CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD


# Impact of Project Learning on Project Team Creativity, with Mediating Role of Interactive Coordination & Moderating Role of Absorptive Capacity

by

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*I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents whose words of encouragement and push for tenacity ring in my ears. I also dedicate this dissertation to my many friends who have supported me throughout the process. I will always appreciate all they have done for me. My honorable teacher for the many hour of proofreading, and for helping me to master the leader dots.*


# CERTIFICATE OF APPROVAL

## Impact of Project Learning on Project Team Creativity, with Mediating Role of Interactive Coordination & Moderating Role of Absorptive Capacity

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# *Acknowledgements*

Then which of the Blessings of your Lord will you deny.

(Surah Ar-Rehman)

First and foremost to my creator, my life coach, the most gracious, the most beneficent, ALLAH S.W.T, I owe it all to you, Thank you! There have been many people who have walked alongside me, who have guided me through all these efforts. I would like to outstretch gratitude to each of them.

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# *Abstract*

The study examines the extent to which project learning can become a reason for the improvement in project team creativity through the mediating mechanism of interactive coordination and moderating role of absorptive capacity. The context of the study was project-based organizations of Pakistan i.e. Sabro, Coolpoint, Petal, DewMax, Coronet Foods, etc. Data were collected from the individuals i.e. team of multiple industries of Pakistan 320 who were engaged in different nature of projects were taken as respondents via questionnaire distribution i.e. convenience sampling. The data was then analyzed using AMOS and SPSS as tools. Based on the results, the study indicated that an increase in project learning increased the project team creativity whereas interactive coordination acted as a mediator of this relation. Further, this research tested the role of absorptive capacity and it's results also elaborate its values as significance consequently absorptive capacity does act as a moderator on the relationship between project learning and interactive coordination; such that if the absorptive capacity is high the relationship between project learning and interactive coordination would be strong. Theoretical and practical implications are also discussed in our research and study will facilitate the project managers to improve their organizational culture and implement the fair practices towards the employees of the project based organizations.

**Keywords: Project Learning, Absorptive Capacity, Interactive Coordination, Project Team Creativity.**

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# Abbreviations

| | |
|---|---|
| **AC** | Absorptive Capacity |
| **CFA** | Confirmatory Factor Analysis |
| **IC** | Interactive Coordination |
| **PM** | Project Manager |
| **PRM** | Project Risk Mitigation |
| **PTC** | Project Team Creativity |
| **PL** | Project Learning |

# Chapter 1

# Introduction

## 1.1 Background of the Study

Learning involves absorption, associating ideas and making connections between previous and updated knowledge, individualistic and critical thinking and ability to transfer knowledge to new and different conditions (Drupsteen & Guldenmund, 2014). Now a days learning is a new area of focus for researchers to elucidate its importance and impact in the literature (Jarvie & Stewart, 2018). Learning has been highlighted as one of the essential success factors (Lozano, 2014), studies addressing management indicate the importance of learning is emerging (Sun, Wu, & Lee, 2017).

At organizational level learning is now taken as routine-based, highlighting all the benefits, it is considered to be one of the key assets of an organization and it has a strong positive impact on performance (Acar, Tarim, Halil, Zaim, & Delen, 2017; Adam, 2017). Learning plays a potential role in contributing to the success of an organization, helping an Organization to develop its skills and capabilities and also engraving the paths for gaining benefits over the competitors has declared it as an important topic for researchers (Shannak, 2010; Acar et al., 2017; Chatzoudes, Chatzoglou, & Vraimaki, 2015).

Fernández-Mesa and Alegre (2015) explains learning as an important facilitating and smoothing factor for an organization. Learning at an organizational level

occurs when employees mutually acquire knowledge, advance their abilities and adopt new approaches and opinions which are applicable in various situations enabling the organization to succeed (Namada, 2018). Organizational learning is a process which not only includes the ability to carry out the solution to the problem to implement but also to specify that solution to increase the performance (Revans, 2017).

Theorists say that learning in an organization is one of the main salient resources for competitive success. Torres, Saterbak, and Beier (2016) referred project learning as the theory and practice of utilizing real world work assignments on time-limited projects to achieve mandated performance objectives and facilitate individual and collective learning. Birasnav (2014) referred project learning as a critical activity that project based organizations must be performing for achieving a competitive edge in their projects by influencing employees to contribute in flourishing and expanding organizational knowledge.

For an organization, learning is considered as an essential source of dynamic knowledge management; it is known as one of the significant conducts to achieve and increase the conception and deployment of an organizations knowledge for the enhancement of business processes (Matthews, MacCarthy, & Braziotis, 2017). Tam and Gray (2016) referred knowledge management as a fundamental factor at both organizational and staff level development in learning organizations. Furthermore, Organizational learning is abstracted as the organizer of knowledge management, studies also indicate that learning at organizational level plays a significant role in improving the power of knowledge management rudiments which have direct effects on projects (Wu & Chen, 2014).

Largely, previous researches have related that the organizations now a days are making great effort for understanding the tactics that train the organizations to learn, transform and adapt to for acquisition of new awareness (Todorović, Petrović, Mihić, Obradović, & Bushuyev, 2015). Organizations performing projects are continuously confronting the challenge of maintaining a balance between continuous improvement and innovation (Turner & Lee-Kelley, 2013). De los Ríos-Carmenado, Lopez, and Garcia (2015) purposed that organization should provide

learners with assured aptitudes that permit them to retain learning and discover by themselves new knowledge tracks and acquire problem solving abilities.

Creativity is recognized as a creation of unique ideas, processes, procedures and effective skills and is considered one of the most crucial factor for organizational existence and efficacy (Dong, Bartol, Zhang, & Li, 2017). Creativity involves the fellows of with diverse thinking styles and value systems to consume their range of information, abilities, capabilities and thoughts to harvest more new choices, strategies, and products which helps the team to investigate problems using various angles and consider several possible alternatives (Wang & Zheng, 2016).

In today's era creativity is one of the highly demanded sources through which an organization can easily get multiple advantages over their competitors and can enhance productive ideas, opinions and business environment (Ghosh, 2015). Anderson, Potočnik, and Zhou (2014) described that in developing organizations, creativity results more when the members contribute as a team rather than performing individually. In developing sector gaining creativity requires additional effort, motivation and risk taking courage (Hon & Lu, 2015), it makes highly demanding.

It is significant to study the impact of project learning because it impacts significantly on important areas like project management, organizational culture and employee connections among themselves and with the manager (Chronéer & Backlund, 2015). Project learning in project-based organizations is considered as a new dimension of strength and backend support of project team. Project learning produces an innovative strength for project team resulting in innovativeness and improved creativity in project-based organizations.

## 1.2 Gap Analysis

Project learning has great importance as they play a competent role by increasing the knowledge in both managerial and technical aspects ultimately strengthening foundations of organizations and increasing individual and group capabilities towards innovation and creativeness. Project learning and project team creativity

are important variables of this study. So far, latest research works emphasize that project learning affects project team's creativity by increasing mutual understanding between each other as well as towards the activities of the project and suggest that still there is need to study more on the subject (Verbano & Crema, 2016; Jordão & Novas, 2017).

While addressing this gap, the study also identifies potential mediator and moderator. The study suggests that interactive coordination as a mediator along with the variable; project learning would be an important distinction in the domain of project management. Interactive coordination is a mechanism to improve the mutual understanding and team combinations for a gain of multiple kinds of results and proposed to study more to understand the effectiveness of the mechanism (Wang, Liu, & Canel, 2018).

However, the inclusion of absorptive capacity as a moderator is one of the unique domains which are still needed to be explored in the context of project management. In the field of management absorptive capacity is one of the highest ranked important variables and is suggested that as a firm especially manages its physical assets, it should devote very much attention in managing its and team's capabilities (Soo, Tian, Teo, & Cordery, 2017).

There is more room to study these variables in the context of Pakistan because study using such variables together would be very useful for meeting the competitive creativity of organizations working in Pakistan. The study will contribute significantly towards the existing literature of the used variables as well as towards the research study in Pakistan for project-based organizations. The mediating role of interactive coordination between project learning and project team creativity is yet to be studied in the domain of project management in the context of Pakistan.

## 1.3 Problem Statement

Project learning is one of the emergent and critical factors of the project due to its novel nature. Learning is a collaborative situation that may elicit specific intellectual learning mechanisms including compilation, knowledge elicitation and

internalization. Mostly project work is allocated among members but, at the same time, the purpose is to paradigm a shared outcome. Thus, project-based learning involves both cooperation and interactive coordination elements. Learning based on projects should be considered through learning environments in which team can at least preferably participate in genuine practices and practice skills needed in project team creativity (J. S. Lee, Blackwell, Drake, & Moran, 2014).

Along with project-based learning, interactive coordination is one of the reasons for project team creativity. Team members' coordination is also one of the tools to manage project learning and elevate the performance of the project towards innovation. This study focuses on the impact of project-based learning the on project team creativity with the mediating role of interactive coordination. The mediating role of interactive coordination to enhance project innovation is yet to be explored in the domain of project management. So, this is the novel domain which has not been studied yet along with all the variables.

Relatedly, limiting the scope of the research articles in which the authors define their work as Project-Based Learning would appear to leave out prior research into project-focused or active learning. Consequently, learning issues should be addressed when scheming project-based learning environments (Zheng, Niiya, & Warschauer, 2015). The outcomes of valuation are of specific attentiveness to researchers, policy makers and to managers considering the possibility of designing project-based learning towards the project team creativity with the influence of coordination. Many projects are undergoing in Pakistan and almost every project is comprised of some project environment which should be considered as a learning project environment which may cause for the innovation in projects. Thereafter the dimensions need to be implored with reference to Pakistan.

Absorptive capacity in a team plays a role of an enabler which allows the firm to turn extracted knowledge into new products, services, or processes to support innovation (Leal-Rodríguez, Ariza-Montes, Roldán, & Leal-Millán, 2014). The moderating role of absorptive capacity between project learning and interactive coordination is yet to be explored in project management's domain and contextual setting of Pakistan. So, this is the novel domain which has not been studied yet

along with all the variables (Project Learning, Interactive Coordination, Project Team Creativity and Absorptive Capacity).

## 1.4 Research Questions

On the basis of the stated problems, the present study is intended to find answers for some questions, a brief summary of the questions are as follows:

**Research Question 1:** Does Project Learning improve Project Team Creativity?

**Research Question 2:** Does Interactive Coordination mediate the relationship between Project Learning and Project Team Creativity?

**Research Question 3:** Does Absorptive Capacity moderates the relationship between Project Learning and Interactive Coordination?

**Research Question 4:** Does the study play a significant role in the contextual settings of Pakistan?

## 1.5 Research Objectives

The research objective is to explore the relation between the variables according to the proposed model, that all of the variables are interrelated with each other to provide the desired results of increased creativity in the team. In addition, absorptive capacity will be used as a moderator to identify the strength of the relationship between project learning and interactive coordination. The main aim is to illustrate the new dimension of project learning in project management along with interactive coordination, in order to enhance the creativity of the project team at the individual and group level.

The specific objectives of the study are sated below:

• To explore the association between project learning and project team creativity.

• To explore the association between project learning and project team creativity through interactive coordination.

• To examine the moderating association of absorptive capacity on the association of project learning and interactive coordination.

• To test empirically and establish the proposed associations in the creative and innovative projects of Pakistan.

## 1.6 Significance

The world has gradually transformed into a global village and the organizations maintain a competitive edge through creativity and innovation. This study will not only be helpful adding more theoretical content to project management but also giving concrete evidence that how the creativity of the team of the project based organization can be improved by utilization of the learning from the experiences and previous projects. It will also help the development sector of Pakistan to realize the importance of utilization of project learning and its implementation not only to increase the performance of the project rather to improve the creativity skills of the project team for the current and future projects.

Today's era is the era of newness and creativity, which compels the project team to introduce creativity in themselves and their skills as they have to face certain failures and setbacks, this study will allow the project team to realize the importance of keeping the knowledge intact and how learning from the experiences of the project managers as well as from the previous projects is vital for improving the creativity. This will also develop a better understanding of the project team members that without absorptive capacity and interactive coordination growth of knowledge repository does not add to learning, affecting the creativity of the project team consequently.

Mostly the project team and the managers have to face different kind of failures and complications especially when a new project is launched or the projects enters its implementation phase, this study will smoothen the way for the project managers in perceiving the importance of learning from the previous projects and experiences intact and how learning is vital for improving the skills of the team in terms of creativity as well as efficiency. This will also develop a better sense

of understanding among the management that the knowledge repository does not change into learning until it is not transferred to the team for its absorption.

The study will fulfill the theoretical gap existing in previous literature because the research on project learning impacts on project team creativity through interactive coordination has not been studied in the field of project management within contextual settings of Pakistan. The study will contribute positively in a productive manner towards achievement of the desired creativity and innovativeness of the project team from the learning gained from the project manager's previous experiences and projects making the best use of the absorptive capacity of the project team through their interactive coordination.

Today's age of globalization has caused individuals from different knowledge levels, cultures and areas to combine together to make a workforce to perform different kind of projects. Keeping in view project learning and interactive coordination, this study will not only help in literature enhancement for scholars but also help existing and developing organizations in Pakistan to effectively improve the levels of knowledge and its absorption and enhance creativity. Project learning should be followed on different steps of innovation through which the willingness and adaptation of employees lead towards the project team creativity. This greatly influences in enhancing the creative sense in the employees by providing them the ways. (M. L. Farnese & Livi, 2016; M. Farnese, Bello, Livi, & Barbieri, 2015).

## 1.7 Supporting Theory

Around the globe many researchers have presented a number of theoretical frameworks to underpin the process of learning through interactions and its relative impact on development at the individual as well as team level, however, Social Development theory incorporates a description of all the related variables of the study. The theory was framed by Lev S. Vygotsky, (1896-1934) supports the study and will help to comprehend the affiliation between variables.

### 1.7.1 Social Development Theory

Social development of learning was proposed by Lev S. Vygotsky, , (1896-1934) who is a prominent theorist in the domain of developmental psychology. The theory of social development explains the effect of human interactions and exchanges as a kind of results-driven social behavior for the better development of individuals, this theory is best suitable. He explained mindfulness or cognizance as a result of socialization. The theory demonstrates how interactions of different individuals with knowledge lead to the development of team or organizations. Vygotsky's theory of social development includes three sub-theories, Social Interaction, The More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD).

Learning is a two-way process between the person with higher set of skills, information, knowledge and experience who according to the social development theory will be known as The More Knowledgeable Other (MKO) and the person who is attempting to learn; the learner. In the present study, this part of theory relates to project learning gathered from the knowledge of project manager (MKO) who has experience and knowledge from previous projects to the development of the team who has less knowledge; the learners. The sub-theory takes into account the fact that the knowledge is transferred from higher level to the lower level i.e. from the more knowledgeable others that may be the project manager or the previous project to the learners; the team.

Interactive coordination mechanism is a learning approach as it involves the daily interactions of the involved members for the energetic sharing of the knowledge from the project learning. The connection of the learners; the team with the information gathered is explained by social interaction sub-theory; it takes into account the interactive coordination of peers, subordinates and all the team members involved in the project. This sub-theory stipulates the relationship between the development of the team and the project learning as an outcome of the interactive coordination process. Development, enhanced innovation or increase in creativity is a result of an active interaction between the individuals of the project team, which indicates an association of support.

The connection of project learning and the interactive coordination explained by The Zone of Proximal Development (ZPD) sub-theory; it takes into account the question of how capable an individual is to absorb the learning. Vygotsky related the zone of proximal development to the more knowledgeable other in a way that the ZPD is that point where the MKO should provide just the right amount of direction and supervision with lots of encouragement, and then allow the learner to learn and develop his required skills.

The theory explains the process in a way that high set of skills leading to high creativeness in the team can be achieved as a result of mutual interactions on the basis of the knowledge from the previous projects as well as the experience of the project manager, rather the interactions and the knowledge is only effective when the team members are capable enough to absorb the knowledge, as the process is an exchange process through interactions. The theory proposed in this study can be viewed holistically to analyze how project learning can be utilized by the project team members through their interactive coordination depending upon their capabilities to absorb that learning which results in an increment of the project team creativity. Interaction between team and individuals relates to components of adaptation and absorption to increase the outcome of creativity.

# Chapter 2

# Literature Review

## 2.1 Project Learning

Project learning is a progression where the workforces of the organization have ability to upshot firm's improvement and enlargement aptitudes and activities by utilizing their mutual capabilities as well as implementing the concepts of newly gained information and knowledge from the previous experiences and projects (Jimenéz-Jimenéz, Martínez-Costa, & Sanz-Valle, 2014).

Vera and Crossan (2004) explained organizational learning as a process that collects and comprehend knowledge at an individual level, develops more knowledge at a group level through elucidation, and record and express it at an organizational level. Learning from projects is now a days an upcoming instructional strategy which can be implemented into many organizations utilizing it for different content.

## 2.2 Interactive Coordination

Wang and Zheng (2016), referred interactive coordination to continuous interactions that may be electronic or face-to-face communications between the team members, creating a mutual operational environment of prompt data interchange,

discussion for the solution of issues, and revealing empirical differences and conflicts. Moreover, when unforeseen issues arise, interactive coordination facilitates the ongoing interfirm involvement and learning in project implementation (Wang et al., 2018).

## 2.3 Absorptive Capacity

Absorptive capacity of an organization is defined as its aptitude to recognize, integrate, acquire, transform and exploit the new knowledge (Wales, Parida, & Patel, 2013; Cohen & Levinthal, 1989, 1990). This definition gives importance to the heterogeneity between individuals in a workplace in regard of their capability to first interpret what new knowledge is, to shape its meaning, to integrate this new acquaintance within the organization and finally to allocate it for utilization and application purposes. It is the capacity to evaluate and use project knowledge, which develops the integration of individuals (Nieto & Quevedo, 2005).

## 2.4 Project Team Creativity

Creativity in project teams acts as a bridging role in linking individual creativity and organizational creativity. Organizations often assign project teams that teams may generate new and resourceful ideas, and transmit these recently shaped ideas into beneficial technology, products, or services (Iansiti, West, & ilustraciones Horii, 1997; Chen, 2006). Project team creativity is defined as "the production of novel and useful ideas concerning products, services, processes, and procedures by a team of employees working together" (Shin & Zhou, 2007).

## 2.5 Project Learning and Project Team Creativity

Projects are distinctive and short-term accomplishments with the fluctuating workforce. Furthermore, projects are typically of a minor period, assimilating inside, outside specialists, as well as data. Members need to get a hold of new conditions and contents of the ongoing project. For organizational learning, the main difficulty is the uniqueness (Schindler & Eppler, 2003; Love, Fong, & Irani, 2005; Prencipe & Tell, 2001). The continuity of the process of learning all over the project exertion, comparatively to a lugubriously enhancement throughout a particular project process cycle, gives a greater chance to continuously look over and improve the procedures practiced along with the created products into more innovative manner with creativity in it (Hanisch, Lindner, Mueller, & Wald, 2009).

Creativity is mostly separated into individual, team and organizational levels and involves in the novel and useful ideas. "Team creativity can be observed as the incorporation of individual proficiency and inspiration (Taggar, 2002). Creativity increases by enhancing team knowledge and encourage team cohesiveness, which constitutes the project goals (Stashevsky, Burke, & Koslowsky, 2006). Project learning is one of the exploratory approach (Glavič, Lukman, & Lozano, 2009), and integrated towards project management (Zhou, 2012), which make the project to achieve creatively through problem-solving, communication, coordination and leadership (Tan, 2009). These techniques are emphasized for the collaboration of project team creatively (Liu & Schonwetter, 2004).

Project learning is well-defined concisely as "an exemplary that organizes learning around projects" (Thomas, 2000). Thomas (2000) explained the concerns for the positive consequences of project learning intended for individuals as the improvement of optimistic and innovative outlooks in the direction of the learning progression, practices of work, self-confidence and aptitudes of problem-solving. Blumenfeld et al. (1991), explored that project learning provides a conceptual framework to create new learning experiences that can help achieve these goals,

and provide practical direction to integrate technology in a way that is more creative across the project, using history in particular of projects lesson learned.

Project-based learning creation was done to engross employee in energetic, cooperative, creative, thoughtful, and collective learning proficiencies (Jonassen, Howland, Moore, & Marra, 2003). Particular knowledge and beliefs are brought to learning situations by the learners. Learning is a process that is both active and reflective, it acts on experiences as an active approach but reflexive in the form of creativeness of the project team. Learning is developmental. Numerous perspectives on learning are offered by social interaction. The learner himself regulates and resolves to learn and create creativity in the project team. (Gülbahar & Tinmaz, 2006).

Project-based organizations are able to prevent customary obstacles to managerial modification and creativeness, considering every project is accessible as a temporary, comparatively short-term, occurrence (DeFillippi, 2002). However, Davies and Brady (2000) claim that achievement of economies can be made through creating creativeness on the way to revise the capability and efficiency by which an increasing number of offers succumb and projects implemented. Prior to the periphery moment, project learning is suggested to be intermittent and empirical.

Green (1998) highlighted that participants learn better by creating the environment of creativeness between a team of project and are extra enthusiastically substitute in their learning in project-based learning. Projects in project learning take extensive time to widespread, are complicated in adore, and should be in an innovative form so it targets a place in the market (Heckendorn, 2002). Moreover, project learning essences mutually on the new creation and the knowledge of the progression. Land and Greene (2000) suggested that learning of the project might be practiced for both individual and group intensities, establishing groups of two or three people to carry out creativity in the project would be more appropriate.

In the twenty-first-century learning gained from the previous projects are utilized as an innovative methodology to learning that teaches a gathering of approaches critical for success. Project team gather their own learning through investigation, as well as work interaction and collaboration with research and create projects

creatively that redirect their knowledge (Geier et al., 2008). Project-based learning results in gaining a sense of responsibility, individuality, and discipline. Project-based learning is a methodology to educate that conducts program notions through a project (Hosseinzadeh & Hesamzadeh, 2012). Proof subsists that through project learning, learners become better investigators, problem-solvers, and highly creative (Gültekin, 2005).

Research supports that individual by means of project-based learning performs better on both homogenous assessments and creativeness than individuals in traditional direct training curriculums and that they learn not only real-world utilization of skills but also innovative ideas (Doppelt, 2003). Project learning help learners to progress towards twenty-first-century skills which will aid them in becoming fruitful members of a comprehensive society and bring novelty (Bell, 2010). Innovation and creativity is the new point of focus, development of new products and services is projectized, it can be predicted that the organization implementing the projects can carry out the execution with good practices and lessons (Anderson et al., 2014). Moreover can further ripen strategic skills, reinforce technology and also reducing the project progress time (C.-J. Wang & Tsai, 2014). In this regard, the practice groups in the project-based organization performing as the medium of the persuasive and competent solution to the organization for acquaintance management and learning development (Serrat, 2017).

Many management theorists explored that the sense of project knowledge sharing to subordinate, which brings project learning creativity in the team, is the cause for every project to be effective (Conger, 1989). Employees' coordination towards learning of project things and self-grooming at the workplace, which develops innovation in the project team (Tims, B. Bakker, & Derks, 2014). Project team learns; learning creates creativeness in the project team (G. Huber, 1999).

Therefore, this suggests the first hypothesis:

**$H_1$:** *There is a positive association between Project Learning and Project Team Creativity.*

## 2.6 Project Learning and Interactive Coordination

Gerwin and Moffat (1997); Kazanjian, Drazin, and Glynn (2000), explain forces of coordination. These forces are "task interdependencies within the team" which refer to the dimension of workflow in the project (Gerwin & Moffat, 1997). In addition "changes occurring" which raises to the environmental uncertainty and allocations (Souder & Moenaert, 1992; Gerwin & Moffat, 1997). Furthermore results in efficiency within the team from project learning to interactive coordination (Kazanjian et al., 2000).

Learning from the projects is an important portion for of the project management practice. The planning, implementation and monitoring of project counterparts the learning process (Sydow, Lindkvist, & DeFillippi, 2004). Learning happens as project team members integrate themselves into discussions regarding the approaches to completing a task or produce newness. There are two rounds of learning in a project, i.e.; intra-learning and inter-learning (Todorović et al., 2015). Inter-project learning is the one in which lessons learned are combined and shared through team coordination across projects for the application and development of new knowledge. Intra-project learning is the one in which knowledge is produced and shared inside a project by the coordination between team and manager. Both learning targets work within a project and supports the interactive coordination of team for transmission of a successful project by analyzing difficulties and resolving them throughout the project. The learning process should be supportive in a way that it provides an interactive coordinating environment that helps team members take account of their mistakes and openly brainstorm to find solutions to problems (Kotnour, 2000).

Project-based organizations should stress on learning of projects that are not only helpful and useful for one time but hold the future of the organization (Disterer, 2002). Knowledge must be created, shared and applied by the members with interactive coordination for the learning of a project organization (G. P. Huber,

1991). New creative knowledge in the project team is created when the members get themselves into learning experience through interaction and coordination between them. Project learning exercises are the set of activities to generate, integrate, distribute and apply acquaintance across the organization. Project learning exercises are the set of activities the project team members utilize to gather and distribute knowledge across and along with the projects. The main support from the gathered lessons is the leader, managing the project, willingly sharing information from his experiences with other projects (Salleh, Chong, Ahmad, & Ikhsan, 2012). The project learning process holds importance as it aids a project manager to enhance the coordination of the team, by that increasing the performance of project management. Achievement of projects can be largely attained by the right combination of experiences and learning from the projects done in the past.

Learning can also be understood to be embedded in the (socio-cultural) circumstances in which a person contributes, rather than in the head of that person as knowledgeable conceptions produced by consideration (Ragsdell, Espinet, & Norris, 2014). The acceptance of interactive learning ambiance need not involves an opposing force, but a view of the learning process through coordination. From this viewing platform, learning fundamentally include interrelations among the learner and other people so that they coordinate interactively (Kiraly, 2005). Zollo and Winter (2002) recognized three learning progressions, namely familiarity consumption, knowledge clarity and categorization. They debated that the usefulness of these methods rest on the interactive coordination held for the activities that the organization efforts to learn.

Conferring to (Hernández-Ramos & De La Paz, 2009), the process of coordination and collaboration has an important value for learning from the previous projects as it involves participants in discovering important and significant inquiries. Thomas (2000) likewise attempts to describe this methodology and highlights that learning the lessons from the projects can resolve the problems faced. They shape their own information by energetic learning, networking with the surroundings as recommended by the constructivist method, working individualistically or synchronized

in teams, while the superior guides and monitors and they create an actual artifact (Prencipe & Tell, 2001).

Exchange of knowledge of project within the team cause project-learning. Moreover, interactive coordination within the project team or with experts from other teams impacts the quality of the team output (Barczak & Wilemon, 1991; Sethi, 2000). Project learning presents a new dimension towards the interactive coordination in project-based teams (Law & Chuah, 2004). Teamwork eminence is the indicator of a team's ability to coordination and collaboration (Labianca, Brass, & Gray, 1998; Ancona & Caldwell, 1990), explains that the team members, which are open towards project learning, are more engaged in the positive interactive coordination and expected to show collaboration within the team.

Hence my second hypothesis can be stated as:

**$H_2$:** *There is a positive association between Project Learning and Interactive Coordination.*

## 2.7 Interactive Coordination and Project Team Creativity

In the recent age of technological advancements, innovation is the key element organizations are relying on the mutual understandings and face to face and other interactions. Firms have to develop both creativity and innovativeness to keep up with the latest trends and maintain market position (Vrontis, Bresciani, & Giacosa, 2016). Creativity requires interactive sessions done by coordination. Brainstorming session of the team is necessary for the creativity of the project team. In result, which turns out to be the project team creativity (West, 2002). Osborn (1957), suggests the effectiveness of creative team through integrations.

Coordination within the team is the stepping stone approach towards a platform for the innovative environment (Kransdorff, 1996). Kraut, Galegher, and Egido (1987), described that shared interests were likely to occur with an integrative team. Insufficiencies in the skills and creativeness can be addressed, diagnosed

and the team gets strengthened through training, they get from the interactions; can value from the enhanced assessment of team understanding. Monitoring approaches for the judgment of creativeness of the individuals should draw directly to measures of team understanding that have developed among themselves during interactions for work (Cooke, Gorman, Myers, & Duran, 2013).

Organizations in developing countries face many conflicts like activities and task holders, such as common resources for multiple activities, multiple tasks assigned to same responsible, simultaneous constraints and task-related affiliation (Fischer et al., 2014). For the existence of organizations, one out of many studied reasons stated in literature is that they enable interactions between the subordinated and peers and coordination of work to occur more willingly. Well-coordinated processes to perform work are predictable to generate and upgrade the set of skills, creative and higher-quality consequences, and to do so more competently and proficiently (Johanson & Fox, 2004).

Coordination among the members of the team that works together for a specific time period to achieve a common objective and innovativeness is counted as a valuable function (Tannenbaum, Beard, & Salas, 1992). Interactive coordination is a process that mutually trails on a detailed procedure for executing the work in a specific organizational context with members of the project team. (Toups, Kerne, Hamilton, & Shahzad, 2011). The success of the project is evaluated by different parameters, it not only depends on the capabilities of individuals and accessible resources but also on how the team members interact and coordinate with each other in order to accomplish their work (Dirks, 1999).

Amabile (2013, 2012), defined the creative process on the basis of implication as to the generation of innovative, different, applicable and suitable counters to the situations, outcome, or services to flexible activity. In the promotional means, creativity has been defined more precisely as an activity that is planned to overcome the problems faced by clients, to reach the innovative goal; the effort has not been perceived before; and inventive, meaning the work is enthusiastically communicative and appreciated for itself (Koslow, Sasser, & Riordan, 2003). Creativity

in public relations also has been defined by developments of tractability, amalgamation, amplification, importance to the consumer, and significance to the brand and by measures of uniqueness, usefulness, impact, and temperament (Stuhlfaut & Yoo, 2013).

Creativity and innovation are assumed to be an important factor during the planning, implementation and execution of the project by the team over the past twenty years. Creativity is now a days very essential for organizations to compete in the market, for which interactions among the team are the core component which plays an energetic part to achieve a high level of creativity. Interactive coordination helps the members to adjust and create a working ambiance which ultimately increases the team creativity which depends upon the productive people (Rico, Sánchez-Manzanares, Gil, & Gibson, 2008).

Rosenfed and Servo (1991), defined the challenge of creativity through conception, invention and exploitation. For this, skills of creative thinking support the project team creativity. For a team to be creative in any contextual setting his knowledge, mutual sittings, trust and knowledge sharing between the team members of the project are must (Chua, Roth, & Lemoine, 2015). Coordination within the team is the stepping stone approach towards a platform for the innovative environment (Kransdorff, 1996). Kraut et al. (1987), described that shared interests were likely to occur with an integrative team.

To gain more creativeness and innovation in a project relies on the coordination of the team involved in every phase of the project. A proposal has been placed that in a project team, one of the most crucial factors that affect the creativity and innovation through collaboration and knowledge sharing among team members is the quality of teamwork. Six elements are termed as the quality of the team work: communication, coordination, the balance of member contributions, mutual support, creativity, and cohesion (Brinckmann & Hoegl, 2011).

Several projects are observed where multiple teams are involved, the factor of most critical importance is the coordination of the teams involved. In the time-to market era, many domains utilize multi-team projects, in order to achieve superiority in creativeness and innovations. Organizations utilize a significant part of their assets

on advancements today, which are further utilized in planning and implementing improvements. To inspect the conditions of creativity of the team, a distinctive understanding of coordination is to be carried out (Hu & Kapucu, 2016). However, a diversion from phase-gate to more stretchable modernization and creativity models and processes has been observed in research(e.g. Fuglsang and Sørensen (2011) that are more knowledgeable and inclined by a the combination of multiple disciplinary thoughts and approach that involve information supervision, learning philosophies and discipline of system (Hemphälä & Magnusson, 2012; Sigala & Chalkiti, 2015).

Hence my third hypothesis can be stated as:

**$H_3$:** *There is a positive association between Interactive Coordination and Project Team Creativity.*

## 2.8 Mediating Role of Interactive Coordination between Project Learning and Project Team Creativity

The core product of the project is learning and new knowledge can be created under the basis of already existing learning through interaction between the team. Project team innovation is an information-processing activity (De Meyer, 1985; Moenaert, Caeldries, Lievens, & Wauters, 2000). Through the integrative coordination of the team, creativity enhances under certain mindsets and learning related to the project (Brereton, 1999; M. C. Yang, 2003; Adams, Turns, & Atman, 2003). Quality of interactive coordination mediates the effect towards innovation with smoothing the team by skills, effectiveness and efficiency of existing knowledge (Jha & Iyer, 2006). Coordination minimizes the problems caused by the availability of interlinked learning about the project (Rad, 1979). Lammie and Shah (1980), pointed out the linking mechanisms between levels of transmitting of project learning which make its way towards the innovative knowledge in the project team.

Solli-Sæther, Karlsen, and van Oorschot (2015), summarises that in an organization, there can be an increase in the motivation level and personal satisfaction of employees by means of learning from the projects. Members involved in the projects can develop longstanding learning skills. Hobday (2000), advised that the team members have four advantages of mutual interactions and meeting. First one for the learners, the content and process get easy to understand. The second one is that the individuals learn to get integrated to solve issues. Interactions indulge members for sharing of thoughts to gather the perfect answers to raised questions.

One of the step in the ladder to success in the real world is that the peers should know how to integrate with people from diverse cultural backgrounds for work. The third one, according to this method one can enhance the level of responsibility and independent learning (Green, 1998). The fourth one, this methodology energetically involves teams in different types of activities of the project; thus meeting the learning needs of many different individuals (Hill & Smith, 1998). Frank, Lavy, and Elata (2003), also list the advantages of project-based learning from the learners' point of view – it develops collecting and presenting data skills, develops thinking skills, suits personal learning styles, enhances motivation, and develops independent learners.

Learning is a practice through which knowledge is generated from capability and the way by which change and advancement occur (Fiol & Lyles, 1985). Peters and Homer (1996) highlight how important it is for project managers to keep on learning. What we need are definite procedures to support learning amongst project team members. To emphasize the importance of the establishment of an environment that supports learning throughout the organization the concept of the learning organization has been suggested (Akbar & Mandurah, 2014).

The learning and education can be comprehended by the constructivist sociocultural approach of project-based learning (Lehmann, Christensen, Du, & Thrane, 2008). Different practices of project-based learning distinctions may be identified in the research, including comprehensive applications of project-based learning at different levels in organizations, from limited applications to single activity. The

main learning principles are summarized by (De Graaf & Kolmos, 2003; Kolmos & De Graaff, 2007) in three approaches: cognitive learning, collaborative learning and contents. project-based learning enhances and polishes the skills and thus brings all the interacting members to one page of solution and innovation. Moreover, creativity and innovation is the aimed point directed by project-based learning as defined by (Rickards, 1985), thus issues are faced and resolved in a smooth way.

Akgün and Lynn (2002) indicated that interactions between the team members encourage them to build a reliable relationship with each other making them understand each other and adopt and absorb each other's knowledge and thoughts. Resulting in developing an environment of intrateam coordination and sharing, this reduces the harmful effects of knowledge hiding thus affecting the creativity of the team in a positive manner (Onağ & Tepeci, 2014). On the other hand, it is also found that on the basis of learning from the executed projects, creativity and innovation is facilitated by the open communication and frequent interactions among team members (Slotegraaf & Atuahene-Gima, 2011).

This research puts light on the continuous improvement in the quality of the projects and the working with the help of knowledge-based learning of the project managers. Project learning produces an innovative strength for project team resulting in innovativeness and improved creativity in project-based organizations. Project organizations must keep on increasing their learning through interactive coordination, taking into consideration that a project organization is based on the bricks of its team creative knowledge, this knowledge develops from success, and failure of projects, as it's an equally important part of the official business (Kharbanda & Pinto, 1996).

Hence my fourth hypothesis would be:

**$H_4$:** *Interactive coordination plays a mediating role between Project Learning and Project Team Creativity.*

## 2.9 Moderating Role of Absorptive Capacity between Project Learning and Interactive Coordination

In the modern era of development, there is a notable shift of organizations in which capabilities of individuals in workgroups is thought-out to be one of the major facts for an increase in innovation, to learn lessons and for organizational performance (Lau & Lo, 2015). Diverseness among the members involved in the team regarding their knowledge backgrounds leads individuals to integrate and absorb from one another that leads to increased creativity, innovation and hence, project performance (Ali & Park, 2016). Many types of research acknowledged that this capacity has a positive outcome on the yield of innovative activities (Cockburn & Henderson, 1998), which efficiently process towards the creation of new products (Atuahene-Gima, 1992; Stock, Greis, & Fischer, 2001). Szulanski (1996) further verified that the project learning, which is considered as the success factor for the organization is, constructed due to the absorptive capacity of the individuals within the project (Arthur, 1989), which then emphasis towards the innovation through team coordination (Grabowski, 1968).

A firm with greater absorptive capacity drives more from the presence of already existing project learning (Zahra & George, 2002; Cohen & Levinthal, 1989). This approach of absorptive capacity as a moderator impact on interactive coordination only when there are external knowledge flows which are developed within the individuals through learning flow (Arora & Gambardella, 1994; Gambardella, 1992). In turn, individuals interacting behavior implies that the role played by absorptive capacity is through the project learning the flow and through the knowledge-based environment, which then enhances the coordination (Escribano, Fosfuri, & Tribó, 2009).

Interactions among the members with different knowledge backgrounds cause all peers to share their perspective, knowledge and generates new fruitful research ideas. The theoretical literature on the capabilities of members to absorb the

knowledge from other members and data bases suggests positive association among workforce and innovation (Miguélez & Moreno, 2015; Miller, McAdam, Moffett, Alexander, & Puthusserry, 2016). Aljanabi, Noor, and Kumar (2014) are of the view that interactions among the team members allow the lessons learned to be shared allowing the members to absorb the knowledge, positively impacting on increased creativity performance and productivity. In today's age of globalization, organizations thrive to produce a climate in which members absorb learning through interactions to attain a competitive edge (Roberts, 2015).

In the ever-shifting period of globalization, the applicability of skills and knowledge from project management practices has affectedly amplified with the passage of time. Organizations have implemented project management rules, practices and processes to achieve the outcomes keeping in view the project constraints and monitoring, additionally to utilize the main limited asset i.e. human resource to come across client's demands and to accomplish reasonable advantage in the market (Zwikael, Shimizu, & Globerson, 2005). Besides the previous project management capabilities, creativity demands effective interactions, sharing and mutual understanding among the project team individuals. Organizing the project associated with its activities necessitate two-way incorporation of interpersonal, intellectual and technical proficiencies of project manager and team members (Marques, Gourc, & Lauras, 2011).

In the recent era, researchers have focused their efforts to study the capabilities and capacities of the individuals in the workforce to absorb the information gathered from the projects. The variable; absorptive capacity has till now not attained its perspective as an operational methodology (Perry, Harp, & Oser, 2013). Absorptive capacity fosters the skills and capabilities in a positive and effectual manner that enhances the project team productivity as the team interacts and shares. Interactive coordination positively impacts the decision-making ability of the decision making authority as after mutual interactions the whole team stands on the common path of achieving the required objective (Zackrison, Seibold, & Rice, 2015). Interactions, understandings and sharing among the team members at the workplace; it enhances staffs approaches and motivation towards work and

supervisor positively (Triana, Jayasinghe, & Pieper, 2015) enhancing both managerial and organizational performance. Empirical studies have shown positive impacts of absorptive capacity on interactive coordination in particular and organizational performance in general (Bhatt, 2001; Tsai, 2001; Mom, Van Den Bosch, & Volberda, 2009).

Hence my fifth hypothesis would be

**$H_5$:** *Absorptive Capacity moderates the relationship between Project Learning and Interactive Coordination; such that if absorptive capacity is high then the relationship between project learning and interactive coordination would be strengthened.*

## 2.10 Moderated Mediation

Lastly, as we expect that previously said variable will moderate the previously mentioned hypothesized link, but we also forecast that this variable concurrently will conditionally effect the indirect effect between project learning and project team creativity. In agreement with the hypothesized model, we forecast a moderated mediation pattern, through which the indirect effect of project learning on project team creativity that happens via interactive coordination will rely on the defined moderator. Hence my sixth hypothesis would be

**$H_6$:** *Absorptive capacity will moderate the indirect effect of project learning on project team creativity via interactive coordination; the mediated relationship will be stronger when absorptive capacity is high as opposed to low.*

## 2.11 Research Model

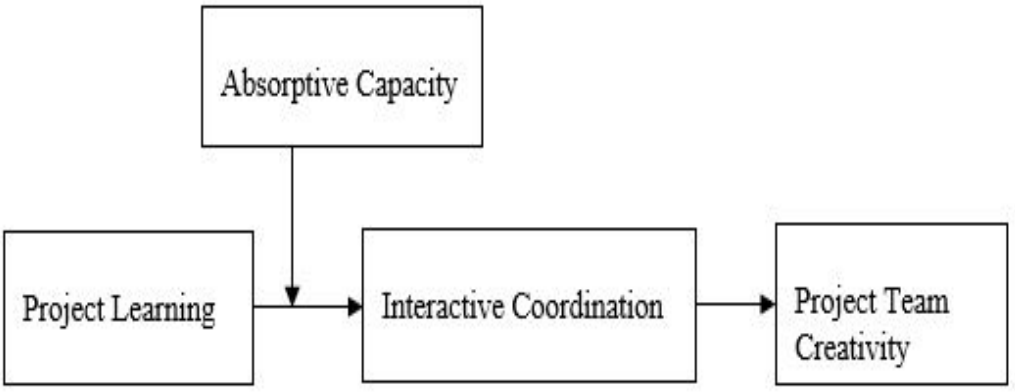


FIGURE 2.1: Research Model Shows that Impact of Project Learning on Project Team Creativity Through Interactive Coordination: Moderation of Absorptive Capacity

## 2.12 Research Hypotheses

**$H_1$:** There is a positive association between project learning and project team creativity.

**$H_2$:** There is a positive association between project learning and interactive coordination.

**$H_3$:** There is a positive association between interactive coordination and project team creativity.

**$H_4$:** Interactive Coordination plays a mediating role between Project Learning and Project Team Creativity.

**$H_5$:** Absorptive Capacity moderates the relationship between project learning and Interactive Coordination; such that if Absorptive capacity is high then the relationship between project learning and interactive coordination would be strengthened.

**$H_6$:** Absorptive capacity will moderate the indirect effect of project learning on project team creativity via interactive coordination; the mediated relationship will be stronger when absorptive capacity is high as opposed to low.

# Chapter 3

# Research Methodologies

The succeeding division describes all the processes and approaches implemented in this study to get reliable outcomes. The deliberation involves essentials as regard of the type of study, design of the research, research viewpoint, unit of analysis, population, sample, sampling procedure, sample features, instrumentation, statistical tools, pilot testing, reliability scales examination and data exploration of all the variables and items included in this research.

## 3.1 Research Design

### 3.1.1 Type of Study

This systematic investigation is used to explain the impact of project learning on the creativity of the team performing the project, for this purpose a cross-sectional study has been carried out. To conduct the investigation, the target population of the research tends to be projectized organizations so as to collect the required information for the authentic results. Initially, 450 questionnaires were distributed among the designated sample but out of those 450, only 343 evident feedback of respondents was received. The particular sample of the study aggregates of the total population of the organizations based on the projects of Pakistan. The outcomes of research disclosed by the designated specimen are to be concluded on the whole residents of Pakistan.

### 3.1.2 Research Philosophy and Quantitative Research

This exploration is centered on the hypothetico-deductive research technique which is totally centered on the viewpoint of destinism, which implants preceding research and present concepts to expose and support our proposition which will then be verified empirically for confirmation of the suggested proposition of the study. The hypothetical deductive model or process is a forecast description of the scientific method. As the name of the process demonstrates, there are two fragments. In a hypothetical fragment, the hypothesis is suggested for examination and in a deductive fragment, outcomes of the examination are deduced from the hypothesis. Then the outcomes deduced from the hypothesis are related to noticeable or tested data to accept or reject the judgment. If the deduced hypothesis is opposed to noticeable data then forecast is considered as falsified and if the deduced hypothesis is not opposed to noticeable data then hypothesis authenticates the theory and expectation are considered as pass.

Calculable methods of exploration are utilized to grasp a large scale of population. Therefore, this exploration has also utilized a calculable exploration process to assemble quality data for the determination of relating variables to each other and for representing the nature of the association between the variables under examination.

### 3.1.3 Unit of Analysis

Unit of analysis is usually the utmost significant factor in any research study. In a research study, the unit of analysis can stretch from a single to diverse clusters, firms, cultures, etc. Since this examination is intended on bilateral association i.e. the impact of project learning on project team creativity, thus the unit of analysis for this examination were the executives and operative level individuals involved in performing projects of project-based firms particularly companies working to bring creativeness and innovation in the workforce and projects.

Conducive to evaluate the impact of project learning through interactive coordination, the examination required to access the precise sector of project-based organization which explicitly involves individuals of the workforce to interact among themselves. To conclude the creativity of the team involved in the projects the stakeholders who were ultimately the end users of the projects were selected as the unit of analysis.

## 3.2 Population and Sample

As the present study pursues to emphasis on the development sector, projects involving teams of different background in Pakistan, the population of the study is the managers, subordinates and the stakeholders (consumers) of this area. As the emerging source of competitive advantage for Pakistan are the project-based firms, in this way this sector is backing in an enormous mode to fascinate other foreigners to capitalize in Pakistan, which in return is growing the requirement of innovation and creativeness in the workforce and also the respect of Pakistan around the world as a new developing and rising country.

For the current study, data were obtained from both national level and international level project-based organizations operating in Islamabad, Rawalpindi, Lahore and Karachi. These organizations include the individuals having different knowledge level and backgrounds in the workforce, running various projects in the field of infrastructure, healthcare, technical, education, energy, hydropower, social services, etc. These projects include capability building of persons, improving the technical skills, vocational and basic education, saving the children, assisting the immigrants and the returnees back in the country, establishing the hygienic areas i.e. pharmaceuticals and hospitals and centers of brilliance for educator and youth training, supporting medical services and much more. The present research will pursue to deliberate on twelve mechanical equipment manufacturing and consuming project-based organizations i.e. Sabro, Coolpoint, Petal, DewMax, Coronet Foods, etc. The data is gathered from the involved project teams and the relevant managers of the projects.

## 3.3 Sample and Sampling Technique

Being aware of the fact that in general, it is hard to collect data from the whole population due to certain restrictions for example restricted time and resource shortage. The sampling process is normally used for the collection of data. For this, a precise group of individuals are chosen that are the factual representatives of the whole population. For the current study, generally, the approached organizations were only project-based organizations of Pakistan. Twelve project-based organizations were being addressed and the information was gathered.

The data on independent variable (i.e., Project Learning) dependent variable (i.e. Project Team Creativity), moderator (i.e., Absorptive Capacity) as well as the mediating variable (i.e., Interactive Coordination) were conveyed by the individuals involved in the projects who had a direct impact on the project team creativity, including the project managers, team leaders, and consultants. The sample mainly contains executive and operative level of different organizations and also the contributors who actually promoted from the project.

The sample specifically includes the project based organizations promoting their employees for an increase in knowledge as well as creativity in work and there exists manager-employee heterophily such that employees and managers are from different experiences and education e.g. delegations of different countries working in Pakistan. The sampling method utilized is convenience sampling technique, which is a sort of non-probability sampling method and data is collected on the base of the comfort of obtainability of data. Hence, convenience sampling is the furthermost appropriate method to be utilized in this research because through this procedure arbitrarily data can be gathered from project base organizations of Pakistan, which will efficiently describe the factual image of the whole population in amplification the impact of project learning on project team creativity through interactive coordination and absorptive capacity.

Self-directed questionnaires were circulated among the project-based organizations. Respondents were enlightened that their data will be private and will be only used for educational purposes through the cover letter. They were asked to

answer the survey questions as correctly as possible by guaranteeing the confidentiality of their responses and namelessness so the respondents don't falter to fill in the survey decisively. Around 400 questionnaires were circulated.

## 3.4 Sample Characteristics

For the current research, two questionnaires were designed. Supervisors/Managers filled questionnaire of project learning and the employees and subordinates of that supervisor/manager filled the other questionnaire having interactive coordination, absorptive capacity and project team creativity. The demographics examined in this study are; project manager's and employee's age, their productive experience in the project based organizations and data connected to gender and qualification.

Sample characteristics are explained as follows:

### 3.4.1 Gender

Gender is a component which remains in places of interest for the determination to uphold gender equivalence, so it is also measured as the significant component of the demographics because it distinguishes between male and female in a given population sample. In this study, it has been tried to make sure the right of gender equivalence but still it has been detected that the share of male managers is significantly larger than that of the share of female managers.

Table 3.1: Gender Distribution

| **Gender** | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
|---|---|---|---|---|
| Male | 212 | 66.3 | 66.3 | 66.3 |
| Female | 108 | 33.8 | 333.8 | 100 |
| Total | 320 | 100 | 100 | |

**Table 3.1** represents the gender composition ratio of the sample in which 66.3% were male and 33.8 % were female. The male percentage of male respondents was high.

### 3.4.2 Age

Age is counted as one of the demographics, to which some of the respondents sometimes feel uncomfortable to disclose openly. So, for the suitability of respondents, scale/choice was used to collect data regarding their age.

Table 3.2: Age Distribution

| **Age** | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
|---|---|---|---|---|
| 18 – 25 | 87 | 27.2 | 27.2 | 27.2 |
| 26 – 33 | 115 | 35.9 | 35.9 | 63.1 |
| 34 – 41 | 75 | 23.4 | 23.4 | 86.6 |
| 42 – 49 | 31 | 9.7 | 9.7 | 96.3 |
| Above 50 | 12 | 3.8 | 3.8 | 100 |
| Total | 320 | 100 | 100 | |

**Table 3.2** shows the composition of the sample with reference to age groups. 27.2% of respondents were having age between the ranges of 18 - 25 years, 35.9% of respondents were having age between the ranges of 26 - 33 years, 23.4% of respondents were having age between the ranges of 34 - 41 years, while 9.7% of respondents were having age between the ranges of 42 - 49 years and just 3.8% of respondents were more than 50 years. In this study, most of the respondents lie in the ranges of 26 - 33 years of age.

### 3.4.3 Qualification

Education is the main component which pays on the way to the success of the whole Nation and it is also the elementary necessity of the hour to participate worldwide. Hence after gender, qualification/education is another vital dimension of the demographics.

Table 3.3: Qualification Distribution

| Qualification | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Matric | 5 | 1.6 | 1.6 | 1.6 |
| Intermediate | 15 | 4.7 | 4.7 | 6.3 |
| Bachelor | 121 | 37.8 | 37.8 | 44.1 |
| Masters | 121 | 37.8 | 37.8 | 81.9 |
| MS/M. Phil. | 53 | 16.6 | 16.6 | 98.4 |
| Ph. D | 5 | 1.6 | 1.6 | 100 |
| Total | 253 | 100 | 100 | |

**Table 3.3** represents the qualification of the respondents, 1.6% were Matric qualified, 4.7% were Intermediate qualified, 37.8% were Bachelors qualified, 37.8% were Masters qualified, 16.6% were MS/M. Phil qualified and 1.6% were Ph. D qualified. A large number of responded were having a Bachelor's and Master's degree.

### 3.4.4 Experience

To gather information concerning the experience of the respondents, also different ranges of the time period of experience were established so that every respondent can effortlessly point to the definite tenure of their experience in the related field of projects.

Table 3.4: Experience Distribution

| Experience | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| 0 – 5 | 139 | 43.4 | 43.4 | 42.4 |
| 6 – 10 | 106 | 33.1 | 33.1 | 72.2 |
| 11 – 16 | 40 | 12.5 | 12.5 | 87.8 |
| 17 – 22 | 25 | 7.8 | 7.8 | 96.3 |
| 23 – 28 | 9 | 2.8 | 2.8 | 99.7 |
| 29 and above | 1 | 0.3 | 0.3 | 100 |
| Total | 320 | 100 | 100 | |

**Table 3.4** represents that 43.4% of the persons were having job expertise ranging from (0 - 5) years, 33.1% of persons were having job expertise ranging from (6 -

10) years, 12.5% of persons were having job expertise ranging from (11 - 16) years, 7.8% of respondents were having job expertise ranging from (17 - 22) years, 2.8% of respondents were having job expertise ranging from (23 – 28) and 0.3% of respondents were having work expertise 29 years and above. Most of the respondents were lying in the work expertise of (0 - 5) years.

## 3.5 Instrumentation

### 3.5.1 Measures

This study consists of a closed-ended questionnaire adopted from diverse sources which were utilized for assessing four variables. Questionnaires were directed to the various groups of manager, employees and other stakeholders of the project based organizations that have been visited during the questionnaire circulation period. Questionnaires were also circulated online to the websites of project-based organizations for the quick response. Managers/employees as respondents filled the questionnaires with five sections in this study: demographic variables (gender, age, qualification and experience), Project Learning, Interactive Coordination, Project Team Coordination, and Absorptive Capacity. The responses were tapped using a 5 point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agreed" unless otherwise stated. Questionnaires also covered demographic variables like Gender, Age, Qualification and Experience.

450 questionnaires were distributed in total but only 343 were received. But the actual numbers of questionnaires used for the analysis of data for demonstrating the results were 320. The discarded questionnaires out of 343 questionnaires were those which were not having the complete information or many of the questions were unfilled in those questionnaires hence making them not appropriate for the study.

### 3.5.2 Project Learning

A four-item questionnaire is adapted for Project Learning constructed by (Wong, Cheung, Yiu, & Hardie, 2012). The responses will be tapped using a 5 point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree". The items of scale are .e.g. "Working (and considering corrective actions if required) under a set of clearly identified project goals", "Referring the firm's past experience to interpret the performance feedback", "Identifying the root of the problem before taking improvement action", "Seeking and adopting new management and working approach through evaluation of current practice."

### 3.5.3 Interactive Coordination

A five-item questionnaire is adapted for Interactive Coordination is constructed by (Narayanan, Jayaraman, Luo, & Swaminathan, 2011). The responses will be tapped using a 5 point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree" to measure the extent of interactive coordination between the team members. Some of the items of scale are .e.g. "We discussed the project status, issues, and resolutions with the client through frequent meetings or conference calls", "We frequently communicate with the client and report to each other on project progress and implementation", "The client and we solve most exceptional problems through interactive discussion", "The client and we recognize and support what each other wants and when we want it".

### 3.5.4 Absorptive Capacity

The questionnaire is adapted for Absorptive Capacity constructed by (Pavlou & El Sawy, 2006). Total items are 10. The responses were tapped using a 5 point Likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree" to measure whether the project delivers high-quality deliverables in an efficient manner. Some of the items of scale are .e.g. "We are successful in learning new things within this group", "We are effective in developing new knowledge or

insights that have the potential to influence product development" , "We have effective routines to identify, value, and import new information and knowledge", "We have adequate routines to analyze the information and knowledge obtained", "We have adequate routines to assimilate new information and knowledge", "We can successfully integrate our existing knowledge with the new information and knowledge acquired", "We are effective in transforming existing information into new knowledge", "We can successfully exploit internal and external information and knowledge into concrete applications.

### 3.5.5 Project Team Creativity

Questionnaire for project team creativity is constructed by (H. Lee & Choi, 2003). Total items are 5. The responses were tapped using a 5 point likert scale where 1 represents "strongly disagree" and 5 represents "strongly agree". The items of scale are: "Our company has produced many novels and useful ideas (services/products)", "Our company fosters an environment that is conductive to our own ability to produce novel and useful ideas (services/products)", "Our company spends much time for producing novel and useful ideas (services/products)", "Our company considers producing novel and useful ideas (services/products) as important activities" "Our company actively produces novel and useful ideas (services/products)."

TABLE 3.5: Instruments

| **Variables** | **Source** | **Items** |
|---|---|---|
| **Project Learning (IV)** | Wong et al. -2012 | 4 |
| **Interactive Coordination (Med)** | Narayanan et al. -2011 | 5 |
| **Project Team Creativity (DV)** | Lee, & Choi -2003 | 5 |
| **Absorptive Capacity (Mod)** | Pavlou, & El Sawy -2006 | 10 |

## 3.6 Pilot testing

Before going to execute somewhat on a bigger level it would be a very positive and in effect method to carry a pilot testing for it, as it will sidestep many dangers associated to the expenditure of resources and time. Hence, Pilot testing of around 35 questionnaires were held out in order to authenticate, whether outcomes are known and in line with the suggested hypothesis or not. After organizing the pilot testing it was determined that there were no significant issues in the variables and the scales were totally reliable for the pilot study conducted.

## 3.7 Statistical Tools

At very prior stage scale reliability and validity were tested by performing CFA (confirmatory factor analysis) by using AMOS and model was found good fit because CFI, GFI, TLI and RMSEA values were significant.

Table 3.6: Confirmatory Factor Analysis (CFA)

| | $\chi^2$ | **df** | $\chi^2$/**df** | **GFI** | **TLI** | **CFI** | **RMSEA** |
|---|---|---|---|---|---|---|---|
| **Hypothesized Model** | 1394.28 | 554 | 2.517 | 0.873 | 0.928 | 0.936 | 0.053 |

As the **Table 3.6** is showing that the measurement model proved to be a good fit to the data. The value of GFI is 0.873, values of TLI is 0.928 and CFI is 0.936 which are more than 0.92 and the value of RMSEA is 0.053 which is between 0.05 and 0.10 (ideal). It gave the confirmation of model fit and scale validity. Table 3.6 (below) comprises of more explanation of CFA.

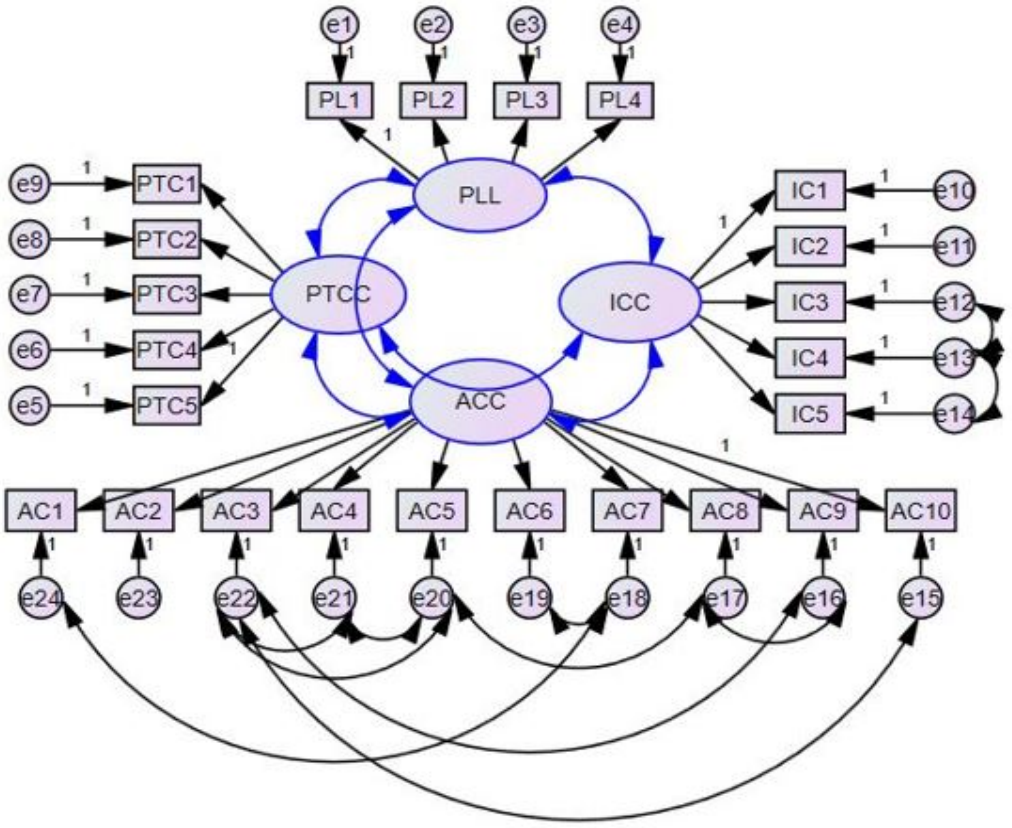


FIGURE 3.1: CFA Model

## 3.8 Covariates

We used One-Way ANOVA test in order to know the control variables for the present study that may affect the outcome variable along with the effect of the predictor. The result showed non-significant difference in project team creativity across gender (F=0.187, p > 0:05); age (F =0.656; p > 0:05); qualification (F = 1.792; p > 0:05) and experience (F = 1.590; p > 0:05); hence having no control variable for the present study.

Table 3.7: Covariates

| **Covariates** | **F Value** | **Significance** |
|---|---|---|
| Gender | 0.187 | 0.666 |
| Age | 0.656 | 0.623 |
| Qualification | 1.792 | 0.114 |
| Experience | 1.59 | 0.162 |

## 3.9 Reliability Analysis of Scales Used

Reliability is mentioned to a procedure of giving the same dependable consequences over and over again when the precise item is being verified over a number of time, same as for the scales. Reliability of scale represents the aptitude of the scale to give reliable outcomes when it is being tested multiple times. The test of the reliability is carried out through Cronbach's alpha, it expresses about the inter-dependability of the variables and expresses about if those variables have a connection between them or not beside with that it also measures the single hypothesis. The significant range for Cronbach's alpha is 0 to 1 (Cronbach, 1951). More the value of Cronbach's alpha, the consistency of the scale to measure the hypothesis it is meant to quantify is also higher. The scale is well-thought-out reliable when the value of alpha above 0.7 and it is less reliable in determining the nominated set of construct when the value is below 0.7.

In **Table 3.7,** the Cronbach's alpha of the scales used in data collection is shown. The values of Cronbach's alpha for the variables under examination are above 0.7. All the items having values above 0.7 shows that these scales are highly reliable to be used in this study according to the context of Pakistan.

TABLE 3.8: Scale Reliability and Validity Analysis

| **Variables** | **Cronbach's alpha ($\alpha$)** | **Items** |
|---|---|---|
| **Project Learning** | 0.673 | 4 |
| **Interactive Coordination** | 0.725 | 5 |
| **Project Team Creativity** | 0.827 | 5 |
| **Absorptive Capacity** | 0.817 | 10 |

**Table 3.8** shows the Reliability and Validity Analysis results after complete data collection. Cronbach's Coefficient Alpha value of Project Learning was 0.673, Interactive Coordination was 0.725, Project Team Creativity was valued as 0.827, and Absorptive Capacity was 0.817.

## 3.10 Data Analysis Techniques

After the collection of the data that is relevant to the study from 320 respondents, the data was then analyzed on SPSS software version 21. A number of procedures while analyzing the data are used, such procedures are as following:

1. First of all, only the questionnaires which were filled appropriately were selected for the analysis.

2. Each variable of the questionnaires were coded and each coded variable was used for data analysis.

3. Frequency tables were used in regard to explain the sample characteristics.

4. Descriptive statistics was conducted by using numerical values.

5. Reliability of all the variables was checked through Cronbach co-efficient alpha.

6. Confirmatory Factor Analysis (CFA) was used to justify the measurement model.

7. Correlation analysis was conducted in order to know whether there is a significant relationship exist between the variables understudied in this research or not.

8. Single linear regression analysis of Independent and Dependent variable was conducted to determine the proposed relationship.

9. Preacher and Hayes Process were used for conducting mediation and moderation to determine the existence of the role of mediator and moderator between the Independent and dependent variables.

10. Through correlation and Preacher and Hayes method, the intended hypotheses were tested to check the rejection and acceptance of the proposed hypothesis.

# Chapter 4

# Results

## 4.1 Descriptive Statistics

Descriptive statistics include the significant points of information about variables such as project learning, absorptive capacity, interactive coordination and project team creativity. It includes the total number of respondents, the minimum and maximum values of each variable, moreover the means and standard deviations of each variable. The mean values demonstrate the average of responses while the standard deviation values indicate the variation of responses from their means. All the variables understudied were measured at 5 points Likert scale. Descriptive statistics is the information summary of whole data because it highlights the significant statistic points. The given table presents some significant figures that are representing the whole data.

Table 4.1: Descriptive Statistics

| | **N** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** |
|---|---|---|---|---|---|
| **Project Learning** | 320 | 1 | 5 | 3.5031 | 0.75585 |
| **Interactive Coordination** | 320 | 1 | 5 | 3.3544 | 0.75120 |
| **Project Team Creativity** | 320 | 1 | 5 | 3.2866 | 0.67348 |
| **Absorptive Capacity** | 320 | 1 | 5 | 3.2094 | 0.87718 |

The descriptive statistic comprises basic particulars like the size of the population, minimum and maximum values, mean values and standard deviation values of the data. Descriptive statistics of the current data is given in **Table 4.1**. The first column of the table gives the details of the variables. Second, third, fourth, fifth and sixth columns inform about sample size, lower most value, upper most value, mean and standard deviation respectively.

**Table 4.1** displays that sample size was 320 for all the four variables. All variables (Project Learning, Absorptive Capacity, Interactive Coordination and Project Team Creativity) were rated on a five-point Likert scale, such as 1 demonstrating "Strongly Disagree" and 5 demonstrating "Strongly Agree". Mean values and Standard Deviation values show the essence of responses. This is the respondents' observation regarding a particular variable. The mean value of the Project Learning (PL) was 3.5031 whereas its value of standard deviation was 0.75585. The mean value of Interactive Coordination (IC) was 3.3544 whereas the value of standard deviation was 0.75120. The mean value of Absorptive Capacity (AC) was 3.2866 whereas the value of standard deviation was 0.67348. Finally, the mean value of Project Team Creativity (PTC) was 3.2094 whereas the value of standard deviation was 0.87718.

## 4.2 Correlational Analysis

Generally, correlation analysis is carried out to determine the association among the variables. In this research work, foremost objective to conduct correlation analysis is to find out the correlation between project learning and project team creativity, the mediating role of managerial interactive coordination and the moderating role of absorptive capacity; to make the proposed hypotheses valid.

Correlation analysis is conducted in order to know about the nature of variation between the two variables that if the variables vary together at the same time or not. Fundamentally correlation analysis doesn't involve association between two or more than two variables because it is different from the regression analysis.

In correlation analysis, Pearson correlation analysis tells about the strength and nature of the relationship through Pearson correlation range i.e. from -0.1 to 0.1. Hence, through magnitude value, we can conclude the strength of the relationship between two variables and that magnitude value can generalize by the distance of correlation from zero. If the correlation is distant from zero that means the relation between the two variables is strong and vice versa. But if the values are zero that straightly means that there exists no relationship between the understudied variables. Positive and negative sign depicts the nature of the relationship, if the sign is positive that means an increase in one variable causes an increase in the other variable and that is considered as direct relationship and in the same way if the sign is negative that means that an increase in one variable will cause a decrease in another variable and that would be an indirect relationship.

The below mentioned table shows the correlation between the variables that are being studied under this study. And the values of correlation are depicting the nature and magnitude of the relationship between the variables.

TABLE 4.2: Correlation Analysis

| Sr No. | Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| **1** | **Project Learning** | 1 | | | |
| **2** | **Interactive Coordination** | 0.685** | 1 | | |
| **3** | **Absorptive Capacity** | 0.525** | 0.541** | 1 | |
| **4** | **Project Team Creativity** | 0.283** | 0.377** | 0.503** | 1 |

*** Correlation is significant at the 0.01 level (2-tailed). N = 320, * p < .05; ** p < .01; ***p < .001 (PL= Project Learning, IC= Interactive Coordination, AC= Absorptive Capacity, PTC= Project Team Creativity)*

**Table 4.2** presents the correlations for all theoretical variables. Project Learning was positively correlated with Interactive Coordination ($r = 0.685^{**}$, $p < 0.01$), with Absorptive Capacity ($r = 0.525^{**}$, $p < 0.01$), and with Project Team Coordination ($r = 0.283^{**}$, $p < 0.01$). Interactive Coordination positively correlated with Absorptive Capacity ($r = 0.541^{**}$, $p < 0.01$), and with Project Team Creativity (r

= 0.377**, p < 0.01). Absorptive Capacity was positively correlated with Project Team Creativity (r = 0.503**, p < 0.01).

## 4.3 Regression Analysis

To analyze the existence of a relationship between the variables, correlation analysis has been performed in the study, however mere reliance on the correlation analysis does not suffice because it just shows the existence of a relationship between variables through inadequate support and doesn't tell about the casual relationship amongst the variables. Therefore, regression analysis is executed so as to validate the dependence of one variable on another variable. Regression analysis basically depicts the extent to which one variable depends on another variable i.e. independent variable on which it is being regressed.

Simple regression or linear regression was conducted, when there are two variables and the purpose is to establish a causal relationship. Multiple regression has conducted when more than two variables are included like in the case of mediation and moderation. Below two tables presented simple regression analysis.

In this study, (Preacher & Hayes, 2004) methods have been used for both mediation and moderation regression analysis. Model 1 for moderation and Model 4 for mediation is used in (Preacher & Hayes, 2004) process, both for mediation and moderation are conducted separately.

### 4.3.1 Linear Regression

#### H1: Project Learning and Project Team Creativity

TABLE 4.3: Simple Regression

| | **Project Team Creativity** | | |
|---|---|---|---|
| **Predictor** | $\beta$ | $\mathbf{R^2}$ | **Sig** |
| **Project Learning** | 0.329*** | 0.08 | 0.000 |

*Un-standardized regression coefficient reported. N = 320, * p < .05; ** p < .01; ***p < .001*

**Table 4.3** indicates the results of hypotheses testing. First, we tested H1 that project learning is positively associated with project team creativity. Results of regression analysis revealed that there is positive and significant relationship existing between project learning and project team creativity. The $\beta$ co-efficient value is 0.329, $R^2 = 0.080$ with the p-value = 0.000. The value of $R^2$ shows the coefficient of determination whereas $\beta$ value shows the rate of change demonstrating that 1 unit change in project learning leads to 0.329 unit change in project team creativity. The p-value of 0.000 indicates that the relationship is highly significant. Hence, Hypothesis 1 is accepted.

**H2: Project Learning and Interactive Coordination**

TABLE 4.4: Simple Regression

| | **Interactive Coordination** | | |
|---|---|---|---|
| **Predictor** | $\beta$ | $\mathbf{R^2}$ | **Sig** |
| **Project Learning** | 0.681*** | 0.47 | 0.000 |

*Un-standardized regression coefficient reported. N = 320, * p < .05; ** p < .01; ***p < .001*

In Hypothesis H2 we assumed that project learning is positively associated with interactive coordination. The regression results of this hypothesis are given in Table 4.4.

Results of regression analysis revealed that there is positive and significant relationship existing between the project learning and interactive coordination. The $\beta$ co-efficient value is 0.681, $R^2 = 0.470$ with the p-value = 0.000. The value of $R^2$ shows the coefficient of determination whereas $\beta$ value shows the rate of change demonstrating that 1 unit change in project learning leads to 0.681 unit change in interactive coordination. The p-value of 0.000 indicates that the relationship is highly significant. Hence, Hypothesis 2 is accepted.

*Un-standardized regression coefficient reported. N = 320, * p < .05; ** p < .01; ***p < .001*

In Hypothesis H3 we assumed that interactive coordination is positively associated with project team creativity. The regression results of this hypothesis are given in Table 4.5.

TABLE 4.5: Simple Regression

| | **Project Team Creativity** | | |
|---|---|---|---|
| **Predictor** | $\beta$ | $\mathbf{R^2}$ | **Sig** |
| **Interactive Coordination** | 0.440*** | 0.142 | 0.000 |

Results of regression analysis revealed that there is positive and significant relationship existing between interactive coordination and project team creativity. The $\beta$ co-efficient value is 0.440, $R^2 = 0.142$ with the p-value = 0.000. The value of $R^2$ shows the coefficient of determination whereas $\beta$ value shows the rate of change demonstrating that 1 unit change in interactive coordination leads to 0.440 unit change in project team creativity. The p-value of 0.000 indicates that the relationship is highly significant. Hence, Hypothesis 3 is accepted.

## 4.4 Mediation Analysis Results

The Hypothesis 4 assumed that interactive coordination plays a mediating role between project learning and project team creativity. To test the mediation of H4 we used model 4 of PROCESS macro through SPSS by (Hayes, 2013). In which we checked different paths a, b, c and c' respectively. According to Preacher and Hayes process, there are total three effects that have to be ascertained: total effect, direct effect and indirect effect.

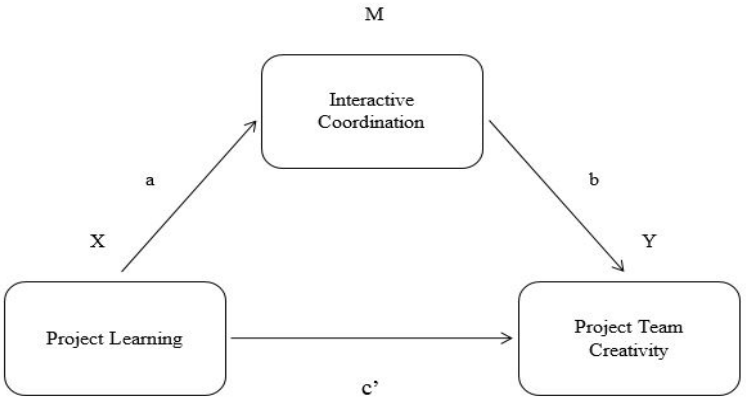


FIGURE 4.1: Mediation Analysis

Table 4.6: Mediation Analysis

| **IV** | **Effect on IV on M (a path)** | **Effect of M on DV (b path)** | **Total effect of IV on DV (c path)** | **Direct Effect of IV on DV (c' path)** | **Bootstrap results for indirect effects** | |
|---|---|---|---|---|---|---|
| | $\beta$ | $\beta$ | $\beta$ | $\beta$ | LLCI | ULCI |
| **PL** | 0.681*** | 0.402*** | 0.328*** | 0.054 | 0.1565 | 0.4083 |

*Un-standardized regression coefficient reported. Bootstrap sample size was 5000. Confidence Interval = 95%. N = 320, IV independent variable, DV Dependent Variable, M Mediator Variable, * p < .05; ** p < .01; ***p < .001 LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.*

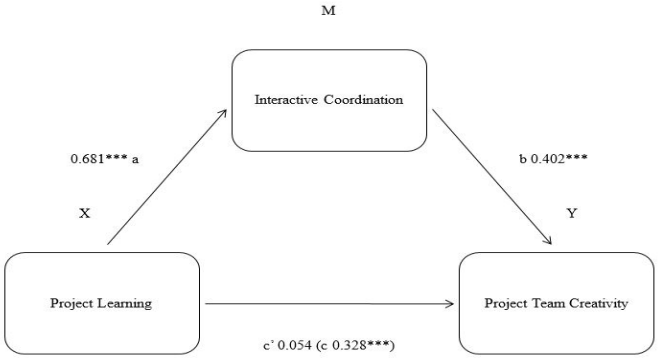


Figure 4.2: Mediation Analysis with Coefficients

Following is the explanation of every path:

Hypothesis 4 pronounces that interactive coordination will mediate the relation between project learning and project team creativity. The results shown in the table 4.6, provides strong justification. Table 4.6 describes that indirect effect of project learning on project team creativity has the lower level confidence interval and upper-level confidence interval of .1015 and .3691. Both the ULCI and LLCI has same sign positive and there was no zero present between these two. Hence, we can conclude from here that mediation is happening. Hence, hypothesis 4, was supported, that interactive coordination mediates the relationship between project learning and project team creativity.

## 4.5 Moderation Analysis

In order to test the hypothesis H5 which states that absorptive capacity moderates the relationship between project learning and interactive coordination, we used model 1 of PROCESS macro through SPSS (Hayes, 2013).

TABLE 4.7: Moderation Analysis

| **Variables** | $\beta$ | **SE** | **t** | **p** | **Bootstrap results for indirect effects** | |
|---|---|---|---|---|---|---|
| **Constant** | 1.7359** | 0.5197 | 3.3398 | 0.0009 | 0.7133 | 2.7585 |
| **Int_Term** | 0.1170* | 0.0471 | 2.4837 | 0.0135 | 0.0243 | 0.2098 |

*Un-standardized regression coefficient reported. Bootstrap sample size was 5000. Confidence Interval = 95%, N = 320, * p < .05; ** p < .01; ***p < .001*

For moderation hypothesis was given. Hypothesis 5 states that absorptive capacity moderates the association between project learning and interactive coordination such that project learning will have a stronger positive relationship with interactive coordination for project team members who have greater absorptive capabilities than those who have low. Table 4.7, results provide an explanation for hypothesis 5. The reason is interaction term of "project learning and absorptive capacity" moderates on the relationship of "project learning and interactive

coordination" has the lower level and upper-level confidence interval of 0.0243 and 0.2098 and both have the same sign and no zero is present. Similarly, the interaction term specified positive and significant regression coefficient ($\beta$=0.1170*, p=0.0135) means that absorptive capacity moderates the relationship of project learning and interactive coordination such that project learning has a stronger positive relationship with interactive coordination for project team members who have greater absorptive capabilities than those who have low. Hence, we conclude that hypothesis 5 was supported for moderation.

**Figure 5** represents the graphical explanation of acceptance of Hypothesis 5. The absorptive capacity moderates the relationship between project learning and interactive coordination.

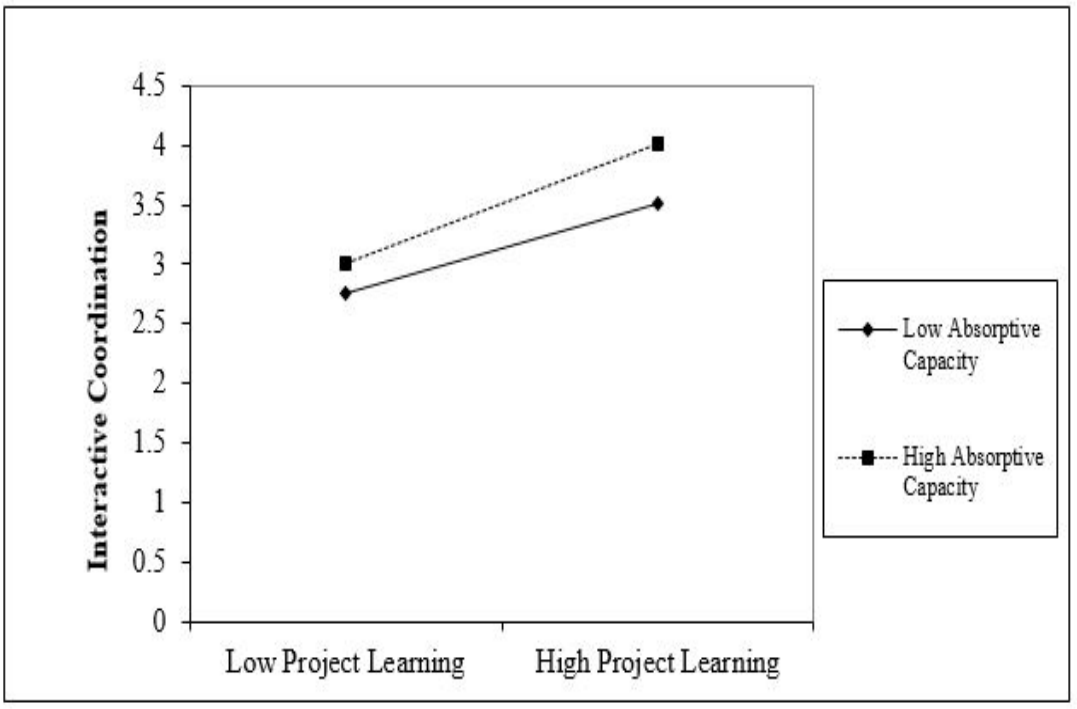


FIGURE 4.3: Interaction Graph

To give more confirmation for the moderating effect of absorptive capacity, the simple slope for moderator was plotted as specified in figure 6. As shown in the figure, the slope of the relationship between project learning and interactive coordination was stronger for team members with greater absorptive capacity. The

figure illustrates that when project learning and absorptive capacity was high the project team will have high interactive coordination among them and vice versa.

## 4.6 Moderated Mediation

In order to test the hypothesis H6 which states that absorptive capacity will moderate the indirect effect of project learning on project team creativity via interactive coordination; the mediated relationship will be stronger when absorptive capacity is high as opposed to low, we used model 7 of PROCESS macro through SPSS (Hayes, 2013).

TABLE 4.8: Moderated Mediation

| **Mediator** | **Absorptive Capacity** | **Indirect Effect** | **SE** | **Boot LLCI** | **Boot ULCI** |
|---|---|---|---|---|---|
| **Interactive Coordination** | 2.613 | 0.2021 | 0.515 | 0.1115 | 0.3115 |
| **Interactive Coordination** | 3.286 | 0.2338 | 0.056 | 0.1313 | 0.3457 |
| **Interactive Coordination** | 3.96 | 0.2655 | 0.0652 | 0.1469 | 0.3973 |

Hypothesis 6 states that absorptive capacity will moderate the indirect effect of project learning on project team creativity via interactive coordination; the mediated relationship will be stronger when absorptive capacity is high as opposed to low. Table 4.8 provides robust reasoning for the suggested hypothesis. Absorptive capacity was investigated across three levels as described in the table to examine conditional indirect effects of project learning on project team creativity through interactive coordination. The results from conditional indirect effects showed in table 4.8. As predicted, the conditional indirect effects of project learning on project team creativity via interactive coordination become more stronger from lower to a higher level of absorptive capacity and both upper level and lower level confidence interval has the same sign and the indirect effect was significant ($\beta$=

0.2021 at a lower level to 0.2655 at a higher level). As such, hypothesis 6 was fully supported.

## 4.7 Summary of Accepted/ Rejected Hypothesis

Table 4.9: Hypotheses Summarized Results

| Hypotheses | Statement | Status |
|---|---|---|
| **Hypothesis 1** | There is a positive association between Project Learning and Project Team Creativity. | **Accepted** |
| **Hypothesis 2** | There is a positive association between Project Learning and Interactive Coordination. | **Accepted** |
| **Hypothesis 3** | There is a positive association between Interactive Coordination and Project Team Creativity. | **Accepted** |
| **Hypothesis 4** | Interactive Coordination plays a mediating role between Project Learning and Project Team Creativity. | **Accepted** |
| **Hypothesis 5** | Absorptive Capacity moderates the relationship between Project Learning and Interactive Coordination. | **Accepted** |
| **Hypothesis 6** | Absorptive capacity will moderate the indirect effect of project learning on project team creativity via interactive coordination; the mediated relationship will be stronger when absorptive capacity is high as opposed to low. | **Accepted** |

# Chapter 5

# Discussion

## 5.1 Discussion

The prior research in the field of project learning and project team creativity benefits in detail the inter-related characteristics of the concepts (Kilelu, Klerkx, & Leeuwis, 2014; Duffield & Whitty, 2015; Gann & Salter, 1998; Barker & Neailey, 1999; Gemünden, Lehner, & Kock, 2018). Pragmatic researches on team creativity support the fact that variables such as project learning, interactive coordination, absorptive capacity are influential variables to be explored further and have significant impact on creativity and innovation of the workforce (Edmondson & Nembhard, 2009; Reiter-Palmon, Wigert, & de Vreede, 2012; Seo, Chae, & Lee, 2015) and project performance (Jordão & Novas, 2017).

The main prominence of this research was to study the association among project learning and project team creativity in project-based organizations within contextual settings of Pakistan. The exploration also considered the mediating role of interactive coordination between project learning and project team creativity and the moderating role of absorptive capacity between project learning and interactive coordination. The study was conducted in project-based firms striving to enhance the creativity of the team through knowledge.

The outcomes of the exploration propose that project learning have a progressive influence on project team creativity which means that the knowledge of project

manager and previous projects improves the creativeness and innovation of the project team. There is a positive association between project learning and interactive coordination, which additionally has a positive connection with project team creativity. Therefore, H1, H2, H3 and H4 are accepted establishing an association between project learning and project team creativity through the mediator of interactive coordination. This suggests that project learning emphatically improves interactive coordination of individuals involved in the project which improves the creativity of the project team.

The study inculcated variable of intercultural group climate as a moderator. The data analysis on the variable in the contextual settings of Pakistan proves that intercultural group climate negatively influences the relationship between cultural intelligence of the project manager and managerial ambidexterity. The role of intercultural group climate was found to be insignificant and negatively affecting the relationship between cultural intelligence and managerial ambidexterity.

The comprehensive discussion on each of the hypothesis is as follows:

### 5.1.1 Hypothesis H1: There is a Positive Association between Project Learning and Project Team Creativity

In Hypothesis 1 it was proposed that there is a significant association between project learning and project team creativity. The outcomes of the hypothesis ($\beta$ = 0.329, t = 5.27, p = 0.00) demonstrated the presence of a considerably positive association between project learning and project team creativity. The t value of 5.27 point to the noteworthy level of association between project learning and project team creativity, as the value is greater than 2 indicates that outcomes are statistically momentous. The $\beta$ co-efficient is 0.329 which demonstrates that project team creativity is increased by 32.9% units when there is 1% unit change in project learning.

Pragmatic studies in the field of project management typically consider project learning as a vital variable positively strengthening the creativity of the project

team as individuals with more creativity have a greater degree of aptitude and demonstrative sense (Zhou, 2012; Leybourne & Kennedy, 2015). The outcomes of this exploration are also in conformance with the outcomes of the exploration by (Dong et al., 2017), which narrates that in today's age of globalization, sharing the learning from the projects and experiences are the main feature contributing positively towards the creativity of the individuals working together. Project learning allows individuals to gain knowledge and appropriately utilize it to meet the required creativeness during the projects in accordance with contextual settings.

Lessons learned play an important role of the tool in projects in making them efficient and minimizing the risk, resulting in enhanced performance in terms of creativity and innovation being brought by learning absorbed by the workforce (Albrechts, 2016). The paradigm of learning, when achieved methodically by taking into consideration its development, gathering, sharing and utilization through the structural procedure, has important connotations in improving both individual and team creativity (Bissola, Imperatori, & Colonel, 2014). Project learning increases the project team creativity by permitting individuals to utilize their capabilities simultaneously in acquiring, generating and applying knowledge for comprehensive project planning and enhancing implementation techniques and sharing the knowledge within project portfolio and project teams, therefore, enhancing project team creativity.

Project learning plays an important role in improving project team creativity especially in the context of collectivist societies like that of Pakistan. The collectivistic cultures are categorized by aspects like kindness, advantageousness, trustworthiness and concentration to requirements of fellows (Anbari, 2005). Project learning allows individuals to increase their knowledge and react according to the demands of situation particularly, therefore, permitting improved adaptableness and improved project team creativity. The relationship of project learning and project team creativity is positively and considerably established in project-based firms of Pakistan as demonstrated by the outcomes of this exploration after factual testing of the data.

### 5.1.2 Hypothesis H2: There is a Positive Association between Project Learning and Interactive Coordination

In Hypothesis 2 it was proposed that there is a positive association between project learning and interactive coordination. The results of the hypothesis ($\beta$ = 0.681, t = 16.7, p = 0.00) verified the presence of a suggestively positive association between project learning and interactive coordination. The t value of 16.7 specifies the noteworthy level of association between project learning and interactive coordination, as the value is more than 2 means that outcomes are statistically momentous. The $\beta$ co-efficient is 0.681 which demonstrates that interactive coordination is increased by 68.1% units when there is 1% unit change in project learning.

Present literature available on project learning and interactive coordination also assist the outcomes of the exploration (Hartmann & Dorée, 2015; Zackrison et al., 2015; Pietrobelli & Staritz, 2018). Erez et al. (2013) suggested in their research paper that project learning improves interactive coordination among the project team members allowing them to explore the ways available to cater the problems and discover new creative ideas to compete against their competitors. L. Lee, Reinicke, Sarkar, and Anderson (2015) indicated in his study that individuals interacting and learning in the project team can be creative and maintain standardization as well which allows them to use these progressions appropriately as and when required.

Learning is a process that includes acquiring of knowledge, improvement in the abilities and gain new methodologies and ideas which are appropriate to be utilized in numerous circumstances enabling the organization to succeed to ensure improved creativity on organizational as well as individual levels. Learning on an individual level allows managers to share their existing proficiencies and allow the subordinated to explore new opportunities along with the creation of new knowledge (Taylor & Greve, 2006). The key element for reaching higher levels

of individual-level learning is to maintain an appropriate equilibrium between acquiring and sharing knowledge and information. Interactive coordination is one of the few essential features supporting to allow individuals to maintain this balance. Successful implementation of the projects can only be ensured whenever this proper balance between acquiring and sharing is achieved. Considering the happenings of globalization, learning from the projects is considered among the fundamentals required in confirming the successful execution and achievement of projects along with interactive coordination in the domain of project management (Sense, 2004).

The project-based organizations of Pakistan necessitate learning element on both organizational and individual level and association of project learning and interactive coordination is positively and significantly recognized as results of pragmatic testing of the hypothesis shows. The findings of the outcomes support the positive association of project learning with interactive coordination in the contextual settings of Pakistan.

### 5.1.3 Hypothesis H3: There is a Positive Association between Interactive Coordination and Project Team Creativity

In Hypothesis 3 it was proposed that there is a positive association between interactive coordination and project team creativity. The results of the hypothesis ($\beta = 0.440$, t = 7.26, p = 0.00) proved the presence of a significant positive association between interactive coordination and project team creativity. The t value of 7.26 indicates the momentous level of association between interactive coordination and project team creativity, as the value is greater than 2 means that results are statistically significant. The $\beta$ co-efficient is 0.440 which demonstrates that if there is 1% unit change in interactive coordination then there is a likelihood that project team creativity would be increased by 44 % units.

The results of this hypothesis are reinforced by the conclusions of past researches that considers element of interactive coordination as one of the vital factors for

enhancing creativity among the team members of projects (Hoever, Van Knippenberg, Van Ginkel, & Barkema, 2012; Paulus, Dzindolet, & Kohn, 2012; S.-B. Yang & Ok Choi, 2009). Interactive coordination allows project team members to interact with each other to share their knowledge, practices and experiences simultaneously not only ensuring adaptability but also for development and enrichment in the creativity of the team involved in the project (Goh, Goodman, & Weingart, 2013; Stark, Bierly, & R. Harper, 2014). Project managers play the role of a motivator for team members as they are creative in thinking and adaptable to recent developments. Interactive coordination enhances trust between managers and team members. Interactive coordination among the manager and the project team allows them to perform remarkably as well as to improve the creativity in both teams as well as the project, (Thompson, 2003).

The element that the projects are time restricted to make it a compulsion to have mechanisms that ensure fruitful and timely adaptability and improvement practices to be implemented according to the need of situations (Davies & Brady, 2016). Interactive coordination allows team members to interact and make effective use of their abilities and knowledge, given the need of an hour making sure the increase in the creativeness in the project team members. Critical success factors for projects available in the project management literature considers creativity and innovation as one of the essential factors to compete in the rising market as well as enhancing performance (Yoon, Song, Lim, & Joo, 2010). It also takes into account the fact that for modern project-based organizations thrive on the constituent of creativity.

Keeping in view the recent changes towards the advancement, in organizations consider creativity and innovation as an important competitive edge over competitors (Nikolova & Rodionov, 2017). Project-based organizations when struggle to initiate new projects, they necessitate creativity on both individual and organizational level to make sure the improvements required to innovate the projects (Misra, 2011). The project-based industries in Pakistan involve creativity and innovation feature in addition to the previous procedures and processes as the results of hypothesis suggests. The exploration of the hypothesis institutes a positive and

significant association between interactive coordination and project team creativity based on the data collected from project-based organizations in Pakistan.

### 5.1.4 Hypothesis H4: Interactive Coordination Plays a Mediating Role between Project Learning and Project Team Creativity

In Hypothesis 4 it was proposed that interactive coordination plays a mediating role between project learning and project team creativity and this hypothesis has been accepted because outcomes are signifying the association of interactive coordination as a mediator between project learning and project team creativity, as the lower limit and upper limit 0.1565 and 0.4083 respectively showed by the unstandardized regression coefficient are both positive and there is no zero existing in the bootstrapped 95% interval around the indirect effect of the relationship of project learning and project team creativity through interactive coordination.

As interactive coordination has not been used as a mediator between learning and team creativity, there is no research prevailing previously to examine its mediating effect in the domain of project management. However, the study carried out by (Joo, Song, Lim, & Yoon, 2012) directs that project learning expressively improves the creativity of the team involved in the project. Deductions of the previous studies also propose that project learning performs an important role in improving interactions in an organization as individuals in an organization have different talents and expertise improving innovative and creative organizational performance (Grabher & Thiel, 2015).

In today's era of globalization learning lessons from past projects and actually applying those learning effectively on upcoming projects is usually recognized as essential feature although it is tough to accomplish (Anbari, Carayannis, & Voetsch, 2008; Carrillo, 2005; Julian, 2008; Newell & Edelman, 2008). Project learning raises interactive coordination allowing team members to adopt the lessons both on individual and organizational level and hence leading to improved creativeness

in the team. During the lifecycles of the projects, they pass through multiple unexpected risks, resources allocation problems or unexpected external events. Projects are matter to characteristic variations of firms in which they are being conducted (Schwab & Miner, 2008). The indeterminate character of the projects demands the involvement of team asset which has learned from the previous projects. Such involvements will induce growth of interactive coordination and hence the creativity of the team will also be improved both on the project and organizational level.

The literature on interactive coordination proposes that interactions among the team to share the knowledge and sort out the solutions for unforeseen problems is a key to success in this modern competitive era. The results of the hypothesis clearly suggest that relationship of project learning and project team creativity is mediated through interactive coordination positively and significantly in the project based organizations of Pakistan.

### 5.1.5 Hypothesis H5: Absorptive Capacity Moderates Positively the Relationship between Project Learning and Interactive Coordination; such that if Absorptive Capacity is high then the Relationship between Project Learning and Interactive Coordination would be Strengthened

In Hypothesis 5, the moderating effect of absorptive capacity between project learning and interactive coordination was studied. The results of Hypothesis 5 showed significant results. The analysis showed that there is a significant effect of absorptive capacity ($\beta = 0.1170^*$, t = 2.48, p = 0.0135). The value of $\beta = 0.1170^*$ predicts that absorptive capacity is bringing change in the relationship of project learnings and interactive coordination. The t-value of 2.48 demonstrates that the relationship is highly significant because the t-value is greater than 2. The lower and upper limit of 0.0243 and 0.2098 respectively indicated by un-standardized

regression are having the same signs and no zero exists in the bootstrapped 95% interval, which means the results are significant. Hence, the results are meeting the standards, statistically, this relationship is significant and the hypothesis is accepted.

According to the results of the hypothesis absorptive capacity moderates the relationship between project learning and interactive coordination. In this study, we explored the moderating effect of absorptive capacity on the association of project learning and interactive coordination. More specifically, the study was intended to prove that absorptive capacity enhances interactive coordination of the project team who has gained lessons. The outcomes of the hypothesis are significant and in our sample of study moderator of absorptive capacity significantly impact the relationship of project learning and interactive coordination.

Previous studies have established the significant impact of absorptive capacity on the relationship of project learnings and interactive coordination (Tsai, 2001). Moreover, it enhances the interactive capabilities of the project team (Lane, Salk, & Lyles, 2001; Lichtenthaler & Lichtenthaler, 2009). The results are in agreement with the research of (Gebauer, Worch, & Truffer, 2012), that individuals with high absorbing power result in more interactions. Similarly Chang, Gong, and Peng (2012) argued that people with higher capabilities about learning the lessons interact more to coordinate and share to implement and utilize the knowledge. This supports that project team members who absorb less from the knowledge gathered from previous projects face more difficulties under situations of troubles and problems. We argue that team members who have low absorptive capacity will be incapable to share the knowledge because it absorptive capacity not only helps the team to absorb the knowledge besides increases the trust level among them.

In conclusion, absorptive capacity impacts interactive coordination. In the contextual settings of Pakistan, it is essential to position light on these distinguishing practicalities. The data suggests that absorbing capabilities of team members of coordinating project teams sharing the knowledge and learning from the previous projects, therefore positively affect the interactions of the project team altogether

which in return enhances interactive coordination of the team involved in the project. In project-based organizations of Pakistan, as the results of the hypothesis suggests that patterns of similarity interactive coordination prevail when it comes to the absorptive capacity of the team involved.

## 5.2 Practical and Theoretical Implication

This study played a vital role, contributing in the past literature in both ways, theoretically and practically. The study has contributed to the literature of variables like project learning, interactive coordination, absorptive capacity and project team creativity. There is very limited literature available on interactive coordination among project team specifically emphasizing its role in the domain of project management (Su et al., 2005). Our outcomes indicate that with the help of project learning we can see a major improvement in creativity and innovation of the project team. This is a very significant contribution to literature since previously there is no research available highlighting the mediating role of interactive coordination in the association of project learning and project team creativity within the contextual settings of Pakistan in the domain of project management.

The study exemplifies very significant facts by recognizing the impact of project learning on project team creativity in the context of Pakistan, where learning is considered an important yet sensitive instrument in streamlining efforts to enhance project team creativity. In collectivist societies like that of Pakistan culture is an important element of individual life and organizational setup. It influences strongly one's believes, values and everyday interactions. In such societies project learning is a central component confirming creativity of team as it allows individuals to gain and reshape the knowledge, using one's own absorbing power (J. S. Lee et al., 2014). It is recognized from the study that project learning significantly enhances project team creativity as it allows project team members to absorb the knowledge and helps the project team to interact and coordinate in a way to motivate them to work effectively and as a result enhanced project team creativity is achieved.

Another very important theoretical contribution is the role of interactive coordination as a mediator between project learning and project team creativity which is not accredited in the literature before. Previous literature available on project learning and project team creativity have identified other mediators in the association but interactive coordination has never been studied not in the association nor as a mediator before. The results of the study demonstrated that project learning increases interactive coordination of project team members that leads to enhanced project team creativity. As project learning and interactive coordination are vital and unique variables in the domain of project management, so analyzing these variables in the contextual stings of Pakistan, comes out as unique research which has contributed significantly in the literature.

Moreover, this research also studied the moderating role of absorptive capacity on the relationship of project learning and interactive coordination. The results of the study suggested that absorptive capacity positively moderates the relationship between project learning and interactive coordination in the contextual settings of Pakistan. This too is a significant theoretical contribution especially in the literature of effects of project learning in projects. Organizations along with project managers should take proper steps to improve the effects of absorptive capacity as it significantly impacts the potential success/future and long term viability of the organization in the context of creativity and innovation.

This study is equally important in the practical business world. In this age of transformation where the world is moving speedily towards globalization, project learning along with interactive coordination is considered one of the significant aspects in defining potential future and long term feasibility of project-based organizations in the context of performance and success. This research is helpful for project-based organizations in a way that it provides insights on how learning absorbed by the team improves project team creativity through interactive coordination, for a system to be adopted in a way that it ensures success on both team and project level.

## 5.3 Limitations of Research

As it is not possible to cover all aspects in one study, a few limitations are always there in research although these are tried to eliminate. A few research gaps have been filled by adding appreciative facts in literature. On the other hand, time and resource restrictions are some of the limitations associated with this study. The study is focused only on the project based organizations of Pakistan and other sectors may not be generalized by the results. The model was analyzed by the single mediator and single moderator due to the time constraint. The data collection for the present study is cross-sectional due to time and resources limitations, as this does not allow for making deduction concerning the connection between variables study as shown in the hypothesized model. Similarly, the current research takes only project-based organizations into consideration the limitation is the generalizability of the study.

Additionally, we use convenience sampling method and choose the sample which was easily accessible to us. As the data was collected from some organizations, it can narrow the generalizability of results. The results are different because of strong contextual and situational factors as well as Pakistani cultural has a strong impact and results cannot be generalized to other countries.

## 5.4 Future Research Directions

As all the aspects of a study cannot be covered so there is always space for the future. This research opens several innovative possibilities for future researches. Future study can be conducted covering the specified suggestions. In this study, we empirically tested the impact of project learning on project team creativity but in the future researchers can examine the impact of project learning on other project related variables i.e. project risk mitigation (PRM). The current study has been done with the focus on project-based organizations only, this actually gives a way forward to the researchers observe and repeat the model in organizations (both

public and private) other than project-based organizations in order to examine the impact with large sample size.

Moreover, the relationship between project learning and project team creativity can be studied with other mediating variables. Future researches can also focus on the moderating role of other variables between the relationship project learning and interactive coordination. Along with there is also an adequate room available to study multiple conditional factors that can affect these relations. Interactive coordination is the unique variable in the domain of project management can be studied and empirically tested in other relationships both on an individual and organizational level.

We recommend additional exploration to pay consideration on the data and data collection techniques because this study has some drawbacks. The consequences and importance of the study will be useful for future researchers focusing on this area to link project learning to various other variables like interactive coordination. Also, the sample size can be increased as this study is just limited to easily accessible sample. Hence, upcoming researches possibly can incorporate these guidelines.

## 5.5 Conclusion

In developing countries like Pakistan, project management is making its way up as it is covering a lot of responsibilities. This study is carried out to advance the domain of project learning and project team creativity, which are very popular fields and having good importance in the present era. This study has made an attempt to consider the relationship between project learning and project team creativity in project based organizations of Pakistan. Data was collected from project-based organizations (embassies, USAID, UNDP, NGOs, Some private companies) of Pakistan through a questionnaire survey to measure the extent to which project learning impacts project team creativity with mediating role of interactive coordination and moderating role of absorptive capacity.

Altogether 450 questionnaires were distributed however, only 320 were used for analysis since these questionnaires were having the most appropriate and complete information required for carrying out the analysis of this study. Statistical tests indicate that validity and reliability of the model variables and fit of the model are also suitable. The proposed hypotheses are also supported by the social development theory of learning. The data analysis results in the acceptance of all hypotheses.

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# Appendix-A

**Questionnaire**

**Dear respondent,**

My name is Bilal Khalid. As a MS research student at Capital University of Sciences And Technology, Islamabad, I am collecting data for my research paper titled as "Impact of Project Learnings on Project Team Creativity, with Mediating Role of Interactive Coordination & Moderating Role of Absorptive Capacity, in the contextual setting of Pakistan". It will take your 10-15 minutes to answer the questions and to provide valuable information. I assure you that data will be kept confidential and will only be used for academic purposes.

Thanks a lot for your help and support!

**Sincerely,**

**Bilal Khalid**

**MS (PM) Research Student,**

**Capital University of Sciences and Technology, Islamabad.**

**Section I**

| **Section: 1** | **Demographics** |
|---|---|
| Gender: | 1- Male 2- Female |
| Age: | 1 (18-25), 2 (26-33), 3 (34-41), 4 (42-49)<br>5 (50 and above) |
| Qualification: | 1 (Matric), 2 (Inter), 3 (Bachelor), 4 (Master), 5 (MS/M.Phil),<br>6 ( PhD) |
| Experience: | 1(0-5), 2(6-10), 3(11-16), 4(17-22), 5(23-28), 6(29 and above) |

**Section II: Project Learnings; 1= Strongly Disagree, 2= Disagree, 3= Neither Agree/nor Disagree, 4= Agree, 5= Strongly Agree**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Do you agree that your firm practiced the followings during the project. | 1 | 2 | 3 | 4 | 5 |
| 2 | Working and considering corrective actions if required under a set of clearly identified project goals. | 1 | 2 | 3 | 4 | 5 |
| 3 | Referring the firm's past experience to interpret the performance feedback. | 1 | 2 | 3 | 4 | 5 |
| 4 | Identifying the root of the problem before taking improvement action. | 1 | 2 | 3 | 4 | 5 |
| 5 | Seeking and adopting new management and working approach through evaluation of current practice. | 1 | 2 | 3 | 4 | 5 |

**Section III: Interactive Coordination; 1= Strongly Disagree, 2= Disagree, 3= Neither Agree/nor Disagree, 4= Agree, 5= Strongly Agree**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | We discussed the project status, issues, and resolutions with the client through frequent meetings or conference calls. | 1 | 2 | 3 | 4 | 5 |
| 2 | We frequently communicate with the client and report to each other on project progress and implementation. | 1 | 2 | 3 | 4 | 5 |
| 3 | The client and we solve most exceptional problems through interactive discussion. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | The client and we recognize and support what each other wants and when we want it. | 1 | 2 | 3 | 4 | 5 |
| 5 | The client and we always solve problems by mutual adaptation and adjustment. | 1 | 2 | 3 | 4 | 5 |

**Section IV: Absorptive Capacity; 1= Strongly Disagree, 2= Disagree, 3= Neither Agree/nor Disagree, 4= Agree, 5= Strongly Agree**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | We are successful in learning new things within this group. | 1 | 2 | 3 | 4 | 5 |
| 2 | We are effective in developing new knowledge or insights that have the potential to influence product development. | 1 | 2 | 3 | 4 | 5 |
| 3 | We have effective routines to identify, value, and import new information and knowledge. | 1 | 2 | 3 | 4 | 5 |
| 4 | We have adequate routines to analyze the information and knowledge obtained. | 1 | 2 | 3 | 4 | 5 |
| 5 | We have adequate routines to assimilate new information and knowledge. | 1 | 2 | 3 | 4 | 5 |
| 6 | We can successfully integrate our existing knowledge with the new information and knowledge acquired. | 1 | 2 | 3 | 4 | 5 |
| 7 | We are effective in transforming existing information into new knowledge. | 1 | 2 | 3 | 4 | 5 |
| 8 | We can successfully exploit internal and external information and knowledge into concrete applications. | 1 | 2 | 3 | 4 | 5 |
| 9 | We are effective in utilizing knowledge into new products. | 1 | 2 | 3 | 4 | 5 |
| 10 | We are able to identify and acquire internal (e.g., within the group) and external (e.g., market) knowledge. | 1 | 2 | 3 | 4 | 5 |

**Section V: Project Team Creativity; 1= Strongly Disagree, 2= Disagree, 3= Neither Agree/nor Disagree, 4= Agree, 5= Strongly Agree**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Our company has produced many novel and useful ideas (services/products). | 1 | 2 | 3 | 4 | 5 |
| 2 | Our company fosters an environment that is conductive to our own ability to produce novel and useful ideas (services/products). | 1 | 2 | 3 | 4 | 5 |
| 3 | Our company spends much time for producing novel and useful ideas (services/products). | 1 | 2 | 3 | 4 | 5 |
| 4 | Our company considers producing novel and useful ideas (services/products) as important activities. | 1 | 2 | 3 | 4 | 5 |
| 5 | Our company actively produces novel and useful ideas (services/products). | 1 | 2 | 3 | 4 | 5 |