when higher project complexity.

Chapter 3

Methodology

The research methodologies discussed in this chapter will be utilized to assist ongoing studies that evaluate the link between project team competency and performance, with the mediating function of project team commitment protected by the moderation of project complexity.

The method is founded on the theoretical underpinnings of variables. In order to do additional analysis, it will be necessary to determine the validity and reliability of the constructs. This section also highlights the demographic information, data gathering procedures, sample methodology, and instruments.

3.1 Research Design

A research design is a plan for how the study will be carried out. It's a plan of the scholar that outlines the strategy and method for acquiring and evaluating the essential material (Zikmund, 2003). The following research design elements are covered:

3.1.1 Research Philosophy

Deductive and inductive methodologies were adopted by researchers depending on the nature of the current research project (Soiferman, 2010). The research

hypothesis is validated using the deductive approach, where the hypothesis is developed based on the existing theory. In the inductive method, the theory is created by examining the existing data after the data has been acquired.

The current research study has been carried out using the hypothetical deductive approach, in which the research hypothesis is developed based on the theory that is now accessible. The quantitative technique was used to collect the traits and attributes from respondents via a questionnaire. The data was collected through the structured questionnaire.

The quantitative research believes on the data collection in numeric form and then analysis of this data to describe, illustrate and predict the impact of independent variable or any other interested phenomena (Gay et al., 2009). For organized data collecting, quantitative approaches should be used as much as possible. The gathered information is next examined and put to an empirical test to confirm the validity of the study hypothesis.

3.1.2 Type of Study

This study takes a positivist method and is an explanatory study since it concentrates on the cause-and-effect connection in order to examine the relationship between Team competence and Project team Performance. Finding the "Why" and "How" of the relationships that occur in a certain context is how Kumar (2019) defines explanatory research.

3.1.3 Time Horizon

Saunders and Lewis (2012) distinguish between longitudinal and cross-sectional studies depending on the period of time used to gather data. A longitudinal study is one in which data are gathered from the same sample over time; in contrast, a cross-sectional research only collects data once. The present investigation is cross-sectional. The questionnaires were used to gather the data for the current study all at once during a two-month period.

3.1.4 Unit of Analysis

The exploratory study's unit of analysis is regarded as its most crucial part (Khan, 2014). The exploration of the study's primary goal is the most crucial part of any scientific study. The information might be gathered from any source. According to the demands of the research, researchers determine their own range.

The unit of analysis for this hypothesized model is Individual mid-tier team members from various Pakistani commercial and public project-based IT organizations. Using this unit of analysis, the effect of team competency on project team performance is examined.

3.2 Population and Sample of Study

A population may be described as the complete group from whom a researcher intends to derive conclusions. A unique person from whose data will be gathered is a sample, according to one definition. To put it another way, the sample is a subset of the population. The study's sample included every project team member employed by an IT company with offices in Lahore, Karachi, and the twin cities.

A sample-based research that accurately reflects the complete population was conducted since it is practically hard to obtain data from the full population. The sample requirement was determined using an online calculator at surveysystem.com, which was created to calculate the sample size.

The minimum requirement was found to be 483 samples, with a confidence level of 95%, a confidence interval of 5, and without entering any numbers in the population cell because it was unknown how many people were in the sample. The sample was taken from IT project-based businesses in the public and commercial sectors where project team members actively participate in project activities. The survey method is used to get the data since it is a simple procedure for gathering data from many people at once.

3.3 Sampling Technique

Using the Snowball sampling approach, we selected a sample of workers from the IT sector for our study. This method is a subset of non-probabilistic sampling. Non-probabilistic sampling was determined to be the best strategy because the population is huge and unknown. Time and financial constraints were also taken into consideration. A total 483 responses were collected from mid-tier team members working in project-based IT companies based in Pakistan make up the sample. Data is gathered from the majority of project-based IT businesses in Islamabad, Karachi, and Lahore.

The Questionnaire was shared with middle tier team members of different project based IT organizations, the team members shared the questionnaires with concerned relevant people who are also working in the similar capacity and in a similar project environment, hence, the snowball effect was created.

3.4 Instruments

All characteristics were evaluated using a Likert scale with a range of 1 to 5, with 1 denoting a low value and 5 denoting a high value. Because every respondent had a university degree, closed-ended questions were created in original English; no translation into the respondents' mother tongue was required. Since English is the language of teaching and examination at universities in Pakistan, every responder had a solid command of the language and could read and reply to the questionnaire in it. Age, gender, qualification, and experience of the respondent are the three variables used in the questionnaire to collect the respondent's demographic data.

3.4.1 Team Competency

Team competency is assessed using 3 items scale originally developed by Margerison, (2001). Each item is rated on a five-point likert scale ranging from (1=strongly disagree to 5=Strongly Agree). And a sample item of this scale is:

"I am self-assured about my team's capabilities to perform project activities".

3.4.2 Team Commitment

In order to capture team commitment, we picked a questionnaire from Singh & Gupta (2015) they developed a questionnaire using a validated instrument of organizational commitment by Allen and Meyer (1990). When creating the scale, the organizational commitment questionnaire was modified to include the word "team." The sample items of the scale are:

'I feel a strong sense of belongingness to my team.'

'My team has great deal of personal meaning to me. '

3.4.3 Project Complexity

In the study, Project Complexity is measured using the scale developed by Xia & Lee, (2005) which included 15 items, but we adapted the scale and picked only three items that are relevant and most suitable for the purpose of this research. The replies were acquired by 5 point Likert scale ranging from 1= strongly disagree to 5= Strongly Agree. The sample items of the scale are:

"The project team was cross-functional"

"The project involved multiple external contractors and vendors"

"The project involved coordinating multiple user units"

3.4.4 Project Team Performance

To measure project team performance the 4 items scale was used which was developed by Henderson and Lee (1992) to capture the data for this variable. Few sample items of this scale are:

"My team maintained good adherence to the project schedule"

"My team was efficient in project operations"

3.5 Scale Summary

Following is a summary of the scales used in this study, and in the end, the questionnaire is attached in Annex-A.

TABLE 3.1: Summary of Scales

Variables	**Scales**	**Items**
Team Competency	Margerison, (2001).	3
Project Complexity	Singh & Gupta, (2015)	3
Team Commitment	Xia & Lee, (2005)	4
Project Team Performance	Henderson and Lee (1992)	4

3.6 Ethical Consideration

First, for the purpose of this study, no abrupt interruptions were made in any organisation, for all the participating members of an organisation, the organization's leader gave his or her consent for the staff members to take part in the study. However, if the data in collected in the personal capacity, it was assured that there are no disturbance caused in normal work routine and the immediate supervisor of the participant is informed about the activity. It was demonstrated that the respondents' concerns regarding confidentiality and privacy were taken seriously by including a confidentiality provision in the covering letter. Additionally, the correspondents were informed of the study's goal.

One of the fundamental components of every study is ethical concern. For the current investigation, the following factors were carefully considered: All of the participants and responders gave their agreement in order to be included in the study. No subject was under any pressure to take part in the study. They participated with their free consent and also participants had full permission to leave the event whenever they wanted. The study data and the participant information collected for the purpose of this study was all kept private and safe. The participants were ensured regarding the safety and confidentiality of their information.

Moreover, there was no misinformation given to the participants about the study and regarding the cultural beliefs of the respondents, each participant received respectful treatment. Lastly, The Questionnaire did not contain any discriminatory or demeaning wording which could hurt the sentiments of any respondents. The data was gathered in utmost professional environment to avoid the effects of any external factors on the respondents or respondents.

3.7 Characteristics of Sample

The respondents might be given a variety of demographic questions to determine the characteristics of the sample. According on the kind of research, this study's demographic features vary. The following demographic factors were taken into account in this study:

1. Gender of respondents.
2. Marital Status of Respondents.
3. Education of Respondents.
4. Age of Respondents.
5. Total Professional Experience of respondents.

3.7.1 Age of Respondents

As presented in Table 3.2, out of a total of 483 respondents, 143 respondents are aged between 20 and 25 years, which makes up 29.6% of the total number of respondents. 144 respondents recorded their age between 26 years and 30 years, making up 29% of the total number of respondents, and a good number of 106 respondents were 31 years to 25 years of age, which means 22% of total respondents fall in this age range. However, a total of 64 respondents are 36 years to 45 years old and 26 respondents are over 45 years old, which makes 13.2% and 5.3% respectively of the total number of respondents.

TABLE 3.2: Frequency by Age

Age	**Frequency**	**Percentage**
20 – 25	143	29.60
26 – 30	144	29.90
31 – 35	106	22
36 – 45	64	13.20
Above 45	26	5.30
Total	483	100

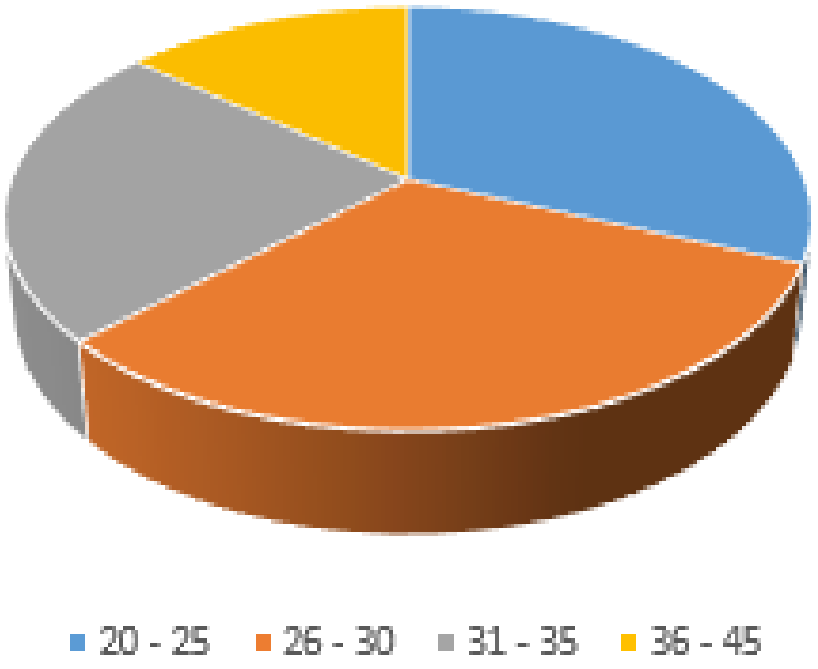

FIGURE 3.1: Frequency by Age

The above statistics clearly shows that the main chunk of our respondents aged between 20 – 25 years & 26 – 30 years.

3.7.2 Gender of Respondents

The data presented in table 3.3 shows that out of a total number of 483 respondents, 289 respondents were male. Rest, 194 respondents recorded their gender as

females. According to this number, 60% of total respondents were male and 40% were female.

TABLE 3.3: Frequency by Gender

Gender	Frequency	Percentage
Male	289	60
Female	194	40
Total	483	100

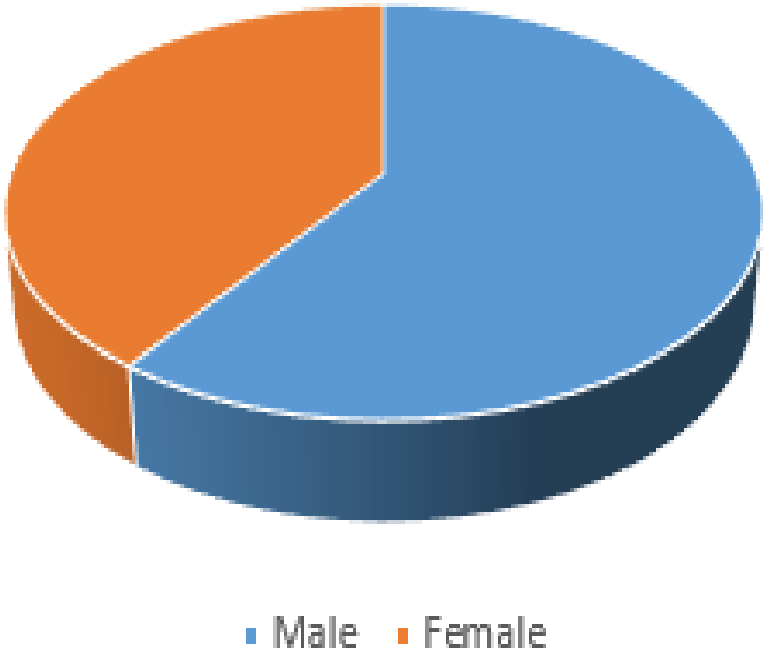

FIGURE 3.2: Frequency by Gender

By looking at the statistics of the test results, we have found that the number of male respondents in our study if higher as compared to female, though the difference is not huge.

3.7.3 Marital Status of Respondents

The table 3.4 below shows the result of descriptive test to find out the frequency of respondents as per the marital status. As shown, out of a total number of 483 respondents, 243 respondents were unmarried/single, and remaining 240 respondents are married.

TABLE 3.4: Frequency by Marital Status

Marital Status	**Frequency**	**Percentage**
Single	243	50.40
Married	240	49.60
Total	483	100

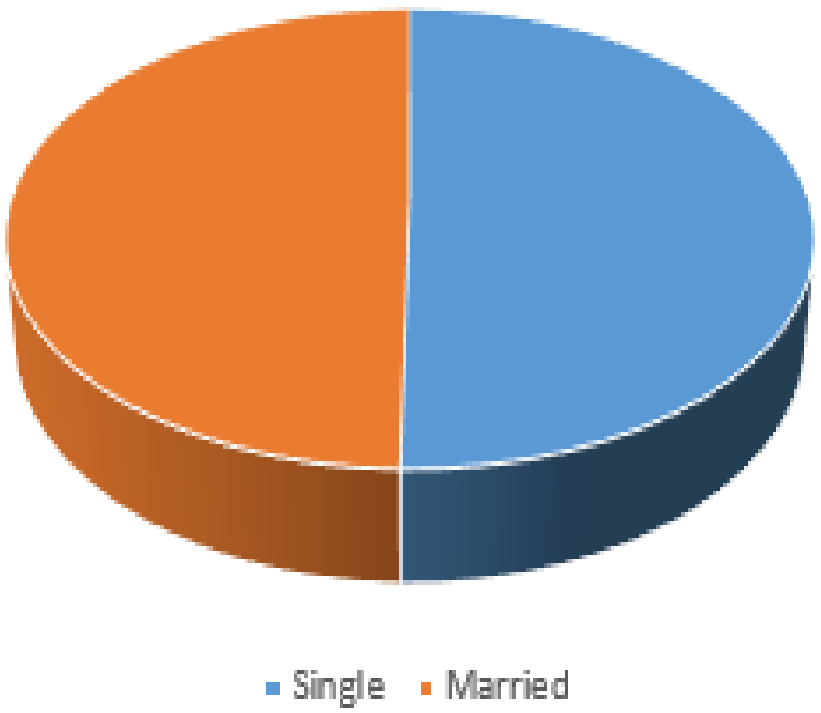

FIGURE 3.3: Frequency by Marital Status

According to results of the descriptive tests, 50.4% of total respondents are Single and 49.6% are married. Therefore, the number of unmarried respondents is slightly higher.

3.7.4 Education of Respondents

A total of 483 respondents provided information for this study, of whom 198 had completed a bachelor's degree, 45 had obtained a technical education, 210 had completed a master's degree, and 30 respondents had earned a PhD. According to the statistics, 41% of respondents have a bachelor's degree, 9.4% have completed their technical education, 43.5% have completed their master's, and 6.1% have PhD.

TABLE 3.5: Frequency by Education

Education	**Frequency**	**Percentage**
Bachelors	198	41
Technical Education	45	9.40
Masters	210	43.50
Doctorate	30	6.10
Total	483	100

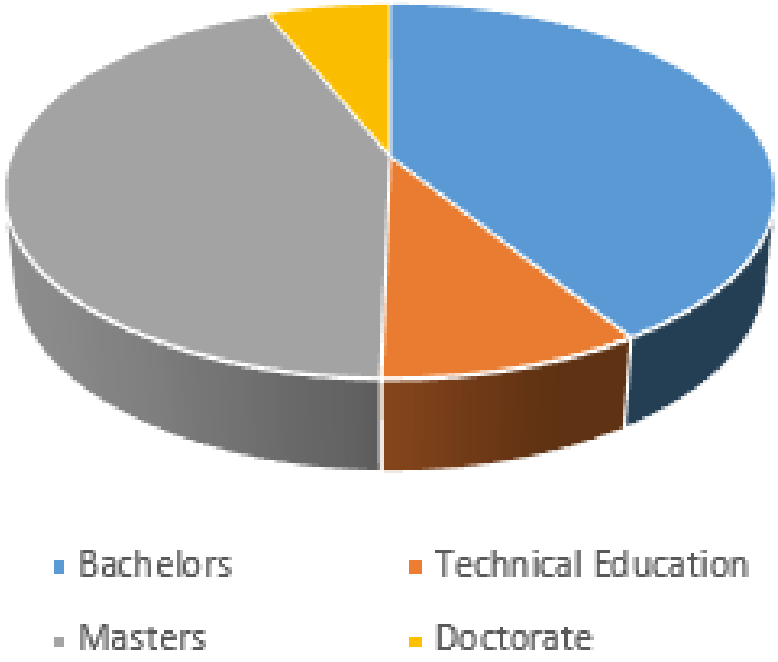

FIGURE 3.4: Frequency by Education

According to this statistics and as presented in Table 3.5, there are more bachelor degree holder respondents than other respondents.

3.7.5 Total Professional Experience of Respondents

As a part of demographic variable, the respondents were asked about their professional experience as well. As per the responses, 51.4% of respondents have an experience of less than 5 years, which means out of 483 respondents 248 respondents fall in this range. 158 respondents have a total professional experience between 6 years to 10 years, which makes up 32.7% of the total responses. As per responses, 64 people have experience ranging between 11 years to 20 years which

is 13.2% of total data. Lastly, only 13 respondents have experience more than 20 years which is only 2.8% of the total data.

TABLE 3.6: Frequency by Experience

Experience (Years)	**Frequency**	**Percentage**
Less than 5	248	51.40
06-10	158	32.70
11-20	64	13.20
Above 20	13	2.80
Total	483	100

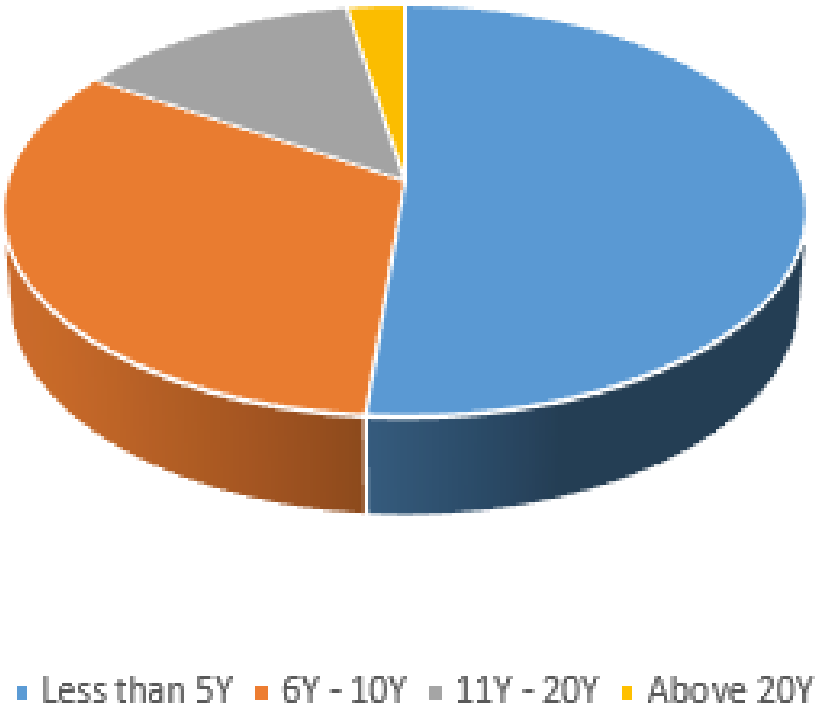

FIGURE 3.5: Frequency by Experience

The statistics presented above highlights that the prominent number of respondents in our study have an experience below 5 years.

3.8 Method of Analysis

After the data has been gathered using the convenience sampling approach, other procedures have been taken to analyze the data. Using the snowball sampling technique, 483 responses were received and further analyzed for the purpose of

this research. The first stage entailed choosing a questionnaire as the survey instrument to ensure accuracy of replies. The data was entered and processed using Software for Social Science-21 (SPSS21) in the following stage, which involved encoding all of the obtained data against each variable. Frequency analysis was used to identify sample characteristics. Then, using numerical values, descriptive statistics were computed. Then the Cronbach alpha was calculated to assess the scale's reliability. To examine the correlation between the study's variables, a Pearson Correlation Analysis was performed. The hypothesis was validated using a regression test, which was used to examine the connection between dependent and independent variables. Also performed was data analysis, which made use of Andrew F. Hayes's (2016) SPSS-21 PROCESS macro. PROCESS macro is used because it makes it easier to investigate a variety of models, including frame models with mediation, frame models with two or more mediations, frame models with both mediation and moderation, and frame models with moderation mediating. With SPSS, simple instructions and commands may be used to handle and analyse highly complicated data. Below is a list of the tests that were conducted using SPSS were Test of Descriptive Statistics to determine frequency of demographic variables of the data, Reliability Analysis was run to check the reliability of Scales, before I proceed with my research, pilot testing was also done, the number of responses for pilot testing is 88. Furthermore, mean, and standard deviation of the data using is determinded using the descriptive statistics test and Skewness and Kurtosis calculation was also done using descriptive statistics tests. Going further, Correlation Analysis was also done on SPSS to check the correlation between the variables. Lastly, Regression Analysis is done using PROCESS macro version 4.1 by Andrew F Hayes. For moderation PROCESS macro Model 1 is used, for moderated mediation PROCESS macro Model 7 is used and for mediation PROCESS macro Model 4 was tested and results are further analyzed.

3.9 Pilot Testing

The purpose of pilot testing is to check the reliability of the scales before digging deep into the research and proceeding further for the complete data collection for

the purpose of the research. Through the pilot testing, a small chunk of responses were gathered and then tested in order to see if the respondents completely understood the questions asked in the scale. It is suggested that if the reliability is proven in the pilot testing, then the researcher proceeds further with the research (Teijlingen & Hundley, 2001). The pilot testing is done using the same procedures and techniques that are employed in actual research. However, for the pilot testing, usually 10% of the overall sample size is taken, or a minimum of 40 responses shall be used for the purpose. The reliability of scales is determined through the Cronbach alpha and, according to Haier et al. (2006), a Cronbach's alpha value of 0.7 or above is considered acceptable. The sample size for the purpose of pilot testing was 88 which makes approximately 18% of total sample size.

Table 3.7: Reliability of Pilot Testing

Variables	**Items**	**Cronbach Alpha**
Team Competency	3	0.823
Project Complexity	3	0.702
Team Commitment	4	0.786
Project Team Performance	4	0.813

N=88.

Considering the above literature references, I was able to perform the pilot testing for the purpose of my research. The pilot testing was done using 88 respondents and after looking at the results presented in the Table 3.7 above it was found that all the scales meet the reliability criteria because the Cronbach alpha is above 0.7 and hence it is safe for me to proceed further with my research using the scales that were analyzed.

3.10 Reliability Analysis of Scales

According to the literature, consistency of scale is referred to as reliability; hence, a scale is considered reliable if it consistently yields the same findings across a range of situations. It is crucial to do a reliability test on the scale used in a

research study in order to determine whether or not the scale is trustworthy for the study; otherwise, the findings won't be valid, and generalization won't be feasible. Cronbach's alpha, which indicates the internal consistency of the variables and their relationship to one another, is one of the extensively used techniques for evaluating dependability. The Cronbach alpha's useful range is 0 to 1. (Cronbach, 1951). The scale's dependability increases as the value rises. Although the Cronbach alpha value of 0.7 or higher is frequently thought to indicate that a scale is reliable, a value of 0.6 is likewise acceptable if the scale's items total less than 10. The Table 3.8 below shows the results of reliability analysis of this study:

TABLE 3.8: Reliability Analysis

Variables	**Items**	**Cronbach Alpha**
Team Competency	3	0.801
Project Complexity	3	0.778
Team Commitment	4	0.741
Project Team Performance	4	0.794

N=483.

According to the above table 3.8, the Cronbach's alpha value of all the individual variables is above 0.7, which means that the analysis result proves that the scales used for the purpose of this variable are reliable. With the Cronbach alpha value of 0.801, the construct of team competency, which is an independent variable of the study, is reliable. Project complexity and team commitment have the Cronbach alpha values of 0.778 and 0.741, respectively, which are also reliable. Last, the Cronbach alpha value of project team performance, which is a dependent variable, is 0.794, which is also reliable. Therefore, the results obtained on the basis of the data collected using the questionnaire could be used for further research.

Chapter 4

Data Analysis and Discussion

4.1 Descriptive and Normality Analysis

To access the key information about variables, descriptive statistics are used. Descriptive analysis provides a summary of the data's distribution, aids in the discovery of errors and outliers, and makes it possible to spot similarities between variables, all of which help determine whether the data are reliable enough to support further statistical analysis. Descriptive analysis aids in clearly defining and condensing data points so that patterns may emerge that support each condition of the data. The mean values shed light on how the data are inclined. It provides a clear understanding of the responses, showing where the majority of them are located.

The results of descriptive analysis also shows the N value, which represents the total number of respondents, as well as the minimum and maximum values, means, and standard deviations for each variable are the outcomes of the descriptive statistics analysis. The standard deviation values are used to explain the variation of responses from their means, and the mean values are used to validate the average of the responses.

Table 4.1 of descriptive statistics provides a summary of the entire dataset along with all the details pertaining to the important statistics points. There are 4 variables studied in this research which are Team Competency, Project Complexity,

Team Commitment and Project Team Performance, every variable in my study was measured using a five point Likert scale.

The first column of the table shows mean value that is obtained through the descriptive analysis indicates the average of response that most of the respondents have chosen against each variable. The data's mean or average is its central tendency, or the point around which the entire set of data is distributed. It may effectively estimate the value of the entire set of data using just one integer. As seen in the table below, the mean value of team competency, which is independent variable of the study, is 3.913. It indicates that the average number of respondents have chosen option 3 from the responses options, the option 3 means that most of the respondents were neutral in their choice. It is usually considered as the most common answer.

TABLE 4.1: Descriptive and Normality Analysis

Variables	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**
Team Competency	3.913	0.71715	-0.835	2.452
Project Complexity	3.6025	0.63311	-0.716	1.478
Team Commitment	3.1801	0.67457	-0.844	1.906
Project Team Performance	4.9855	0.74413	-0.826	1.703

Furthermore, most of the respondents in our study chosen option 3 which is being neutral in their responses. However, for Project team performance which is also the dependent variable in this study, the mean value is 4.9855 which means average response of the total number of 483 respondents is 4 or 5, which indicates that they either agree or they strongly agree.

The next columns shows the value of standard deviation of each variable. The standard deviation is a measurement of how far apart on average each number is from the mean. That is how data deviates from the mean. When the standard deviation is low, the data points tend to fall inside a narrow range of values, whereas when the standard deviation is high, the data points are spread out over a greater range of values. Standard deviation can never be negative. When there

are many outliers, the standard deviation is large. A single outlier can raise the standard deviation and, as a result, distort the statistics. Standard deviation must be less than 1 in value. In the above dataset, result presented in table 4.1 it can be seen that the standard deviation values of all the variables is less than 1.

Third column of the table 4.1 present the skewness values of the descriptive analysis. Skewness is a metric for the asymmetry of a real-valued random variable's probability distribution with respect to its mean. Skewness should have a value between -1 and +1. The skewness value might be zero, positive, or negative. The tails on either side of the curve are identical mirror reflections of one another in a perfect normal distribution. When a distribution is skewed to the left, the mean is lower than the mode, and the left tail of the curve is longer than the right tail. Additionally known as negative skewness, this circumstance.

When a distribution is skewed to the right, the mean is higher than the mode, and the tail on the right side of the curve is longer than the tail on the left. Positive skewness is another term for this circumstance.

Lastly, the last column of the table entails the kurtosis values of the descriptive analysis. Kurtosis values must be between -3 and +3. It is now established how the measure of Kurtosis should be interpreted precisely. It concerns the existence of anomalies. Kurtosis is a metric used to determine whether data are heavy-tailed or light-tailed in relation to a normal distribution.

The table 4.1 shows that the values of skewness and kurtosis lies right in the range as the value of Skewness of Team Competency is -.835, and value of project complexity is -.716, while the skewness value of Team commitment is -.844, lastly the skewness value of Project team performance is -.826. All the values are tight within the suggested range of value of skewness, which is between -1 to +1.

However, as per the table in which the result of descriptive and normality analysis is presented, the value of kurtosis of team competency is 2.452 and project complexity is 1.478 while the value of kurtosis of team commitment is 1.906 whereas, the value of kurtosis of last variable which is project team performance is 1.703. Hence, all the values falls between the suggested range of value of kurtosis, which is between -3 and +3.

4.2 Correlation Analysis

I used the bivariate Pearson correlation test for this study's purposes because it essentially describes how the variables are related. The bivariate Pearson Correlation yields a sample correlation coefficient, abbreviated as r, which assesses the strength and direction of linear relationships between groups of continuous variables. By extension, the population correlation coefficient, abbreviated "rho," or "Pearson correlation," measures the statistical support for a linear relationship between the same pairs of variables in the population.

Among parametric measurements is the Pearson Correlation. The bivariate Pearson measure, (a) Correlations between different pairs of variables. (b) Correlations between and within sets of variables.

The following is revealed by the bivariate Pearson correlation (a) whether there is a linear relationship between two continuous variables that is statistically significant. (b) How strong a linear relationship is (i.e., how close the relationship is to being a perfectly straight line) (c) A linear relationship's direction (increasing or decreasing)

From this test, I am able to explain how strongly variables are related to one another. It is a single number that describes the relationship. The range of -1 to +1 is the acceptable value for correlation. Variables are associated but there is only a weak or smaller correlation between them, as indicated by values between 0.10 and 0.29. There is a moderate correlation, as indicated by values between 0.30 and 0.49, and a strong correlation, as indicated by values between 0.5 and 0.8.

(Cohen, West & Aiken, 2014) Values above 0.8 indicate high correlation between the variables, which means that they can be represented as a single variable due to the strength of their relationship, which indicates that there is a multicollinearity error. So that it can be minimized, this error must be dealt with appropriately by running various tests. If not, multicollinearity error may have an impact on the correlation of other variables.

TABLE 4.2: Correlation Analysis

Variables	**Team Competence**	**Project Complexity**	**Team Commitment**	**Project Team Performance**
Team Competency	1			
Project Complexity	.342**	1		
Team Commitment	.147**	0.139**	1	
Project Team Performance	.476**	0.189**	1.181**	1

*Significant Correlation is at the 0.01 level (2-tailed). ***

*Significant Correlation is at the 0.05 level (2-tailed). **

According to the values presented above, there is a positive significant relationship exists between team complexity and team competency which means that if the project complexity increases the team competence also increases. As per the ranges discussed earlier, there is a moderate correlation is indicated as the value falls between the range of 0.30 and 0.49.

Next, the correlation value of Team competence and team commitment is 0.147 which means that there is a positive significant correlation lies between the two variables as the value is positive it indicates that with an increase in team competence, there will be a positive increase in team commitment as well.

The correlation value of 0.476 indicates that there is a moderately significant positive relationship of project team competence and project team performance. By looking at the value I interpreted that the higher the team competence will be the high will be the project team performance. The value lies between the range of 0.30 to 0.49, therefore, this shows that it is a moderately strong relationship between the two variables.

The second column of the table 4.2 shows the correlation value of project complexity with the other variables. We have already seen the correlation of project complexity and team competence therefore, we will jump to the next variable which is team commitment, the table shows that there is a positive correlation exists between project complexity and team commitment, which means that the team commitment will increase with the increase in project complexity.

Lastly, there is a positive correlation seen between project team commitment and project performance, which means that with the increase in project team commitment, the project team performance will also increase. There will be an increase with the change because there is a positive relationship between the two.

The significance value, or P value, is used to indicate the likelihood that an error occurred when analyzing the data. If the P value is less than 0.01, there is only a 1% chance that the data were incorrectly collected. The values marked with "**" in the table below indicate that there is only a 1% chance that the data is inaccurate.

4.3 Testing Theoretical Relationship

Using PROCESS Macro by Andrew F. Hayes (2012) in SPSS, I ran a regression analysis to verify the theoretical relationship between the variables. The process macro employs SPSS bootstrapping as a method. The anticipated statistics for each sample are calculated using random samples that are created from the available data (Preacher & Hayes, 2004; Shrout & Bolger, 2002). To evaluate the strength of the link between one dependent and independent variable, regression analysis is performed.

By using one or more independent variables, it aids in predicting the value of a dependent variable. Regression analysis aids in determining how much variance in a single answer (the dependent variable) is being accounted for by a collection of independent variables. Model No. 4 of the PROCESS macro is introduced to test the relationships between project team competency and project team performance, as well as the relationships between team commitment and team competency, project team performance, and the mediating effect of team commitment on these relationships.

The moderated mediation function of project complexity between Team Competency and Team Commitment was tested using PROCESS Marcro's Model No. 7. The PROCESS macro's model no. 1 was used to test the theoretical relationship between team commitment and competency, where project complexity serves as a moderating factor.

4.3.1 Direct Effect of TCOMP on PTP

The first relationship that is tested using the regression analysis is direct relationship, this relationship is also denoted by "Path c' ". It is a relationship between independent variable and dependent relationship, in my study, the independent variable is Team Competency (TCOMP), whereas, Project Team Performance (PTP) is Dependent Variable. In the table below, the Independent variable is denoted by "X" whereas, "Y" represents dependent variable.

TABLE 4.3: Direct Effect of X on Y

Predictor	**coeff**	**se**	**t**	**p**	**LLCI**	**ULCI**
X to Y	0.3897	0.0342	11.4	0.0000	0.3225	0.4569

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit

X = Independent Variable – Team Competency

Y = Dependent Variable – Project Team Performance

According to the figures presented in Table 4.3 which are obtained as a result of regression analysis of direct relationship between TCOMP and PTP using SPSS. The p value of 0.000, which is less than 0.05, as shown in table 4.3, indicates the significance of the link. It amply demonstrates the significance of the link between the independent and dependent variables. Additionally, there is no zero between the values of the LLCI, which is 0.3225, and the ULCI, which is 0.4569, suggesting that the link is likewise substantial. The figure 4.1 below shows the direct relationship.

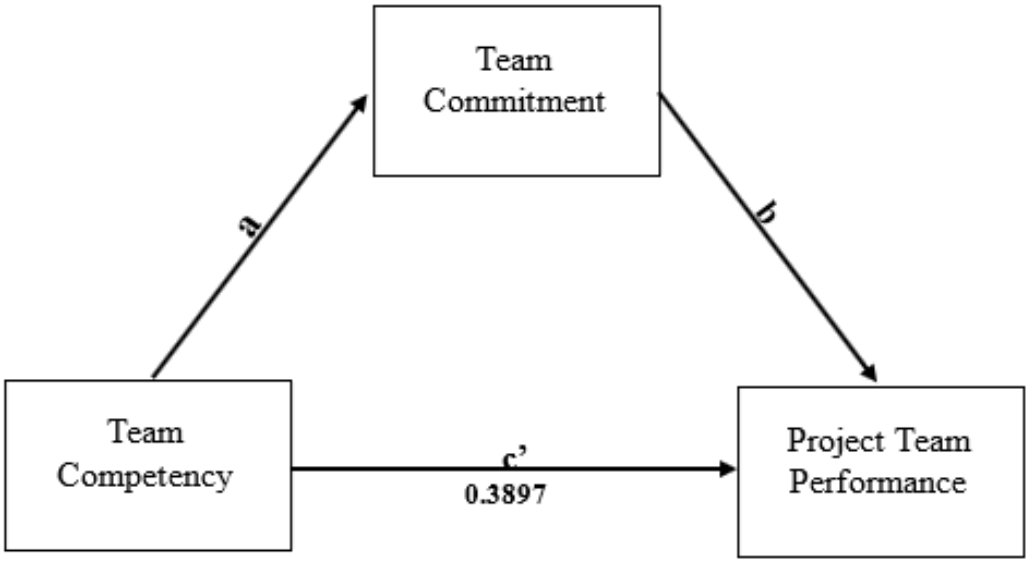

FIGURE 4.1: Direct Effect of X on Y

The coefficient value in table 4.3 is 0.3879 which is positive, this value indicates that the Project Team Performance will increase with the increase in team competency. As a result, the analysis's findings indicate that the performance of the project team is significantly impacted by team competency. This confirms our

first hypothesis, according to which Team Competency is positively linked with Project Team Performance.

4.3.2 Mediation Analysis

Moving further, values given below in table 4.4 is result of analysis that is run to test the relationship between independent variable and mediator, in my study, the independent variable is Team competency and Team commitment is mediator. The path of this relationship is denoted by "Path a" as shown in figure 4.2

TABLE 4.4: Direct effect of X on M

Predictor	**coeff**	**se**	**t**	**p**	**LLCI**	**ULCI**
X to M	0.1207	0.0371	3.2511	0.0012	0.0478	0.1937

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit

X = Independent Variable – Team Competency

M = Mediator – Team Commitment

The table 4.4 contains all the values of this relationship of direct effect of X on M, where X is representing independent variable that is Team Competency and M denotes Mediator which is Team commitment in this study. As presented in that table, the p value which shows the significance of relationship is 0.0012, which is less than 0.05, therefore, we could clearly say that there is a significant relationship between our Independent variable and Mediator.

Also, there is no zero between LLCI which is 0.0478 and ULCI which is 0.1937, therefore significance of relationship is proved again. Lastly, the coefficient value of 0.1207 is also positive. The positive coefficient value shows that team competency would have a positive direct impact on team commitment. With 1 unit increase in Team competency, the independent variable, there will be an increase of 1.2 units in project team commitment which happens to be the mediator in this study.

Hence, the above arguments on the basis of the theoretical testing of the relationship, it is proven that our second hypothesis that states that team competency has a significant positive impact on team commitment is 'Supported'.

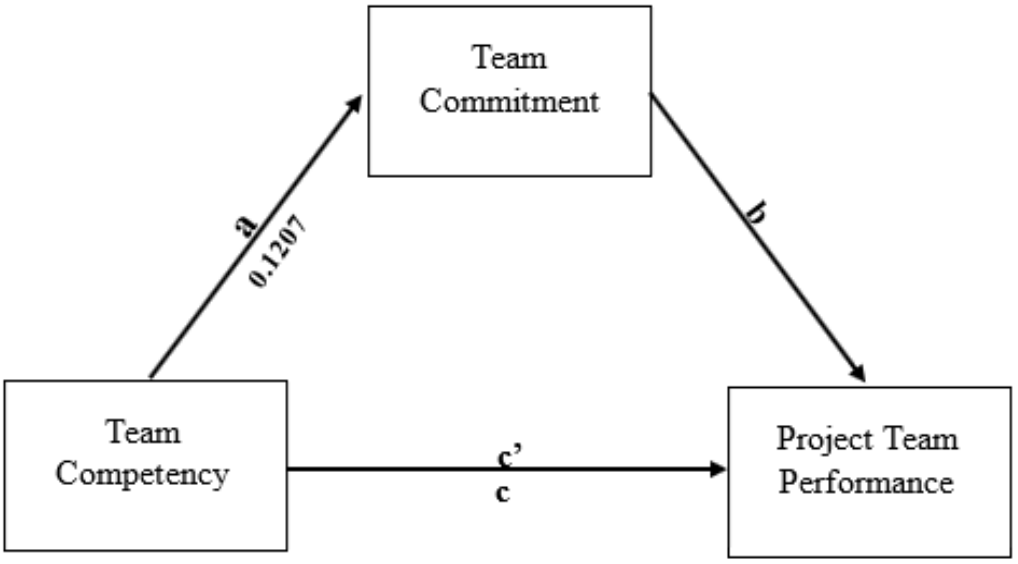

FIGURE 4.2: Direct Effect of X on M

Next comes the path 'b' which shows the relationship between Team Commitment, the mediator of our model and project team performance the independent variable. This relationship will highlight that how M impacts the Y variable of our model, where M represents Mediator that is Team Commitment and Y represents Project team Performance that is dependent variable of our model. The figures presented in the table 4.5 are the result of test run to analyze theoretical relationship of third hypothesis of our model, which states Team Commitment has a positive significant impact on Project Team Performance.

TABLE 4.5: Direct effect of M on Y

Predictor	**coeff**	**se**	**t**	**p**	**LLCI**	**ULCI**
M to Y	0.1172	0.0415	2.823	0.005	0.0356	0.1988

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit

M = Mediator – Team Commitment

Y = Dependent Variable – Project Team Performance

The **Table 4.5** indicates that the relationship is significant with p value of 0.0050. Also, there is no zero value between upper limit confidence interval and lower level confidence interval which proves the significance of relationship as well. The LLCI is recorded as 0.356 and LLCI is 0.1988 with coefficient value standing at 0.1172.

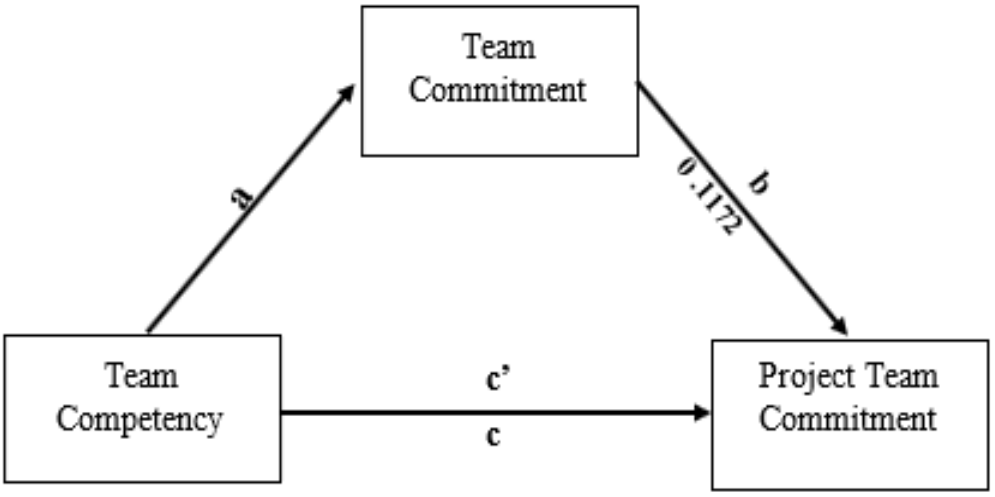

FIGURE 4.3: Direct Effect of M on Y

Thus the above data presented in **Table 4.5** shows that the relationship of 'Path b' as shown in figure 4.3 which is between the mediator; Team Commitment and Independent variable that is Project Team performance is positively significant with the coefficient value of 0.1172 which essentially means that with one unit increase in Team Commitment, the project team performance will also increase by 1.1172 units. Hence, our third hypothesis that states that Team Commitment has a significant positive impact on project team performance is supported.

Next, the next relationship that is examined is Indirect relationship of X and Y, that is Impact of our independent variable which is Team Competency on dependent variable that is Project Team Performance through mediating effect of Team Commitment. Such relationship is shown as Path C in the **Figure 4.4**.

TABLE 4.6: Indirect effect of X on Y

Bootstrap for Indirect Effect	**Effect**	**BOOT SE**	**BOOT LLCI**	**BOOT ULCI**
X to M to Y	0.0142	0.008	0.0019	0.0327

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit

M = Mediator – Team Commitment

Y = Dependent Variable – Project Team Performance

X = Independent Variable – Project Team Performance

As the bootstrap values are presented in **Table 4.6**, the Lower limit Confidence Interval and Upper limit Confidence Interval does not have zero in between them, as both the values are in positive, therefore, it is safe to say that there is a mediation exists in the model of my research.

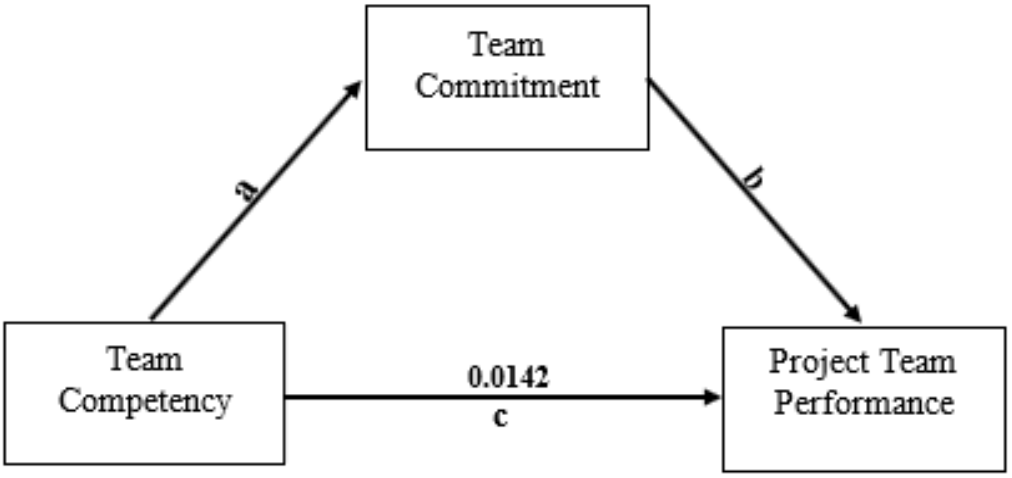

FIGURE 4.4: Indirect Effect of X on Y

Direct and indirect effects are added to determine the total effect. In this study, the indirect effect value that is 0.0142, which is presented in **Table 4.5** and **Figure 4.4**, is positive, indicating that the total impact values will rise with the presence of the mediator. As a result, my fourth hypothesis—that is Team Competency mediates the relationship between Team Competency and Project Team Performance—is supported.

4.3.3 Moderation Analysis

Model 1 in process macro is used in SPSS to test project complexity as a moderator. **Table 4.7**, which is provided below, shows the values of the Lower Limit Confidence Interval (LLCI) and Upper Limit Confidence Interval (ULCI), which are, respectively, -0.0290 and 0.1379. The results clearly show that there is a zero value between these two. Along with that, the p value also illustrates that the moderator has insignificant effect in this study. Because, in my study, the p value is 0.2007, which is higher than 0.01.

TABLE 4.7: Moderation Analysis

Predictor	**coeff**	**se**	**t**	**p**	**LLCI**	**ULCI**
Constant	4.3366	0.6028	7.1937	0.0000	3.1521	5.5211
Int-Term	0.0544	0.0425	1.2813	0.2007	-0.029	0.1379

N = 483 , Int-Term = Team Competency x Project Complexity

According to the aforementioned data, my study's five (a) hypothesis according to which "Project Complexity" moderates the relationship between team competence and team commitment such that an increase in project complexity will weaken the relationship—is not supported.

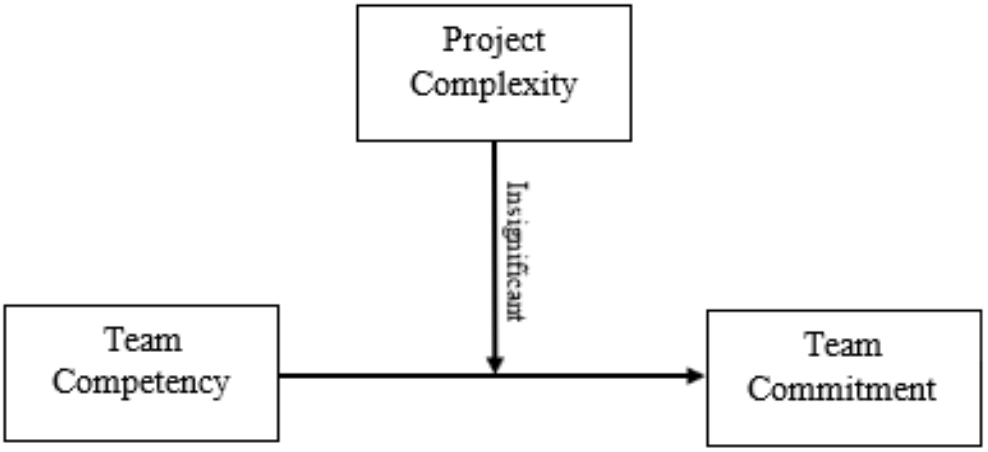

FIGURE 4.5: Moderation Analysis

4.3.4 Moderated Mediation Analysis

To test Project complexity as the moderator, PROCESS macro Model 7 is used to perform the analysis. The outcome of the analysis is presented in the table 4.7.

TABLE 4.8: Moderated Mediation Effect on M by X and W

Predictor	**coeff**	**se**	**t**	**p**	**LLCI**	**ULCI**
X	-0.0883	0.1463	-0.6034	0.5465	-0.3757	0.1992
W	-0.1583	0.1803	-0.8779	0.3804	-0.5126	0.1960

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit
W = Moderator – Project Complexity
Y = Dependent Variable – Project Team Performance

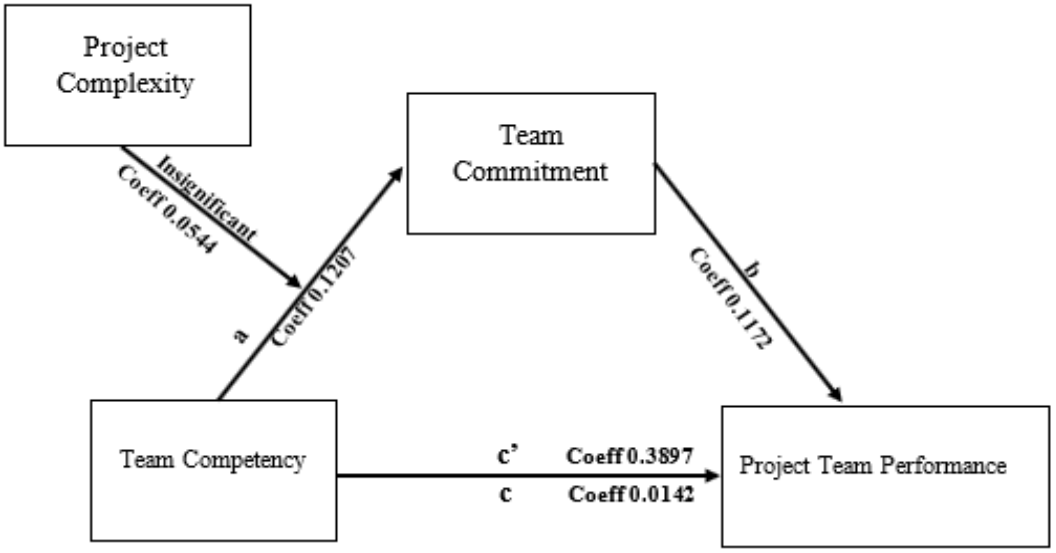

FIGURE 4.6: Research Model with Results

As presented in the above table, Team Competency LLCI and ULCI values are -0.0883 and 0.1583 respectively, indicating a zero between them and a p value greater than 0.01 (p = 0.5465) also confirms the insignificance. Project Complexity LLCI and ULCI values are -0.5126 and 0.1960 respectively, indicating a zero between LLCI and ULCI and a p value also greater than 0.01, which is indication of insignificance. According to these findings, the moderator's influence on team commitment is not significant because both variables have zeros between them and each variable's p value is more than 0.01. Here Team Competency as an independent variable is denoted by alphabet "X" Team Commitment which is the mediator is denoted by "M" and Project Complexity is denoted by "W" as a Moderator.

TABLE 4.9: Index of Moderated Mediation

Predictor	**Effect**	**BOOT SE**	**BOOT LLCI**	**BOOT ULCI**
Project Complexity	0.0064	0.0067	-0.0067	0.0204

N = 483 , CI= Confidence Interval, UL = Upper limit, LL = Lower Limit.

Table 4.8 shows that the model does not contain the index of moderated mediation. According to the values in table boot, LLCI is -0.0067 and ULCI is 0.0204, which indicates that there is a zero value exists between them, and the hypothesis

developed that Project Complexity has a moderated mediation role in the relationship between Project Competency and Team Commitment and has a negative impact on the Project Team Performance is NOT supported.

4.4 Hypothesis Result Summary

TABLE 4.10: Summary of Hypothesis

Hypothesis	**Statement**	**Status**
H1	Team competency has a significant positive impact on Project Team Performance.	Supported
H2	Team competency has a significant positive impact on Team Commitment.	Supported
H3	Team Commitment has a significant positive impact on Project Team Performance.	Supported
H4	Team Commitment mediates the relationship between Team Competency and Project Team Performance	Supported
H5 (a)	Project complexity moderates the relationship between Team Competency and Project Team Commitment in such a way that this relationship is weak when Project Complexity is high	Not Supported
H5 (b)	The Indirect effect of team competency on project team performance through team commitment is higher when low project complexity and lower when higher project complexity.	Not Supported

Chapter 5

Discussion and Conclusion

5.1 Discussion

I will discuss the significance and applicability of research to the body of literature in this chapter. This chapter will discuss the findings of the study, how they add to the body of knowledge already available, and how they differ from it. The research study's primary objective was to examine a set of theoretically-based hypotheses. My study's primary goal was to look at the relationship between project team performance and team competency. In this study, Project Complexity served as a moderator and Team Commitment as a mediator. The data and conclusions that were presented in the previous chapter are essentially discussed in this chapter. If we study Chapter 4 of this thesis, we will learn that there is a substantial link between Team Competency and Project Team Competency, Team Competency and Team Commitment, and Team Commitment and Project Team Performance. Project Complexity is not significant as a moderator, yet Team Commitment is significant as mediator. These findings are discussed in this chapter keeping in view the references from previous literature. The link that was discovered and the outcomes that were produced as a result of the data analysis will thus be covered in detail in this chapter. This chapter serves as a connecting point between my study and the other research, enabling us to determine how closely our study's findings align with those of the earlier research literature and, in the event that they don't, what may be the cause. In order to provide direction for our debate and enable

the development of theoretical contributions and practical implications, previously mentioned aims will be connected with tested hypotheses at the conclusion.

After the analysis done for the first hypothesis that states that the team competency have a positive significant impact on project team performance, the findings of the hypothesis supported the hypothesis and confirmed that the project team performance increases when the team competency is high. The findings of this study are consistent with studies done by different researchers in the past, few of such researches ares done by Elliot et al. (2000), Kozlowski & Ilgen (2006), and LePine et al. (2008), which asserted a positive relationship between team competency and project team performance. Some of the earlier studies that supports the findings of this study, in which it is stated that organizational success is probably dependent on the capacity of competent teams to collaborate and consistently execute at a high level to advance the job. This means that the capacity of qualified and competent team members to collaborate effectively and continuously strive toward the accomplishment of projects is crucial for organizational success. Due to the complexity of IT project execution, team competency can improve performance (Kirsch, Sambamurthy, Ko, & Purvis, 2002). According to this research, team members and team leads may and do have a big impact on the performance of the project team, which in turn affects the success of the project. This corroborates the claims made by (Cadle & Yeates, 2004; Luftman & Kempaiah, 2007; Gingnell et al., 2014). Therefore, finding it helpful that competent team members who demonstrate enough competency would be good for the organisation in order to improve project team performance and assure the success of projects.

The above references confirms the authenticity of the findings of my first hypothesis which says that supports that there is a positive significant relationship between team competency and project team performance. According to the results of my analysis, the significance of the relationship is shown by the p value of 0.000, which is less than 0.05. Furthermore, there is no zero between the LLCI's value of 0.3225 and the ULCI's value of 0.4569, indicating that the relationship is significant between the project team competency and project team performance. Literature supports that project management trends in many projectized organisation have shifted over the past two decades from formal technical structures to team-based

design (Devine, Clayton, Philips, Dunford, and Melner, 1999; B. S. Bell and Kozlowski, 2002; LePine, Piccolo, Jackson, Mathieu, and Saul, 2008); Therefore, the ability of competent teams to collaborate and consistently deliver at a high level positively impacts the project team performance is undoubtedly essential to the success of any firm.

The second hypothesis developed in this study is that team competency has a significant positive impact on project performance. The literature supports the hypothesis and approves the fact that if the team is competent and has mastered the skills required to undertake the project, the team feel motivated and hence the drive to stick to the team comes with the encouragement from the team mates. In the literature it is argued that the Team commitment is likely to have an impact on each team member's efforts, and team competency has also been connected to increased team performance (Hackman, 1990; Hoegl et al., 2004; McDonough, 2000). Team performance is significantly predicted by project commitment. Team members should be able to develop a bond with the group of people who they are working with in order to be committed and together identify with project's objectives and values. Team commitment will rise when members have a high level of confidence in one another and see one another as competent. Team members' belief in their coworkers may increase their motivation to commit oneself to the completion of a project (McDonough, 2000). If team members lack trust in their colleagues and think they lack the necessary abilities to carry out the assigned obligations, they may not be ready to put out the time and energy necessary for project success.

The hypothesis is developed in alignment with the studies done by the researchers present in the literature, few of the references are presented above. The findings of our analysis on the basis of data collected from the IT sector of Pakistan, it is evident that there is a significant positive impact of Team Competency on Team commitment with significance value 00012 is less than 0.05. The significance of the link is once again demonstrated by the fact that there is no zero between LLCI, which is 0.0478, and ULCI, which is 0.1937.

The third hypothesis is that team Commitment has significant direct impact on Project Performance, the hypothesis tested and analyzed and the finding approved

that there is a significant direct impact of team commitment on project team performance. The statistics shows the p value which represents the significance of relationship stands at 0.0050 which is less than 0.05 and there is no zero value between ULCI and LLCI, therefore, the result is presented which proves that hypothesis is supported. Also, there are reference from the literature support the hypothesis, in one reference Mei-Yung et al. (2004) claim that commitment improves project team performance because employees get more devoted to and committed in the project and also want to stay with the organisation for the particular project.

In another argument, Commitment, in the opinion of Rikketa and Landerer (2002), fosters organizationally beneficial behaviors like performance and intention to stick with the organisation. The organizational literature has proposed additional commitment categories as normative commitment and continuation commitment. However, emotional commitment is the one with the greatest and most consistent association to that substantially influences team performance, according to Mei-Yung et al. (2004). In the project management literature, there has been a lot of focus on the effect of commitment on project team performance.

In the next hypothesis, the mediating effect of team commitment on project team competency and project team performance is tested. In the hypothesis, the team commitment and team competency are presented to be positively correlated and hence, the findings proved that there is a positive link between project team competency and project team performance in the presence of team commitment as mediator. Rossy, G. L. & Archibald, R. D (1992) suggests one of the biggest obstacles that has been identified in project environment has been maintaining commitment to a project on a personal and organizational level. However, commitment is crucial to the project team's effective performance and project success. The research supports that the members of a project team that is competent establish commitment via activities like supporting and inventing. Focusing on what matters, leading by example, praising contributions and accomplishments, and handling disrespect are the four primary supportive behaviors that help develop project team commitment. Looking for methods to do things better, pushing past preconceived beliefs, building an open workplace, and encouraging risk-taking are

the four fundamentally inventive behaviors that are essential for team commitment. The findings of the analysis of this hypothesis showed the significance as there is no zero between the BOOT ULCI and BOOT LLCI. Through this hypothesis, the indirect effect of team competency on project team performance is tested.

The fifth hypothesis of this study tests the moderating effect of project complexity between the relationship between project team and project team commitment. The suggested hypothesis states that there will be negative impact of project complexity on project competency and project team commitment. Which mean as the project complexity increases, the project team competency decreases and the project team commitment is challenged negatively. The hypothesis was developed in light of number of references present in the literature, one of such references states that the project team performs poorly in the presence of project complexity if the team does not possess the right set of competencies that are adequate to deal with project's complexity, the project team performs poorly, which causes the project to be delayed (Hanisch and Wald, 2009). The most obvious trait of projectized organisation is complexity, which is defined as an interdependency between numerous different tasks and activities (Burke and Morley, 2016). (Baccarini, 1996) defined project complexity as connected tasks and codependency between the activities. According to Gidado (1996), complexity is the capacity to complete a challenging process with several complicated elements joined in a functional network for the workflow within time, cost, and quality to achieve the intended output without causing internal conflict in the process. Project team competency and project success have become a central subject in project management; garnering substantial attention because the involvement of certain factors that could be internal or external, nature of project changes making it complex in nature. The success or failure of every project is directly tied to its team competency to deal with such complexity and how determined the team is to handle the complexity, however, when there is high project complexity the project team's performance impacted when the project is badly managed and when activities that have been distributed or that will be completed soon are improperly carried out due to lack of competency. However, the result of hypothesis shows that the

presented hypothesis is not supported, which essentially means that with the increase in project complexity, the project team competency and team commitment is not negatively affected and thus project team performance is not negatively impacted. There could be number of reasons that are considerable for the hypothesis being rejected, one of the reasons is presented by White (1959) in which he argued that an individual tend to perform well and acquire more capabilities when he faces complex situations which means that project complexity will trigger the team member and they will focus more on their capacity building and enhancing their competencies in order to give solutions to the complexities they face.

The last hypothesis, which is developed for the purpose of this study, is Project Complexity moderates the mediating effect of project team commitment between the relationship of project competency and project performance in such a way that project performance is low when project complexity is high. The hypothesis is backed by the references from the literature. As suggested in the literature, the unpredictability that results from project complexity makes it challenging to work on and comprehend the projects because of the developments in the area, which make it hard to comprehend and complex to handle the expectations of the client, projects in the field of information technology frequently fail owing to their complexity and requirements. Because interruptions brought on by complexity make it more difficult to accomplish the project, complexity has a negative influence on the project team's performance (Zhu and Mostafavi, 2017). Gao et al. (2018) in their research also supported that in order to successfully execute a complicated project and ensure project success, the organisation must utilize its resources, its resources' capabilities, and its participants' collaboration, if the competencies of the resources is not optimally utilized then the project complexity will ultimately decrease the project performance. Therefore, essentially, if the team competency is high then the team would be able to effectively handle complexity as project complexity adversely affects the project team performance. Project failure is a result of project complexity, which is a primary driver of uncertainty and unpredictability (Vidal, & Marle, 2008; Parsons-Hann et al., 2005). The difficulties of working as a team on a project makes it harder for the employees to commit to the team.

The finding of the statistical analysis proved that the hypothesis is not supported however the literature also suggests Project complexity can affect team performance both negatively and positively. The introduction of new properties that none of the system's components own has a negative impact on how difficult it is to comprehend and regulate. Due to the emergence of occurrences that could not be foreseen by a single, complete understanding of the behavior and interactions of the system's components is what has a positive influence. Project managers need to understand how to take advantage of complexity's potential and how to prevent or at least lessen its negative consequences in order to manage complexity effectively. Therefore, the possible justification of the findings is that the project team members of our target sample may be working in that environment where they are well equipped with the knowledge of handling complexity and uncertainties. Furthermore, most of the IT companies from where data was collected, they are working in agile environment, and in agile projects, the team is comprised of subject matter experts and also the project is not carried forward following a linear path which incorporates more adaptability, therefore, the agile team members could take the most benefit of the flexibility of making adjustments to eliminate the negative impact of project complexity. In addition, in agile project management, the project lifecycle is composed of several iterations, which mean the project is divided in small chunks and the progress is evaluation and complexities are identified at the smaller level, which also eliminates the project complexity and it negative impact.

Furthermore, in agile environment, the stakeholders of the projects interact with each other whenever it is needed, therefore, the high interaction and high accessibility of all the stakeholders also eliminates the negative impact of project complexity on project team performance.

The team's capacity to respond to and adapt to change while maintaining focus on the end goal will be improved by acknowledging the inevitable complexity of the project. Agile methodologies and practises encourage the ability to manage and drive change by recognising the inherent complexity in projects.

Even though managing requirements complexity in Agile is a little hazy and open to interpretation, the Agile principles are helpful guidelines for projects that help

them manage complexity. Iterative and incremental tasks are among the agile principles. cooperation and flexibility, Accept change, adapt to it, and pursue ongoing improvement.

Agile fundamentally suggests tackling complexity by breaking down the requirements into manageable scope that can be completed without triggering constraints. Additionally, it encourages cooperation to foster a sense of teamwork, knowledge sharing, and adaptability to change in the project environment, reducing impact and facilitating learning to adapt as the project moves forward. Agile thus reduces complexity? Yes, if Agile is mastered and there is the necessary maturity to implement and run the process.

5.2 Theoretical Contribution

The study under consideration discusses the relationship of project team competency and project team performance that is a major contribution in the present literature. The findings of my study suggest that team competency is link with project team performance in such a way that right competency in the team members will elevate the project team performance. The study is carried out and data is analyzed using the responses from people working in the project based organisation and through the developed hypothesis it was found that if the team members possess the right kind of competencies needed to perform the task than their performance will be changed positively as well as, the team members will have high commitment and feeling of responsibility. Therefore, team competency triggers high team commitment and ultimately high team performance. Also, the study is carried out using the project environment therefore, it is also examined how the project complexity as a moderator effects project team performance through moderated mediation relation of between team competency and team commitment. According to Crawford et al. (2005), project management should take into account not only the project management processes but also the project team member's competency. In other works of literature, a link has been established between team members' competency and project success.

5.3 Practical Implications

This study has an imperative value since the practitioners need to understand that the project team member must possess the right kind of competencies in order to elevate the overall team performance. As this study is typically conducted keeping the focus in IT sector of Pakistan, where team commitment is observed to be one of the major challenges.

This study will help IT companies in Pakistan to focus on the capacity building of their team members in order to attain the right kind of competencies, however, by doing this; the companies will enable themselves to make their employees committed. In addition, with the right competency, the accomplishment of tasks will increase and hence the overall team performance and project success will be increased ultimately.

The supporting theory of this study which is competency motivation theory also suggests that with attainment of right competency and mastering the right skills comes motivation, however, one of the most important factor that could be considered by the practitioners in IT companies is that there should be a reward system in place for the employees to keep them motivated and make them committed and they will stick to the organisation for long. Also, with the right competencies at hand, the team members will be motivated and motivation ultimately brings commitment, therefore, a competent team member will be committed enough to be able to handle project complexity effectively therefore, the negative impact of project complexity could be minimized.

The study will provide practitioners the basis and the knowledge they need to put greater emphasis on enhancing project team members' abilities so that they can work effectively in challenging situations without being adversely affected by project complexity. The relationship between project team competency and project team performance is examined with mediating effect of project team commitment and the relationship is guarded by project complexity in such a way that team competency will be low when project complexity is high and project team performance will be low however, when there is low project complexity, the team competency will increase and project team performance will be enhanced.

Because, as per the references present in lieterature, it is observed that typically teams perform poorly in complex projects even though they are competent, and their commitment wanes as soon as they encounter any complex situation in the project. Because this is a relatively new paradigm, it is important to investigate the link between team level characteristics and the moderation of project complexity. In this age of advancements and evolutions, managing project complexity is becoming a difficulty. As a result, the study's main goal is to improve project team performance by increasing team competency and team commitment.

The study will allow the practitioners to identify the new façade of the organizational culture; they will be able to promote such an organizational culture where teams will be motivated in order to maintain their commitment. In addition, this study emphasizes on the practice of hiring the competent team members with right set of skills, also, there should be ongoing training and development programs within the organisation so that they could do the capacity building of the team so that the team members could attain the competencies required to fulfill the needs of the changing landslides of the industry.

5.4 Limitations of the Research

This study has been conducted with all the due formalities and all the steps have been taken to make the study a valuable contribution to the research literature, however, keeping any research work free of limitation is not possible for any researcher because not all the aspects can be covered in one time research. However, the study has covered most of the gaps that were considered while initiating the research. One of the major limitations is the Time and Resource limitation, which significantly affected the research. In addition, the data collected for the purpose of this research is gathered from project based IT companies. The team members working on projects usually have tight deadlines and they have defined schedules, therefore, getting accurate response from such people is one of the limitations, therefore, the limitations effected our results and they were not as expected despite the fact the literature present supports the hypothesis that we developed, but our findings were otherwise.

Another limitation that I have identified is that I have used snowball-sampling technique, which is referral based sampling, and the recipient refers to the other people that could be the respondents of the study. Since I have disbursed questionnaire online through google forms therefore, checking the authencity and relevancy of the referrals was one of another limitations.

Lastly, due to time limitation, it is a cross sectional study, which could only assess the responses of the people at one time and hence, effects the accuracy of responses that were gathered for the purpose of this research.

Furthermore, instead of using closed ended questionnaires for data collection, other methods of data collection could also be used, which could positively impact the accuracy of responses.

5.5 Future Directions

This study is conducted with an aim to examine the impact of project team competency on project team performance where project team commitment serves as the mediating variable and project complexity guards the relationship as a moderator. Because of few limitations as well as otherwise, few future directions could be helpful for researchers.

1. The researchers should study other variables as a mediators and moderators to check how they affects the relationship between project team competency and project team performance.

2. In addition, instead of cross sectional study, the researchers could do longitudinal research to get better results and to incorporate the change factor within the attitude of team towards team commitment and how they handle complexity.

3. The researcher should instead of using snowball non-probabilistic sampling technique use other type of sampling technique to get more accuracy of results.

4. The target population of my study are people working in project based IT companies; they future researchers may target some other industry like health care and construction.

5. Due to limitation of time, the sample size of this study is very low that is 483 respondents, this sample size only ensure 95

6. Another recommendation is that the framework should contain multiple mediators as well as the moderating effect of project complexity could be tested by keeping the moderator on Path b relationship which is between team commitment and project team performance.

7. Also, there could another moderator could be tested like Trust instead of Project complexity.

8. The variables could be tested in other countries and cultures to check how cultural difference affects the relationship that is tested in this relationship.

9. The future researchers could also use financial resources funding in order to properly investigate the relationship in order to add value in the literature.

5.6 Conclusion

Project team performance is imperative to project success, there are different factors that affect the project team performance, and in this study, I have examined the relationship of one of those few variables to see how they affects project team performance. In this study, the impact of project team competency on project team performance has been studied with mediating role of project team commitment and moderating role of project complexity. Lately, it has been a challenge for the organizations to have a commitment from their team members due to which the success rate of projects has been effected. In addition, literature suggested that it has been observed that team members mostly fail at the project despite of them having the required skillsets to execute the project. In this thesis report, I have started with the theoretical background of the study where I have discussed the supporting literature from the previous studies done by different researchers, the

theoretical background provides basis to our research model specifically the direct relationship which is project team competency and project team performance to see how the competency impacts the project team performance.

Similar to this, I have discussed the gap in the literature that currently exists and how this study can fill that gap further on in the report. Then, using the study's variables, a theoretical model is created and linked to the Competence Motivation Theory which is presented by Susan Harter based on Robert White Model of Effectance. On the basis of the literature already in existence, we developed six hypotheses for the this paper. And tests are suggested for these hypotheses. 483 respondents who were a part of Pakistani project-based IT organizations were surveyed using a quantitative research methodology for this study. In order to confirm reliability, various tests of reliability were also carried out using reliable instruments that I used for data collection. Following data collection, data analysis was carried out using Andrew Hayes' process macro models 1, 4, and 7. In accordance with the data's findings, two of my study's hypotheses were not supported, while four of them are accepted.

The findings of my study approved that Project team competency positively impacts the project team performance, the hypothesis test result showed significance of relationship. Also, according to the findings the mediation effect of project team commitment also exists in my model which means the project team competence helps increasing the project performance and ultimately project team performs effectively. However, the moderation analysis shows that the hypothesis of the negative moderating effect of project complexity between the relationship of project team competence and project team commitment does not exists. In the similar manner, the project complexity will not negatively affect the mediating relationship of project team competency through project team commitment on the dependent variable, which is project team performance.

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Appendix-A

Questionnaire

Dear Respondent

Being a student of MS degree in Capital University of Science and technology, I am doing a research on topic "**Impact of Team Competency on Project team performance with mediating role of team commitment and moderating role of Project Complexity**". In a hunt of my potential respondents, I have found that you can also help me out in my research by just spending few minutes out of your precious time and fill this questionnaire. I assure you that the data is being captured anonymously and will be kept confidential. Your help and support is highly appreciated!

Sincerely,

Anum Khalid ,

MS (PM) Research Scholar,

Faculty of Management and Social Sciences,

Capital University Science and Technology, Islamabad.

Section 1: Team Competency

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	**Item**					
1	I am confident about my team's ability to carry projects	1	2	3	4	5
2	I am self-assured about my team's capabilities to perform project activities	1	2	3	4	5
3	My team has mastered the skills necessary for our projects	1	2	3	4	5

Section 2: Project Complexity

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	**Item**					
1	The project team was cross-functional	1	2	3	4	5
2	The project involved multiple external contractors and Vendors	1	2	3	4	5
3	The project involved coordinating multiple user units.	1	2	3	4	5

Section 3: Team Commitment

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	**Item**					
1	My team has great deal of personal meaning to me	1	2	3	4	5
2	I have to work in a team out of compulsion	1	2	3	4	5
3	I feel I am making an effort not only for myself but also for my team	1	2	3	4	5
4	I feel a sense of belongingness to my team	1	2	3	4	5

Section 4: Project Team Performance

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	**Item**					
1	My Team is efficient in project operations	1	2	3	4	5
2	My Team Maintained good adherence to the project schedule.	1	2	3	4	5
3	My team maintained a good adherence to the project budget.	1	2	3	4	5
4	My team produced good quality of work.	1	2	3	4	5