

**CAPITAL UNIVERSITY OF SCIENCE AND
TECHNOLOGY, ISLAMABAD**



**Impact of Knowledge Management on Project
Performance with the Mediating Role of Project Based
Learning and Moderating Role of Intellectual Capital**

by

Sadia Abbasi

A thesis submitted in partial fulfillment for the
degree of Master of Science

in the

**Faculty of Management & Social Sciences
Department of Management Sciences**

2018

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Dedicated to the strongest person I know ... "Me"



CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY
ISLAMABAD

CERTIFICATE OF APPROVAL

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1. Abbasi, S., Bashir, S., (2018). Impact of Knowledge Management on Project Performance with the Mediating Role of Project Based Learning and Moderating Role of Intellectual Capital, EMJ-D-18-00026.

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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.

I would like to extend special gratitude to my supervisor, Dr. Sajid Bashir, whose contributions in simulating suggestions and encouragement, helped me to coordinate my thesis work and especially in achieving the results. It was because of your support and guidance from the beginning that I have done it!

Furthermore, I would also like to acknowledge with much appreciation the crucial role of my friends for their support, mentorship, encouragement and technical advice throughout research work. Without you it was not possible!

It is my radiant sentiment to place on record my best regards, deepest sense of gratitude to the most valueable asset for investing full effort, precious guidance and unwavering support which was extremely valuable for my study both theoretically and practically.

A special thanks goes to my maid for making multiple cups of coffee during compilation of this write up.

I express my deepest and earnest thanks to Raja Mobeen Sikandar for taking part in useful decisions & giving necessary advices, support and motivation for completion of this degree and all. I choose this moment to acknowledge your contributions appreciatively.

Here I am indebted to my parents and my brothers for their stanch support and encouragement throughout my educational career. It was your believe in me that brought me here. Words cannot express my gratitude for everything you have done for me.

How can I forget you Abba jee! Always interested to know what I was doing and how I was proceeding! I am eternally grateful to you and this is a testament of

your faith in me, I hope your Bacha has made you proud. I would like to express my cordial appreciation to all those who provided me the possibility to complete this report.

Abstract

Current research on project based organizations fails to explain in detail how these projects can achieve greater performance. This study explores those underlining circumstances that have been ascertained to contribute in improving organizational performance, in project based organizational setting. The impact of knowledge management on project performance has been examined. Data were collected from 276 respondents working in various project based organisations across Pakistan. The results indicate that knowledge management has a significant and positive impact on project performance. Performance of the project is significantly increased when there is a systematic knowledge management in place. The mediating role of project based learning was established for knowledge management and project performance. Intellectual capital (human capital) playing the role of a moderator has shown in-significant impact on the relationship between knowledge management and project performance such that when the level of human capital rises, the relationship between knowledge management and project performance weakens. The study significantly contributes to the area of research specifically in the domain of project management and knowledge management. The study also provides significant implications for academicians and practitioners.

Key words: Knowledge Management, Project Based Learning, Intellectual Capital, Human Capital, Project Performance

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Abbreviations

KM	Knowledge management
IC	Intellectual capital
HC	Human capital
PBL	Project based learning
CFA	Confirmatory factor analysis
VIF	Variance inflation factor

Chapter 1

Introduction

1.1 Background of the Study

Knowledge management has generated new avenues for the researchers and has also increased their interest in exploring the relevance of knowledge and its management [Heisig *et al.* \(2016\)](#). Specific journals now publish studies on knowledge management which has increased visibility and impact of knowledge management in the literature [Akhavan *et al.* \(2016\)](#). Studies confirm that it improves organizational performance [Ahmad *et al.* \(2017\)](#).

Different interlocking terms have been used such as knowledge creation, knowledge sharing, knowledge matrices, knowledge mapping, knowledge storing and distributions; all of these come under the umbrella of knowledge management [Gloet & Terziovski \(2004\)](#); [Durst *et al.* \(2012\)](#); [Reich *et al.* \(2014\)](#). These underpinning terms of knowledge management have potential contributing role in the success of an organization, developing the Organizational capacities and also paving the ways for gaining competitive advantage has declared it as an important topic for researchers [Shannak \(2010\)](#); [Acar *et al.* \(2017\)](#); [Chatzoudes *et al.* \(2015\)](#). Having all the highlighting benefits, knowledge is considered to be one of the key assets of an organization and it has a strong positive impact on performance [Acar *et al.* \(2017\)](#); [Adam \(2017\)](#). Implementation of knowledge management process is critical activity that organizations must be performing for achieving competitive

advantage by motivating employees to contribute in developing and expanding Organizational knowledge [Birasnav \(2014\)](#). In a knowledge base perspective, Organizational knowledge is one of the main strategic resources for competitive success. Though knowledge management is an emerging field yet it has proven to be valuable for the corporate sector [Gourova & Antonova \(2008\)](#); [Garcia \(2017\)](#).

Dynamic business environment, revolution in information technology and innovation is driving the advent of knowledge-based economy. This calls for realizing the importance and value of intellectual capital as a foundation for organizational performance and gaining sustainable competitive advantage [Seleim et al. \(2007\)](#); [Edvinsson & Malone \(1997\)](#); [Kianto et al. \(2017\)](#); [Sharabati \(2010\)](#); [Jardon & Martos \(2012\)](#); [Kim et al. \(2012\)](#); [Grant \(2004\)](#) . One of the key dimensions of intellectual capital is human capital defined as smart, competent, and talented business people who are technologically sound, having globally intelligent perspective, operationally active and proactive [Dess & Shaw \(2001\)](#) . Studies indicate that the requirement for more experts in projects for dealing with the complex interfaces has been increased as a result of emerging advancements and new developments such as societal development [Chou & Yang \(2012\)](#); [Gasik \(2011\)](#) . It has also been confirmed that the most important determinant for firms performance is human capital [Seleim et al. \(2007\)](#); [Bontis et al. \(2007\)](#); [Cabello-Medina et al. \(2011\)](#); [Hormiga et al. \(2011\)](#) .

Over the last couple of decades, interest in understanding the concept of organizational learning has been aroused so as to explain the that to improve performance and competitiveness attention is required not only on individual learning but also on how organizations can connect individual learning for organizational gains [Crossan et al. \(1999\)](#); [Chaston et al. \(2001\)](#) .[Huber \(n.d.\)](#) outlined the process of OL in a very elaborated way, which starts by knowledge acquisition, which is to be converted into information and disseminated in the organization, before getting it stored in the organizational memory to be applied in future. This actually enables to align the firm with the ultimate criterion of organizational performance [Fiol & Lyles \(1985\)](#).

Broadly, research linked to organizational learning strives for understanding the approaches that equip the organizations to learn, change and adapt to for gaining new knowledge [Huber \(n.d.\)](#). Organizational learning is referred to as an indispensable factor for dynamic knowledge management; It recognized as one of the important ways to manage and improve the creation and utilization of an organizations knowledge for the improvement of business processes [Spender \(2008\)](#); [Zhao \(2013\)](#); [Matthews *et al.* \(2017\)](#). In todays learning organizations, knowledge management plays a pivotal is for both organizational development and staff development [Tam & Gray \(2017\)](#). Furthermore, Organizational learning is conceptualized as the facilitator of knowledge management, studies also indicate that organizational learning plays an important role in enhancing the power of knowledge management fundamentals which have direct impact on organizational performance [Wu \(2014\)](#).

1.2 Gap Analysis

Knowledge management and its impact on Organizational performance has been studied in organizations like manufacturing companies, Greek banks, small enterprises, small and medium enterprises [Acar *et al.* \(2017\)](#); [Chatzoudes *et al.* \(2015\)](#); [Granados *et al.* \(2017\)](#); [Martinez-Conesa *et al.* \(2017\)](#) which tends to be a potential gap that current studies did not explore these elements in project based organizations. In spite that, to respond to the complex dynamic business setting and high technology businesses, organizing by projects in increasing on a rapid pace.

An important objective of this study is to clarify the relationship between KM and project performance and also to study in detail the moderating role of project intellectual capital, since the literature suggests that KM affects SME firms intellectual capital by increasing performance, sustainability competitiveness and innovation and also indicates that still there is need to study more on the subject [Verbano & Crema \(2016\)](#); [Jordo *et al.* \(2017\)](#). Also a number of research areas that require more focused studies have been highlighted that certify new attention

from KM perspective including intellectual capital and well-known themes like Organizational learning and competitive advantage [Heisig et al. \(2016\)](#). However, limited theoretical perspective exists in the literature as of yet that clarifies the relationships among these constructs in project based organizations specifically. In this context, this study is also an attempt to explore these thematic areas and their inter relationship in depth in project based organizations.

The present research contributes to project management literature in a number of ways for instance it investigates the role of KM on project performance, which has been neglected in the existing research. Furthermore, the moderating role of project intellectual capital is explored so as to enrich the existing knowledge of project based organizations. Also another important aspect is that majority of the literature on projects addresses countries including Jordan, Iran and China [Masadeh et al. \(2017\)](#); [Wei \(2017\)](#). [Wu \(2014\)](#) where the moderating effect of Organizational learning on KM and organisational performance has been examined and further research on impact of KM on Organizational performance has been suggested, which posits theoretical and practical implications of project based organizations in developing countries like Pakistan.

Therefore, this study will contribute significantly towards literature as well as towards research study in Pakistan for project based organizations. This study thus moves the field of project management forward by analyzing project based organizations in a non-Western context.

1.3 Problem Statement

Knowledge management has permeated project management in the purview of managing and organizing. Extensive literature has been produced highlighting increased interest of researchers in this domain. However, a number of aspects linked to KM are still not explored. On one side the study on the relationship between KM and project performance is a grey area, also mediating role of project based learning between KM and project performance is completely untouched.

Moreover, the moderating influence of intellectual capital (Human capital) on KM and project performance is still unexplored. To provide evidence in this domain (particularly KM, IC, Project based learning and project performance) is the necessity of the hour since this will provide the convincing grounds for the projects to deal with knowledge so as to drive them in a better way.

1.4 Research Questions

This research will answer the following questions:

Research Question 1

What is the importance of knowledge management?

Research Question 2

How knowledge management contributes to project performance?

Research Question 3

What is intellectual capital(human capital)? And what are the different elements/-components of intellectual capital(human capital)?

Research Question 4

Does project based learning plays a role mediator on the relationship of knowledge management and project performance?

Research Question 5

Does intellectual capital plays a role of moderator on the relationship of knowledge management and project performance?

1.5 Research Objectives for This Study

The broad objective of the study is to develop and test anticipated model to find out the relationship between knowledge management, project based learning and

project performance. Furthermore, project intellectual capital is added as the potential moderator for examining the relationship of the variables mentioned in the research model that is knowledge management, project based learning and project performance.

The specific objectives of the study are stated below:

Research objective 1

To explore the relationship between KM and project performance.

Research objective 2

To explore the relationship between KM and project performance through project based learning.

Research objective 3

To explore the moderating effect of project intellectual capital on the relationship of KM and project performance.

Research objective 4

To test empirically and establish the proposed relationships in the developmental projects of Pakistan.

1.6 Significance of the study

This study will be facilitating on one side by adding more theoretical content to project management and alongside will also be giving concrete evidence that how the performance of project based organization can be improved by adopting KM practices. The study also opens new aspects of KM to be studied further in detail. It will also help the development sector project based organisations of Pakistan to apprehend the significance of managing knowledge and intellectual capital in the projects effectively and efficiently.

Project based learning takes place within a project to keep up with modification issues occurring as a result of the changing environment. It circulates the knowledge within a project since the purpose is to use it in a dynamic learning atmosphere

rather than only storing in the electronic databases. Underlining this connotation and also that the top most priority of each project is to achieve high performance, this study will give direction and insight towards enhanced project performance through effective learning at all the levels of the projects.

Most of the time whenever a new project is launched or a second phase of the project is implemented, certain failures and setbacks are faced, this study will facilitate the project managers in realizing the importance of keeping the knowledge intact and how learning is vital for improving performance. This will also develop better understanding of the decision makers that growth of knowledge repository does not add to learning unless it is not absorbed and transferred, affecting the performance of the project consequently.

This study also highlights that knowledge is one of the key elements for the success of projects. Project performance will certainly improve when the management of knowledge and intellectual capital is ensured. This domain has not been explored yet in Pakistan; therefore it is going to be a great contribution in to the research arena alongside will also pronounce the value adding factors for augmenting the project performance and gaining competitive advantage. Moreover, this research work will encourage the researchers to further study these intangible assets that create values and competitive advantage for the projects.

1.7 Supporting theories

Several theoretical perspective have been presented by different researchers which are used worldwide to underpin the studies of knowledge management and project based learning like exchange theory, knowledge based theory, social power and Organizational support theory but social capital theory and social exchange theory can cover all the variables of the present study.

Social Exchange Theory

Social exchange theory, derived from economic exchange theory is focused on social behavior. It is one of the most dominant concept for understanding workplace

behavior. Homans (1958), came up with concept of social behavior based on exchange. He introduced the opinion that exchanges are not limited to material goods but also includes non-material that carries symbolic value like recognition, reward of prestige. When engaged in social behavior an individual expects the same valued things to be reciprocated from the other individual in order to balance the contributions from both the individuals involved in social exchange. Knowledge management can be regarded as a process in which the organizations leverage and extract value from their intellectual or knowledge assets. It is the composite of knowledge creation and sharing, these terms are interchangeably used to represent the concept of KM. KM is dependent on the interaction and communication between the individuals and the Organizational units.

Additionally organizational learning has adopted learning as behavioral change, knowledge is generated by structured process of organizational learning happening as a result of exchange between the individuals or teams, outcome is then managed by the processes of knowledge management [Spender \(2008\)](#). The availability of resources with both explicit and tacit knowledge and skills is the core part of an organizations intellectual capital therefore both applicability of both these forms should be ensured. Existence of these forms of knowledge is also the important factor for improving the performance of an organisation [Cook *et al.* \(1993\)](#). It offers a very valuable perspective for understanding and explaining the creation of intellectual capital and also supports in the development by affecting the conditions necessary for exchange and the combination or partnering of the individuals for exchange to occur [Nahapiet *et al.* \(1998\)](#).

Chapter 2

Literature Review

2.1 Knowledge Management

Knowledge management is defined as a systematic ongoing process of creating, applying, disseminating, renewing, and updating the knowledge for obtaining organizational objectives [Awad & Ghaziri \(2008\)](#).

Serrat (2009) conceptualized that Knowledge management is explicit and systematic management of processes enabling vital individual and collective knowledge resources to be identified, created, stored, shared, and used for benefit. Its practical expression is the fusion of information management and organizational learning.

O'Dell & Grayson (1998) elaborated the concept of Knowledge Management as a cognizant approach of acquiring the right knowledge to the right folks at the right time and facilitating people to share and exploiting and applying information that endeavors to improve organizational performance.

2.2 Intellectual Capital(Human Capital)

Stewart (1997) stated that intellectual capital refers to intellectual materials (e.g., knowledge, information, intellectual property, and experience) which can be formalized, captured and leveraged to give an organization a competitive edge by producing a higher-valued asset.

Bontis (1999) defined intellectual capital as a second order construct comprised of human capital, structural capital and relational capital.

Human capital refers to an employees ability to provide solutions for customers and creating innovation [Stewart \(1997\)](#).

2.3 Project based learning

Crossan, Lane & White (1999) abstracted organizational learning as a process that acquires and intuit knowledge at an individual level, creates further knowledge at a group level through interpretation, and captures it at an organizational level.

2.4 Project performance

Pollanen, Abdel-Maksoud, Elbanna & Mahama (2017) conceptualized organizational performance as a multifaceted notion. This has further been underlined by [Boyne & Gould-Williams \(2003\)](#) that there are multiple indicators alongside financial measures that is quality, service, cost and efficiency which capture the aspects of performance.

2.5 Knowledge management and project performance

The concept of knowledge management has emerged since 1990. Knowledge is the capability and aptitude of the people to renew and upgrade them in order to meet the evolving challenges and opening new opportunities. It is the product which is to be utilized in any organization for it continuous improvement [Almashari et al. \(2002\)](#).

Skyrme (2001) and Alavi & Leidner (2005), defined knowledge management as the management of key knowledge systematically, including the processes of knowledge creation, organization, dissemination and application.

Knowledge sharing is one of the most important functions of KM contributing greatly to the organizational performance Hansen (1999); Dyer *et al.* (2000) and also leading to creation of new knowledge and utilization of existing knowledge Nonaka & Takeuchi (1995).

Maier (2005) defined KM as the management function responsible for regular selection, implementation and evaluation of knowledge strategies that aim at creating an environment to support work with knowledge internal and external to the organization in order to improve organizational performance.

Knowledge is the most important asset that enhances organizational performance when the organizational strategy embeds knowledge acquisition and management resources Wiig (1997), alongside merely having a repository of experiences. It relies on the active systematic efforts extended by the organization in recognizing and capturing new knowledge Drucker (1993), since the organizations that have the ability to accrue and manage knowledge perform better than less focused firms Hart & Banbury (1994). Usage of KM process is thought to be a crucial activity that the organizations must follow to accomplish competitive advantage and for improving performance Kiessling *et al.* (2009); Birasnav (2014); Chen & Fong (2015).

Organizational performance is figured out from a comparison between the actual output achieved and the initially set targets. Moreover, it also provides a criterion for measuring the effectiveness and efficiency of the organizational goals being achieved. An organization and its human resource can be involved in multiple knowledge management process chains contributing to the organizational performance Adam (2017). The relationship between organizational performance and knowledge management has been studied a number of widely and a positive relationship between both has been found in a multiple studies Lee *et al.* (2005); Ahmed *et al.* (1999); Jain & Moreno (2015).

Studies indicate that a lot of emphasis has been paid on studying project based organizations ability to leverage knowledge and reusing knowledge across projects Pemsel *et al.* (2013). Knowledge is the critical resource of an organization and in project based settings, in order to avoid repetition of mistakes management

of knowledge (creation, organization, transfer) across the project serves as the opportunity to exploit and leverage the lessons learnt [Almeida et al. \(1999\)](#) consequently to improve project performance [Landaeta \(2008\)](#). It has been confirmed that the projects that have the learning element embedded in the organization be it the informal ways of knowledge sharing via seminars and staff meetings, this is considered as the major driver for improvement of organizational and project performance [Prencipe & Tell \(2001\)](#).

Recent studies underline that the systematic management of knowledge significantly contributes to the project performance [Wei \(2017\)](#). These findings and social exchange theory indicates that if knowledge management practices are introduced as an organizational best practice, its employees will engage more frequently in knowledge sharing and thus, the organization will enjoy higher performance. These lead to the following hypotheses:

H1: There is a positive association between knowledge management and project performance.

2.6 Knowledge management and project based learning

Knowledge management is a mechanism that creates and stores data in order to increase organizations response time and facilitates in enhancing its creativity and innovativeness by collection, storage and exploration of existing information [Dimitriades \(2005\)](#). Knowledge is considered to be most common thing in all the projects and is also a precondition for effective project management [Sankarasubramanian \(2009\)](#); [Gasik \(2011\)](#). Gasik (2011) presented a general definition of project knowledge management: Project knowledge management comprises processes that aim to generate, utilize, and distribute the micro-knowledge necessary for project execution and processes that are performed on the macro knowledge of

people at all organizational levels and that aim to increase the capabilities of direct or indirect participation of people in effective project execution or to increase their possibilities for influencing project execution.

Study conducted by [Arag?n-Correa et al. \(2007\)](#), suggests that organizational learning is a factor that influences knowledge management. Findings of another study further endorses that organizational learning has positive impact on knowledge management [Liao & Wu \(2010\)](#). Manufacturing firms are likely to be successful in terms of creating, storing, sharing and managing knowledge if they have a successful performance in terms of organizational learning [Noruzy et al. \(2013\)](#).

Organisational learning is an ongoing dynamic process built on information; it is cyclic in nature, moving in various levels of activity from individual to a mass level heading towards organisational level and back once more [Crossan et al. \(1999\)](#). The relationship between organizational learning and knowledge management has been defined in a number of ways, one of the perspective is that organizational learning is the facilitator of knowledge management [King \(2009\)](#). Another conceptualization is that OL is focused on process and KM pays attention on the content of knowledge acquired, created and utilized by an organization. From this point of view organizational learning is one of the ways to sustainably improve the utilization of knowledge [Easterby-Smith & Lyles \(2011\)](#). Hence, organizational learning comprises of processes of creating, retaining and transferring knowledge and has effects for the performance and competitiveness of organizations [Linda & Manpreet \(n.d.\)](#).

Huber (1991), suggested that an organisation learns if any of its units gains information that it perceives as possibly helpful for the organization. This idea was further endorsed by suggesting that effectiveness of an organization is critically dependent on its modes of acquisition and utilization of new sources of information [Nonaka \(1994\)](#).

In comparison to functional organization, project based organization is ideally appropriate for managing rising product complexity, dynamic markets, technology uncertainty and cross functional expertise requirements. It has been suggested that this type of organizational form is also very significant at integrating different

types of knowledge. (Hobday,2000).It is evident that previous studies endorse the effectiveness and the facilitation role of knowledge management and organizational learning, since the focus of present study is project based organization therefore same concept can be replicated in project based organisations. Therefore, knowing the significance of knowledge management for organizational learning in general organizational context, we argue that it should be significant for development sector projects also. In terms of project based organisations the concept of organisational learning will be termed as project based learning that is when knowledge management is applied successfully, it should enhance the project based learning of the projects.This leads us to our next hypothesis, which suggests that

H2: There is a positive association between knowledge management and project based learning.

2.7 Project based learning and project performance

Different perspectives about organizational learning exist in literature, one of them emphasizes that disseminating the knowledge has an impact on firms performance rather than only focusing on acquisition and storage into databases without its application Wong (2009). Slater and Narver (1995) suggested that OL is the process by which new knowledge or insights are developed by an organization. Sadi-Nezhad (2017), stated that one of the crucial concern for the success of any organization is to manage and handle the developments in technology to escalate their performance.

Results of study conducted by March (1991) suggest that possible impacts of learning within an organization can be comprehended in the changes occurring in the performance distribution. In addition, it is indicated that if learning does not essentially enhances both average performance and variability, however it does reduce the variation of performance rather than elevating it, because when the work procedures are standardized, methods and systems are learned, it has a

direct impact on reduction of variability both in terms of time needed to achieve a task and in the quality of task performance.

Studies depict that organizational learning is considered to be playing a pivotal role in enhancing the performance of project based organizations [Argote \(2011\)](#); [Wong \(2012\)](#); [Oztrk & Arditi \(2016\)](#). Individuals and teams are the key actors in project based organizations and firms performance is improved and enhanced by the practices of teams [Wong \(2009\)](#); [Bontis et al. \(2002\)](#). Marquardt (1996) states that an organization which learns powerfully and collectively and is continually transforming itself to better collect, manage, and use knowledge for success

Work of [Chaston et al. \(2001\)](#), indicated that the basis for performance improvement in SMEs is observed only when the organization competence has been developed from learning activities. Scholars accept the utilization of KM as part business process improvement [Linderman et al. \(2010\)](#) that is actually the organizational transformation heading towards improvement of business performance [Massingham et al. \(2017\)](#). Senge, (1990) has regarded OL as one of the strategic means for achieving organizational success. Organizational learning is effective if knowledge is retained and reused deliberately, thus making the organization a driving force for its development and sustainability [Smith \(2012\)](#); [Tam & Gray \(2016\)](#). Prior empirical studies conducted in this perspective also provides evidence that organizational learning has a positive and significant impact on entrepreneurial firms and performance [Zahra \(2012\)](#); [Eggers et al. \(2013\)](#).

Projects are involved in the development of new products and services, it can be anticipated that such organization dealing with projects implementation can build on good practices and lessons and also to further develop key competences, strengthen technology and also decreasing the project growth time. In the light of this, practice groups in projects which serve as the learning loci which provide effective and efficient solution to the organization for knowledge management and learning development in project based organization [Serrat \(2017\)](#).

Project based organizations like all other organizations have certain systems and processes in common, however studies that have been conducted so far validate

the positive effect of organizational learning on organizational performance in generalized way which means in organizations other than project based organizations Wang (2015); Csath (2012). Owing to the fact that projects are of temporary nature, the field of project based organizational learning remains the topic for detailed research Aerts *et al.* (2017). Based on this premise, we intend to find out the effect of project based learning on project performance whereby proposing that

H3: There is a positive association between project based learning and project performance.

2.8 Mediating role of project based learning between knowledge management and project performance

In the current uncertain dynamic environment, organizations need to keep learning in order to sustain success and organizational learning develops based on structured knowledge in organizations Nonaka & Takeuchi (1995). Liao & Wu, (2010) argued that KM is an input and organizational learning is a process and a significant relationship between both the variables exists. Furthermore highlighting that implementation of KM process develops learning proficiencies of individual employees and teams in any kind of organization. Knowledge is the crucial source for organizations persistent competitive advantage and also for retaining the existence in the knowledge based and evolving high technological businesses. Based on this justification, this phenomenon is emerging as a very important research area in which knowledge management, organizational learning and intellectual capital provide the platform for understanding the complex phenomena of organizational technological advantage de Castro & G. (2015) . It has been suggested that integration and implantation of knowledge is the most important element in knowledge management and organizational learning study Argote *et al.* (2003). Knowledge

implantation occurs when, it is completely transferred into the organizational work practices [Cranefield & Yoong \(2009\)](#).

Besides other critical topics under discussion now days, issue of performance is also one of them for the organizations to remain in market. Organizational performance is considered important equally for both academicians and experts [Liao & Wu \(2009\)](#). Moreover linked to this, studies indicate that KM appears to be an important factor significantly related to organizational performance [Lim et al. \(1999\)](#); [Grimaldi et al. \(2008\)](#); [Heisig et al. \(2016\)](#); [Garcia \(2017\)](#).

It has been found that most of the organizations are running their business operations via projects [Kerzner \(2002\)](#) and projects have become an significant approach to structure work in most organizations [Bakker \(2010\)](#). Therefore, when the organizations further split into project teams, knowledge management becomes necessarily important [Hanisch et al. \(2009\)](#); [Kang \(2007\)](#). Similarly, learning in projects setting is of utmost importance for the project success both in terms of project performance and project teaching [Arthur et al. \(2001\)](#). However, it has been concluded that only a small number of project based organizations have systems in place for identifying and transferring knowledge from past to future relevant projects [Hanisch et al. \(2009\)](#); [Kang \(2007\)](#). Therefore, continuous learning and development has been considered as the foundation stone in context of project management development [Williams \(2007\)](#). Studies conducted by studies by [Barber & Warn \(2005\)](#); [Quigley et al. \(2007\)](#) confirm that KM has a positive influence on project performance. Also the impact of learning practices on project performance has been observed in quality and operational management [Arumugam et al. \(2013\)](#); [Reich et al. \(2012\)](#). General criteria for measuring the success of a project is linked to time, cost and quality [Archer \(1999\)](#) and the most renowned project performance metrics are associated to gathering and correlating the planned schedule and cost at the completion of the project [Gray \(2001\)](#); [White \(2002\)](#).

Based on the previous studies it can be figured out that KM and organizational learning are pointed out as among the key factors for improving and enhancing organizational performance [Birasnav \(2014\)](#); [Heisig et al. \(2016\)](#). It is also

concluded that knowledge management in project setting is an inadequately investigated topic in project management. We build on the premise that KM will improve project performance provided project based learning is there. Therefore, on the basis of the findings of the previous studies we anticipate to test the following hypothesis.

H4: Project based learning plays a mediating role between knowledge management and project performance.

2.9 Moderating role of intellectual capital between knowledge management and project performance

Masoulas, (1998) defined IC as all intangible assets that contributed to enhancing organizational performance, including employee skills, experience and attitude.

IC is classified into human capital, structure capital and customer capital respectively. Stewart (1997) suggested that human capital is the organizations only source having the capability to think and particular merits for human capital [Hormiga et al. \(2011\)](#); [Cabello-Medina et al. \(2011\)](#); [Kianto et al. \(2017\)](#) in playing a vital role in improving firms performance have been found. Human Capital includes employee competence, attitudes, intelligence [Roos et al. \(2001\)](#) as well as their psychological quality, cultural literacy and the abilities to develop the inbuilt creativity for devising the solutions to the problems [Brooking \(1996\)](#).

Roos, Bainbridge & Jacobsen (2001) suggested that the concept of IC goes beyond the phenomenon of having resources in place but also on the ability of the organization for transforming one resource to another for value creation. Studies confirm that despite being considered as another dimension of IC, human capital is thought to be the most vital impalpable resource of an organization [Marr & Roos \(2005\)](#). It plays a fundamental role in the evolving knowledge based economy [Sveiby \(2002\)](#) and is also the driving force of the other dimensions of IC: relational and structural capital.

A substantial correlation between firms performance outcomes and its overall IC has been identified including improvements in financial performance [Youndt \(2004\)](#) and in innovation performance [Wu \(2008\)](#) . The relationship between IC and performance is becoming a famous subject for in depth study, IC including human capital considerably affects the organizational performance as an important value contributor to performance [Vargas \(2017\)](#); [Xu \(2017\)](#); [Urban \(2017\)](#) . The prerequisites for the capacity development of talented employees lie with the existence of good organizational culture, structure and learning [Xu \(2017\)](#).

[Stahle & Hong, \(2002\)](#) state that intellectual capital management is concerned with grasping and valuing an organizations knowledge capabilities; knowledge management, in contrast, is concerned with the capability of an organization to transform knowledge into added value.

Past studies pertaining to the effects of knowledge management, IC and global performance are not substantial, though the studies that have been conducted prior do validate that KM provides framework to manage IC whereby converting IC into values [Jih et al. \(2005\)](#); [Shih et al. \(2010\)](#). The scope of IC management and knowledge management is immense and has an impact on almost all the functions of an organisation [Wiig \(1997\)](#). The results of study conducted by [Ling, \(2013\)](#) suggest that if the KM strategy and IC are properly aligned this together will enhance the organizations performance globally also. [Cabello-Medina, Lpez-Cabrales and Valle-Cabrera, \(2011\)](#) indicated that it is the distinctiveness of human capital which has a direct and significant impact on innovativeness which improves firms performance. Also social capital can be increased by recruiting individuals with exceptional learning tendency and interpersonal skills. IC and Knowledge are the most important assets of an organization and its importance has been realized also, contributing towards organizational success. However it can only be significant if they are renewed regularly and utilized effectively [Wiig \(1997\)](#).

Studies indicate that the emphasis on these variables have been in context of organizations other than project based organizations. Also the moderating effect of IC on KM and organizational performance has not been studied as yet. Since

project based organizations are to be further explored in context of these variable based on the fact that PM is evolving at a very fast pace with human capital and KM playing a critical role in the improvement of project performance. Based on this premise we argue that KM coupled with human capital should have a positive effect on project performance. This proposition forms the basis for our next hypothesis:

H5: Intellectual Capital (Human Capital) moderates the relationship between KM and project performance; such that if IC is there than the relationship between KM and Project performance would be strengthened.

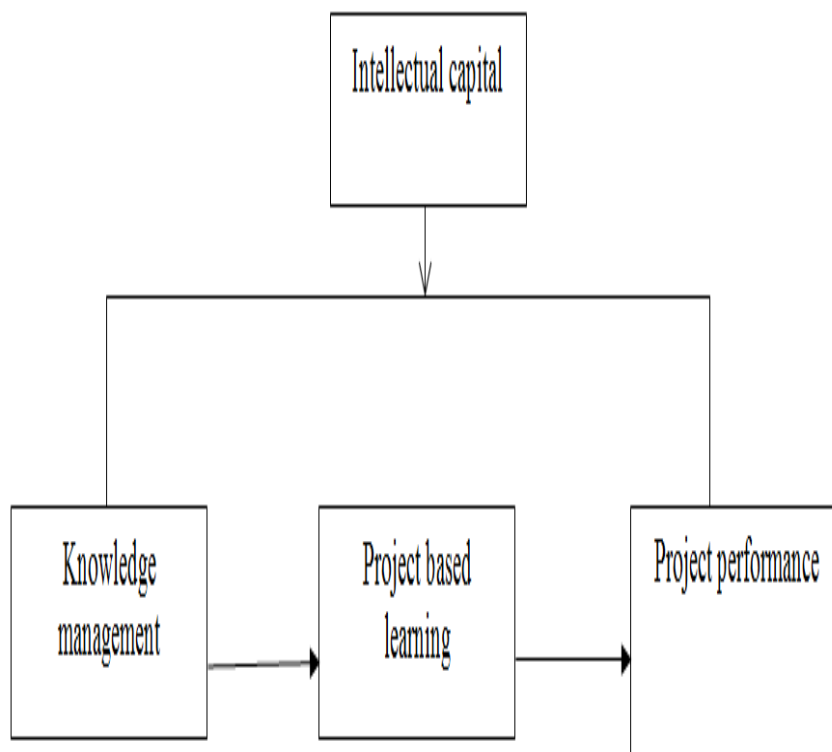


FIGURE 2.1: Research Conceptual Model of KM impact on project performance through project based learning: Moderation of Intellectual capital.

2.10 Summary of Proposed Hypothesis of the Study

H1: There is a positive association between knowledge management and project performance.

H2: There is a positive association between knowledge management and project based learning.

H3: There is a positive association between project based learning and project performance.

H4: There is a mediating role of project based learning between knowledge management and project performance.

H5: Intellectual capital (Human Capital) moderates the relationship between KM and Project performance.

Chapter 3

Research Methodology

This chapter contains detail about all the procedures and methods applied in this research to get the authentic results. The discussion includes details regarding design of research, population, sampling techniques, sampling characteristics, instruments and reliability of all the variables and items involved in this research.

3.1 Research Design

3.1.1 Type of the Study

This study is used to highlight the impact of knowledge management on the performance of project, for this co-relational study has been used in this research. In this regard, project based organizations of Pakistan have been targeted to get the required data needed to get the authentic results. Initially 350 questionnaires were set as a target but 276 genuine responses were collected. The sample that was selected for this research is assumed to represent the whole population of Pakistan. This will help to generalize the results from the sample statistics that will likely to be exhibited by the whole population of Pakistan.

3.1.2 Research philosophy and quantitative research

This research is following the hypothetical deductive research method which is based on determinism philosophy, in which previous research and existing theories were employed to demonstrate and support our hypothesis which will then be tested empirically for verification of the proposed hypothesis. The hypothetical-deductive model or method is a anticipated description of scientific method. According to this method, scientific inquest initiates by framing a hypothesis in a way that could credibly be falsified by a test on visible data. A test that runs antagonistic to forecasts of the hypothesis is taken as a falsification of the hypothesis. A test that does not run antagonistic to the hypothesis substantiates the theory. It is then proposed to compare the descriptive value of competing hypotheses by testing how strongly they are authenticated by their predictions.

As to reach a large scale of population, generally quantitative methods are used and valued. Hence, in this research quantitative research has been utilized in order to collect the quality data for the purpose of associating variables to each other and for demonstrating the nature of relationship between the variables used in the research.

3.1.3 Unit of Analysis

Generally unit of analysis is the most important characteristic in any research study. In research study, unit of analysis can range from an individual to different groups, organizations, cultures etc. Since this study is designed on dyadic relationship i-e., the impact of knowledge management practices in projects on its performance, therefore the unit of analysis were the employees of project based organizations.

In order to assess the impact of knowledge management in project through learning amongst employees, study needed to approach the specific sector of project based organization which basically required and promoted knowledge management in their projects under affective presence of the project based learning. To assess the

performance of the projects the stakeholders who eventually benefited from the projects were taken as the unit of analysis.

3.1.4 Population and Sample

Since the present study seeks to focus on the developmental sector projects in Pakistan, the population of the study is the managers, subordinates and the stakeholders (end-users) of this sector. For the current study, data were obtained from ten project based organizations operating in Islamabad, Rawalpindi, Lahore and Karachi. These include both National level and international level project based organisations, running various projects in the field of infrastructure, healthcare, education, energy, hydropower, social services etc. These projects include capacity building of personnel, reforming of technical and vocational education and basic education, saving the children, facilitating the migrants and the returnees back in the country, establishment of hospitals and centers of excellence for teacher and youth trainings, providing medical services and much more. There were 40 projects under these programs and the data is collected from the project teams and the relevant stakeholders of the projects.

3.1.5 Sample and sampling technique

Being mindful of the fact that it is generally difficult to collect data from the entire population due to certain constraints for instance limited time and resource scarcity. Sampling is the commonly used procedure for data collection. For this, a specific group of people are chosen that are the true representatives of the whole population. For the present study, generally, only project based organizations of Pakistan were approached. Almost 40 different projects of ten project based organisations were being approached and the data was collected.

The data on independent variable (i.e., knowledge management), moderator (Intellectual capital) as well as the mediating variable (i.e., project based learning) were reported by the projects core team members who had a direct impact on the

project performance, including the project leaders, team leaders, and advisors/-experts. However, support staff was excluded from this group.

The data on project performance has been obtained from key stakeholders i.e., the customers who are the end users of the product or service being produced by the project. The sample mainly consists of managerial and operational level of different organizations and also the counterparts who actually benefited from the project.

Almost four hundred project managers and teams were approached for data collection; however, 276 complete responses were received where 80 responses were purely from the stakeholders/customers on project performance. For reporting purposes, the data on project performance obtained from customers were merged and described as averages, which indicated that no threat of common method variance exists. The convenience sampling technique was used due to time limitations. Convenience sampling is one of the techniques of non-probability sampling technique, in which data is collected randomly based on the feasibility to collect data effectively. Hence, Convenience sampling is the most appropriate technique to be used in this research because through this technique data can be collected from the project based organizations of Pakistan randomly, that will depict the most genuine picture of the whole population in demonstrating the impact of affective presence of knowledge management on project performance through project based learning and intellectual capital.

The cover letter unequivocally demonstrated that the examination is being led for scholastic research purposes just and is gone for giving clear comprehension of KM and project based learning and some different elements influencing the project performance. Respondents were guaranteed of the privacy of their reactions and namelessness so the respondents don't hesitate to fill in the survey decisively.

3.2 Sample Characteristics

The demographics considered in this study are; project managers and employees age, their dynamic experience in the project based organizations and information

linked to gender and qualification. As it was a dyadic relationship, two different questionnaires were made; one to be filled by the project team (project managers, experts/advisors) only and one to be filled by the stakeholders only.

Sample characteristics details are elaborated as follows:

a) Gender of Respondents

Gender is an element which remains in highlights for the purpose to maintain gender equality, so it is also considered as the important element of the demographics because it differentiates between male and female in a given population sample. In this study, it has been tried to make sure the privilege of gender equality but still it has been observed that ratio of male managers is considerably greater than the ratio of female managers, it includes the consolidated information as that of stakeholders also.

Table 3.3 depicts the ratio of male and female respondents. It is evident that among respondents 56.9% were male and 43.1% were female.

TABLE 3.1: Gender distribution.

Gender	Frequency	Percent
Male	157	56.7
Female	119	43.3
Total	276	100

b) Age of Respondents

Age is considered as one of the demographics, to which respondents sometimes feel uncomfortable to disclose openly. So, for the convenience of respondents, scale/range was used to collect information regarding their age.

It has been shown in Table 3.2 among respondents 52% were having age ranging between 26-33, 32.2% were having age ranging between 34-41, 7.3% respondents were having age ranging between 42-49, while 6.2% were having age ranging between 18-25 and only 1.8% of the employees were having age range of 50 or above

c) Experience of Respondents

TABLE 3.2: Age distribution.

Age	Frequency	Percent
18-25	17	6.2
26-33	145	52.7
34-41	89	32.2
42-49	20	7.3
50 and above	5	1.8
Total	276	100

Again to collect information regarding the experience of the respondents, different ranges of experience time period were developed so that every respondent can easily indicate the specific tenure of their experience in the relevant field of projects.

It has been shown in Table 3.3 that most of the respondents were having an experience ranging between 05-10 years, which depicts that 51.3% respondents were having experience between the range 05-10 years, 35.5% respondents were having experience ranging between 11-16 years, 10.9% respondents were having experience ranging between 17-22 years, 0.7% respondents were having experience ranging between 23-28 years, 1.1% of respondents were having experience ranging between 29-35 years and only .7% were having experience from 36 and above years.

As experience includes gaining knowledge about new procedures and ideas to bring creativity in the tasks, experience is considered as one of the most effective demographics which contribute too much towards the knowledge management and knowledge sharing domain for the success of the creative and innovative projects.

TABLE 3.3: Experience distribution.

Experience	Frequency	Percent
05-10	141	51.3
11-16	98	35.5
17-22	30	10.9
23-28	2	.7
29-35	3	1.1
36 and above	2	.7
Total	276	100

d) Qualification of Respondents

Education is the major element which contributes towards the prosperity of the whole Nation and it is also the basic need of the hour to compete globally. Hence after gender, qualification/education is another vital dimension of the demographics. Education opens up many new and unique paths for success and creativity in order to gain competitive advantage amongst all the other countries around the globe. Probably education plays an important role in demonstrating creativity and innovation in project tasks by facilitating the effective knowledge management.

It has been shown in Table 3.4 that most of the respondents were having qualification of Master, which comprises 60.1% of the total respondents chosen as the true representative sample of the whole population. 21.5% were having qualification of Bachelor, 17.5% respondents were having qualification of MS/M.Phil. and 1.1% of the respondents were PhD amongst the 276 respondents.

TABLE 3.4: Qualification distribution.

Qualification	Frequency	Percent
Matric	0	0
Bachelor	59	21.5
Master	166	60.1
MS/M.Phil.	48	17.5
PhD	3	1.1
Total	276	100

3.3 Instrumentation

3.3.1 Measures

The data was collected through adopted questionnaires from different authentic sources. Almost 50-60 questionnaires were distributed in each project based organization that have been visited during questionnaire distribution period. Questionnaires were also distributed online to the websites of project based organizations for the quick response. Past researches indicate that, online collection of data is

the more expedient way of data collection, as respondents find it more easier to fill the questionnaires in contrast to the process of filling questionnaires by paper-pen method and regardless of data collection approach, there is no substantial effect on the quality of data while utilizing any of the two aforementioned methods [Church et al. \(2001\)](#).

According to the nature of research, items included in the questionnaire that is knowledge management, project based learning, intellectual capital focusing on human capital was filled by the employees/subordinates(project teams) and project performance was filled by the stakeholders of the projects. All the items in the questionnaire were responded to using a 5-points Likert-scale where 1 (strongly disagree) to 5 (strongly agree), unless otherwise stated. Questionnaires also cover demographic variables like Gender, Age, Qualification and Experience.

400 questionnaires were distributed in total but only 300 were received. But the actual numbers of questionnaires used for the analysis of data for demonstrating the results were 276. The discarded questionnaires out of 300 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.

a) Independent Variable:

Knowledge Management (KM): 5-item scale developed by [Kearns & Sabherwal \(2006\)](#) was adopted on organizational emphasis on KM. Two of these items reflect the organizations attitude towards knowledge and knowledge management processes. The other three items indicate the manifestation of such emphasis on knowledge management within the organization; individuals in an organization that emphasizes knowledge management would have access to the organizations knowledge as well as to processes for identifying and exploiting the organizations knowledge. The responses were obtained through 5 point Likert scale ranging from 1= Strongly disagree to 5= Strongly agree.

b) Moderating Variable:

Intellectual Capital (Human Capital): The intellectual capital tool developed by [Subramaniam *et al.* \(2005\)](#) was adopted with specific focus on human capital component. The responses were obtained through 5 point Likert scale ranging from 1= Strongly disagree to 5= Strongly Agree. The items of the scale are Our employees are highly skilled., Our employees are widely considered the best in our industry., Our employees are creative and bright., Our employees are experts in their particular jobs and functions. and Our employees develop new ideas and knowledge.

c) Mediating Variable:

Project based learning/Organizational learning (PBL): A four item scale was used to assess practices of project based learning/organizational learning, developed by [Wong \(2012\)](#). The rating scale ranged from 1=Strongly disagree to 5= Strongly Agree. The items are Working (and considering corrective actions if required) under a set of clearly identified project goals, Referring the firms 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.

d) Dependent Variable:

Project Performance (PP): To analyze project performance short scale developed by [Aladwani \(2002\)](#) was adopted, based on the literature review seven factors are considered. The responses will be obtained by the Managers through 5 point Likert scale ranging from 1= Strongly disagree 5= Strongly Agree so as to gauge whether a project produces high quality deliverables in an efficient manner. The respondents are asked to rate how strongly they agree or disagree with seven statements with respect to their recently completed project: efficiency of operations, adherence to schedules, adherence to budgets, amount of produced work, quality of produced work, effectiveness of interactions with consultants and ability to meet its goals.

TABLE 3.5: Instruments.

Variable	Source	Items
Knowledge Management	Kearns & Sabherwal (2006)	5
Project based learning	Wong & Cheung & Yiu & Hardie (2012)	4
Project performance	Aladwani (2002)	7
Intellectual Capital	Subramaniam & Youndt (2005)	5

3.4 Statistical Tools

IBM AMOS was used to analyze the measurement models. The models were tested through fit statistics. These statistics include multiple indices, for example, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA).

Goodness of Fit Index (GFI) states the absolute fit for the measurement model Gefen *et al.* (2000). GFI defines the degree of variance and covariance proportion Raykov & Marcoulides (2000). The range of GFI lies between 0 and 1 while for good model fit, value should be close to 1. Value above 0.80 indicates acceptable fit whereas below 0.80 indicates poor model fit that is the evidence of rejection.

Adjusted Goodness of Fit Index (AGFI) is the index associated to GFI. AGFI adjusts the value of GFI according to degree of freedom Byrne (2001). The anticipated range of AGFI also lies between 0 and 1. Value should be close to 1 for good model fit while the value lying below 0.80 indicates poor model fit whereas above 0.80 is acceptable fit.

Comparative Fit Index (CFI) index undertakes that all latent variables are not correlated (null/independence model) and compares the sample covariance matrix with this null model. The designed range of CFI lies between 0 and 1 and value should be near to 1 is for good model fit. Value above 0.90 indicates acceptable fit whereas below 0.90 indicates poor model fit. Root Mean Square Error of Approximation (RMSEA) estimates model goodness with population co-variance matrix Byrne (1998). Different authors have suggested different threshold values of RMSEA. Schumacker and Lomax (2004) indicated that the value for RMSEA should be less than 0.05 and this value represents the best model fit. Whereas, Hu &

Bentler (1999) recommended the calculated range of RMSEA should be between 0.06–0.08, while MacCallum *et al.* (1996) stated that the value equal to 0.10 or below 0.10 is considered acceptable.

Firstly, the measurement model was tested and Confirmatory Factor Analysis was done on the basis of fit statistics criteria.

3.4.1 Measurement Model

Confirmatory Factor Analysis (CFA) approach was followed for validating the measurement model Anderson (1988), which consisted of four latent variables: knowledge management, project based learning, intellectual capital and project performance. The combination of different fit indices: model chi-square, incremental fit index (IFI), Tucker-Lewis index (TLI), comparative fit index (CFI) and root mean square error of approximation (RMSEA), was used to assess the model fit.

3.4.2 Confirmatory Factor Analysis for each Latent Variable

a) Independent Variable:

Knowledge Management (KM): The first variable of the study was Knowledge Management coded as KM that included 5 items in scale. The factor loading of this scale was KM1 = 0.68, KM2 = 0.65, KM3 = 0.84, KM4 = 0.79 and KM5 = 0.63. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indices showed values that were on acceptable criteria, for example, GFI = 0.99, AGFI = 0.96, and RMSEA = 0.04.

a) Mediating Variable:

Project based learning (PBL): Project based learning coded as PBL that included 4 items in scale. The factor loading of this scale was PBL1 = 0.82, PBL2 = 0.71, PBL3 = 0.69, and PBL4 = 0.73. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indices

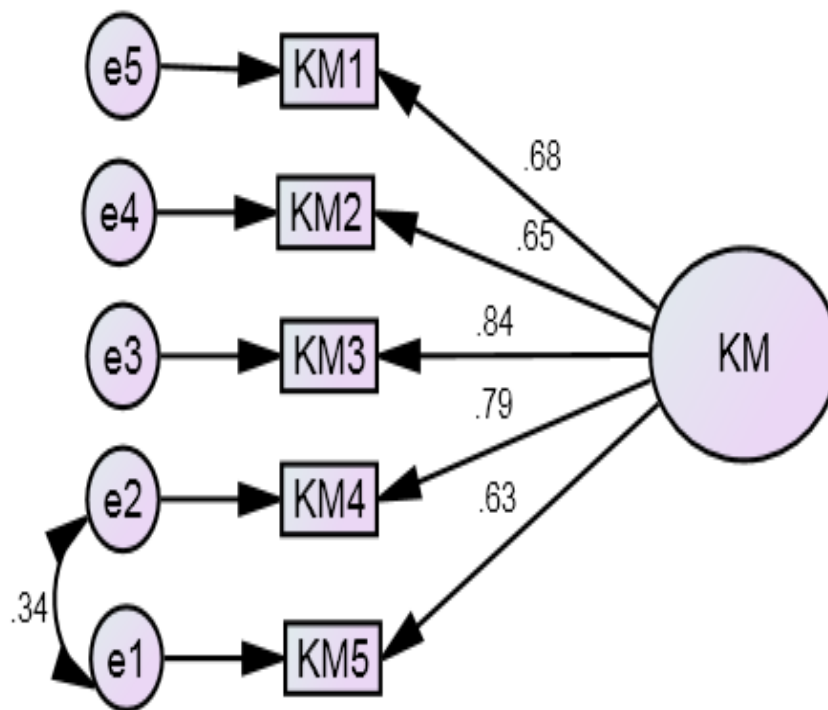


FIGURE 3.1: CFA for Knowledge Management.

showed values that were on acceptable criteria, for example, GFI = 0.99, AGFI = 0.97, and RMSEA = 0.03.

a) Dependent Variable:

Project Performance (PP): Project Performance coded as PP that included 7 items in scale. The factor loading of this scale was PP1 = 0.83, PP2 = 0.64, PP3 = 0.83, PP4= 0.71, PP5=0.73 , PP6= and PP7=0.77 . This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indices showed values that were on acceptable criteria, for example, GFI = 0.95, AGFI = 0.91, and RMSEA = 0.09.

a) Moderating Variable:

Intellectual Capital (Human Capital): Intellectual Capital coded as IC that included 5 items in scale. The factor loading of this scale was IC1 = 0.68, IC2 = 0.65, IC3 = 0.84, IC4= 0.63 and IC5=0. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indices

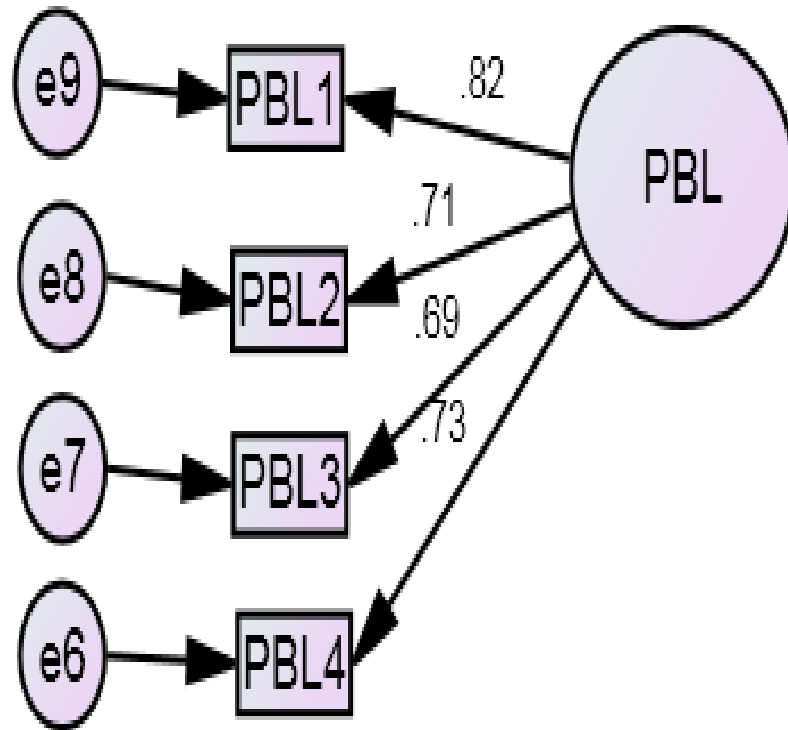


FIGURE 3.2: CFA for Project Based Learning.

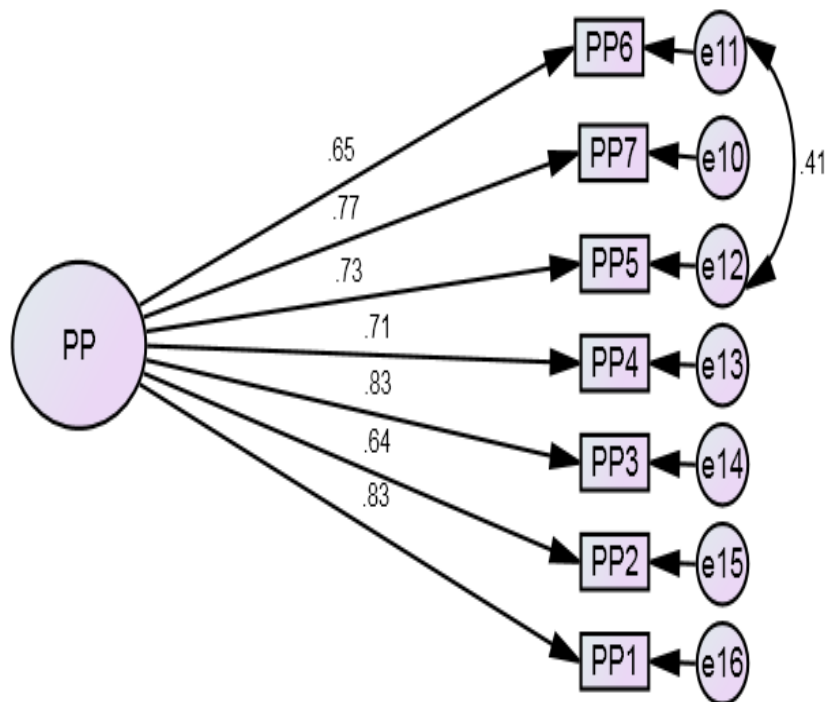


FIGURE 3.3: CFA for Project Performance.

showed values that were on acceptable criteria, for example, GFI = 0.99, AGFI = 0.96, and RMSEA = 0.04.

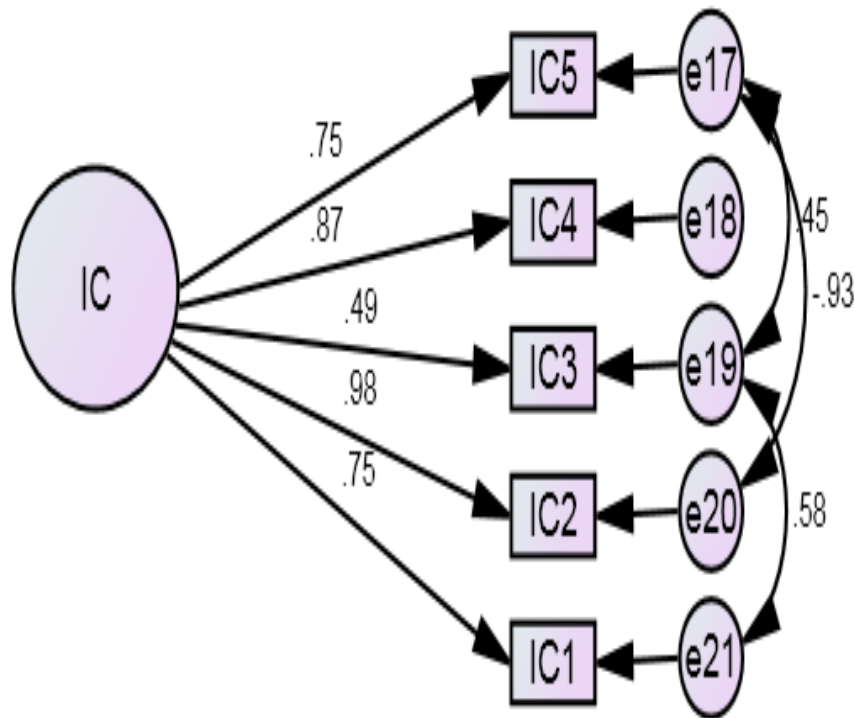


FIGURE 3.4: CFA for Intellectual Capital (HC).

a) All Latent Variables:

Confirmatory Factor Analysis for all Latent Variables: The measurement model provided an excellent fit to the data over the alternative models (/df=3.5, IFI=0.884; TLI=0.86; CFI=0.88; RMSEA=0.09) shown in table 4.1 The aforementioned results of CFA demonstrated that four-factor model had satisfactory discriminate validity. Moreover, the results show that all the items loaded significantly on their particular latent factors, the factor loadings range from 0.65 to 0.99. The satisfactory level of testing recommended by Thompson (2000) is 0.05 (ideal) for RMSEA however 0.09 (average) may also be acceptable. CFA for complete model is shown in figure 6.

Table 3.6 Measurement Model

*P>0

TABLE 3.6: Measurement Model.

Model	Factors	X	Df	RMSEA	IFI	TLI	CFI
Baseline hypothesized model	Four factors	624.08***	178	.09	0.884	0.86	0.88

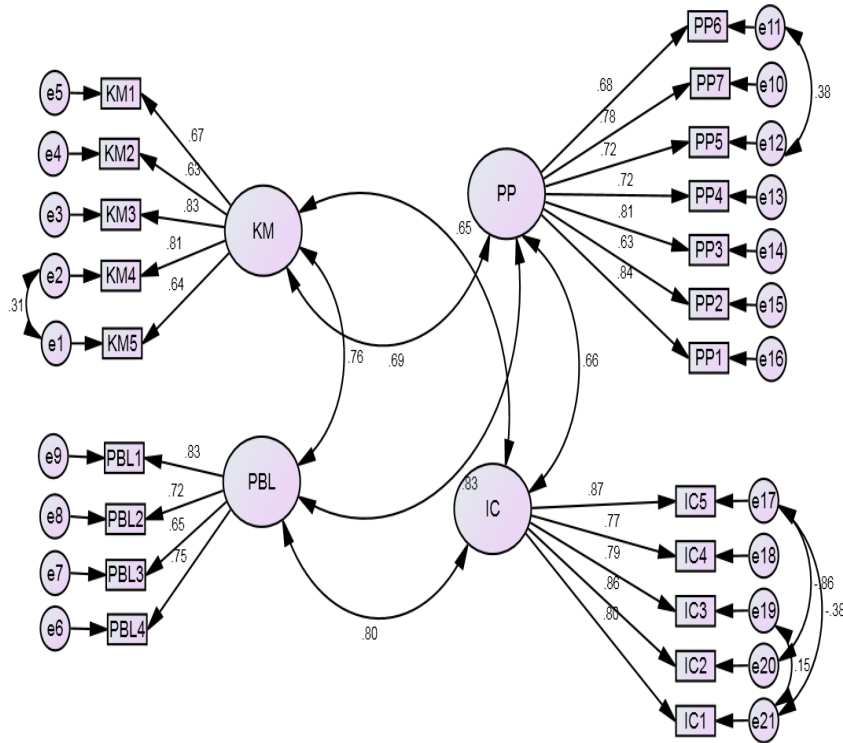


FIGURE 3.5: CFA for complete model.

After conducting CFA, single linear regression was carried out in order to study the casual relationship between the independent variable that is knowledge management and dependent variable that is Project performance. Regression analysis is generally used when we have to study the impact of multiple factors on the dependent variable under the study. Regression analysis will make it assure that the previous study regarding the variables is still supporting the acceptance or rejection of the proposed hypothesis or not.

Then for further analysis three steps of Preacher and Hayes (2004) were used. In these three steps, first we have to put our dependent variable i-e Project performance in the outcome column, then our independent variable i-e Knowledge management in the IV column and after that we have to put all the demographics in covariant column. Along with all these steps we have to choose our Model number, as we have to perform both mediation and moderation through Preacher and

Hayes we have to separately perform the analysis both for mediation and moderation by selecting model 1 for moderation and model 4 for mediation respectively for both analyses.

3.5 Pilot Testing

Before going to perform something on a larger scale it would be a very proactive and effective approach to conduct a pilot testing for it, as it will avoid many risks related to wastage of resources and time. Hence, Pilot testing of almost 30 questionnaires were carried out in order to validate, whether results are familiar and in line with the proposed hypothesis or not. After conducting the pilot testing it was concluded that there was no significant problem in the variables and the scales were absolutely reliable for the pilot study conducted.

3.6 Reliability analysis of scales used

Reliability is referred to a process of giving same consistent results over and over again when the specific item is being tested over number of time, same is for the scales. Reliability of scale depicts the ability of the scale to give consistent results when it is being tested for number of times. I have conducted reliability test through Cronbach alpha, it tells about the internal reliability of the variables and tells about if those variables have a link between them or nor along with that it also measures the single construct. Significant range for Cronbach alpha is 0 to 1. Higher the value of cronbach alpha, the reliability of the scale to measure the construct it is meant to measure is also higher. Scale is considered reliable when the value of alpha above 0.7 and it is less reliable in measuring the selected set of construct when the value is below 0.7.

In Table 3.7, the Cronbach alpha of the scales used in data collection are shown. The values of cronbach alpha for the variables under research are above 0.7. All the items having values 0.8 shows that these scales are highly reliable to be used in this study according the context of Pakistan.

TABLE 3.7: Scale reliabilities.

Variables	Cronbachs Alpha	Items
Knowledge Management	0.855	5
Project based learning	0.849	4
Project performance	0.909	7
Intellectual Capital	0.902	5

3.7 Data analysis techniques

After the collection of the data that is relevant to the study from 276 respondents, the data was then analyzed on SPSS software version 20. 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 questionnaire 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 the numerical values.
5. Confirmatory Factor Analysis (CFA) was used to justify the measurement model.
6. Reliability of all the variables was checked through Cronbach coefficient alpha.
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 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 knowledge management and project performance, the mediating role of project based learning and the moderating role of intellectual capital; 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. Basically correlation analysis does not entail relationship 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 exist no relationship between the understudied variables. Positive and negative sign depicts the nature of the relationship, if the sign is positive that means increase in one variable causes 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 increase in one variable will cause decrease in another variable and that would be an indirect relationship.

The above table shows the mean, standard deviation and correlation between the variables that are being studied under this study. And the values of correlation are depicting the nature and magnitude of relationship between the variables.

Knowledge management has a mean of 3.4594 with a standard deviation of .81188. The mean of Project performance is 3.7257 whereas standard deviation is .69080. Project based learning which acts as a mediator between Knowledge management and project performance has a mean value of 3.6042 and a standard deviation of value .78438. Intellectual Capital (Human Capital) which acts as a moderator between knowledge management and project performance has a mean value of 3.4674 whereas standard deviation is .75853 The Correlation Findings according to the 4.1 are as following:

TABLE 4.1: Correlation Analyses

Variables	1	2	3	4
Knowledge Management	1			
Intellectual Capital(Human Capital)	.588**	1		
Project Based Learning	.610**	.701**	1	
Project Performance	.571**	.646**	.723**	1

$P < .001^{***}, p < 0.05^{**}, p < .01$

Correlation table shows that there is a positive and significant relationship between knowledge management and project performance, where $r = .571^{**}$ at $P_i 0.01$. It can be seen from the table given above that knowledge management has a positive relationship with project based learning, where $r = .610^{**}$ at $P_i 0.01$. It was seen that at $r = .588^{**}$ at $P_i 0.01$, knowledge management has a significant relation with the intellectual Capital (HC).

There is a positive relationship between project performance and project based learning, where $r = .723^{**}$ at $P_i 0.01$. A positively significant relationship exists between project performance and Intellectual capital (HC), where $r = .646^{**}$ at

P; 0.01. project based learning and intellectual capital also has as a significant positive relationship, where $r = .701^{**}$ at P; 0.01. Since high correlation values were high as indicated in aforementioned table, therefore a variance inflation factor (VIF) was being conducted for analyzing the chances for multicollinearity. Multicollinearity is a condition where very high inter-correlations among the independent variables exists. Therefore, it depicts disturbance in the data, and if it is present in the data the statistical inferences made about the data may not be reliable. Therefore, so as to validate this condition, multicollinearity test that is variance inflation factor was conducted. Hair, Ringle and Sarstedt (2011) suggested that there exists a collinearity problem if the value for variance inflation factor is greater than 5, the results indicated VIF for KM is 1.7, HC is 2.1 and PBL is 2.2, which demonstrates that the maximum value of variance inflation factor was 2.2, which validated that collinearity was not the area of concern for this study.

4.2 Regression Analysis

To analyze the existence of 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 relationship between variables through an inadequate support and doesnot tells 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.

In this study, Preacher and Hayes (2004) methods have been used for both mediation and moderation regression analysis. Moderation regression analysis is conducted to examine the interaction effect of knowledge management and project performance. Like-wise mediation regression analysis was conducted to examine the mediation effect of the mediator project based learning on the relationship of knowledge management and project performance. Model 1 for moderation and

Model 4 for mediation is used in Preacher and Hayes (2004) process, both for mediation and moderation are conducted separately.

From 4.2, it is concluded that knowledge management has a direct positive and significant relationship with the project performance, hence the un-standardized regression co-efficient indicates that ($B = .49$, $t = 11.43$, $P = .00$), the results in the above table provides strong justification for the acceptance of hypothesis. So the hypothesis H1 i-e There is a positive association between knowledge management and project performance is accepted. Results also shows that there is a positive and significant relationship between knowledge management and project based learning as indicated by un-standardized regression co-efficient ($B = .60$, $t = 12.78$, $P = .00$), hence the hypothesis H2 i-e There is a positive association between knowledge management and project based learning is accepted.

It is predicted from the table given above that project based learning and project performance also have a significant relationship between each other. Evidence is provided through the un-standardized regression co-efficient as ($B = .52$, $t = 11.56$, $P = .00$) and from these values it is concluded that H3 i-e There is a positive association between project based learning and project performance is totally accepted.

Results indicates that project based learning mediates the relationship between knowledge management and project performance, as the indirect effect of knowledge management on project performance through project based learning has the upper and lower limits of 0.23 and 0.42 and does not contain zero in the bootstrapped 95% confidence interval, thus it is concluded that the hypothesis H4 i-e There is a mediating role of project based learning between knowledge management and project performance. is accepted.

Table 4.2: The mediating effect of project based learning between knowledge management and project performance

Note. Un-standardized regression coefficient stated. Bootstrap sample size 5000. LL =lower limit; CI = confidence interval; UL = upper limit.

N=276, Control variables were, Gender, Age, Experience and Qualification, * $P < .05$; ** $P < .01$

TABLE 4.2: The mediating effect of project based learning between knowledge management and project performance.

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Knowledge management →Project performance	0.49	.04	11.43	.00
Knowledge management →Project based learning	0.60	.04	12.78	.00
Project based learning →Project performance	0.52	.04	11.56	.00
	LL 95% CI	UL 95% CI		
Bootstrap results for indirect effect	.23	.42		

Table 4.3: The moderating effect of intellectual capital (HC)

TABLE 4.3: The moderating effect of intellectual capital.

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Int_term → Project performance	-0.17	.04	-3.5	.00
	LL 95% CI	-.26	UL 95% CI	-.07

Note. Un-standardized regression coefficient stated. Bootstrap sample size 5000. LL =lower limit; CI = confidence interval; UL = upper limit.

N=276, Control variables were, Gender, Age, Experience and Qualification, * P < .05; ** P <.01

Furthermore **Table 4.4** indicates that these results are subject to conditional effect of intellectual capital (HC) that is intellectual capital shows moderation at low and moderate level and at the higher levels there is no moderation effect as represented in figure 7.

Table 4.4: The Conditional effect of intellectual capital on knowledge management and project performance

TABLE 4.4: The Conditional effect of intellectual capital on knowledge management and project performance.

		<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>LLCI95%</i>	<i>ULCI95%</i>
Int_term → Project performance	Low	0.36	.05	6.18	.00	0.25	0.48
	Moderate	0.24	.04	5.08	.00	0.14	0.33
	High	.11	.05	1.86	.06	-0.00	0.22

Figure 7 represents that at the lower levels of intellectual capital (HC) the relationship between KM and project performance increases at 95% confidence interval, at moderate level also the relationship increases however as the level of IC(HC)

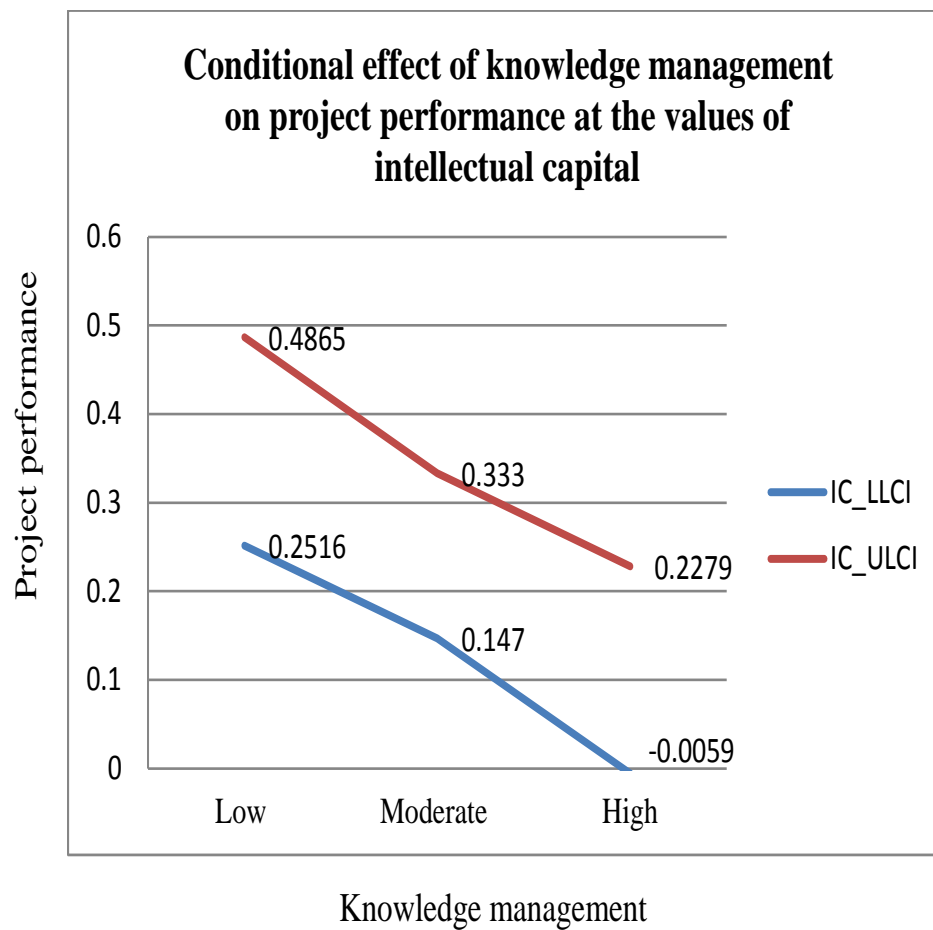


FIGURE 4.1: Conditional effect of knowledge management on project performance at the values of intellectual capital..

further increases the moderating influence of IC(HC) weakens the relationship between KM and project performance.

4.3 Summary of Hypothesis Accepted and Rejected

Table 4.5 illustrates the precise summary of results for the proposed hypotheses under this study.

TABLE 4.5: Hypotheses Summarized Results.

Hypotheses	Statement	Result
H1	There is a positive association between knowledge management and project performance.	Accepted
H2	There is a positive association between knowledge management and project based learning.	Accepted
H3	There is a positive association between project based learning and project performance.	Accepted
H4	Project based learning mediates the relationship between knowledge management and project performance.	Accepted
H5	Intellectual capital (Human Capital) moderates the relationship between KM and Project performance.	Rejected

Chapter 5

Discussion and Conclusion

5.1 Discussion

Previous research in the field of knowledge management and performance has been broad in nature [Acar *et al.* \(2017\)](#); [Chatzoudes *et al.* \(2015\)](#); [Granados *et al.* \(2017\)](#); [Martinez-Conesa *et al.* \(2017\)](#) . Studies support the notion that variables such as knowledge management, intellectual capital, organizational learning are important variables to be explored in detailed and have an impact on organizational performance [Heisig *et al.* \(2016\)](#); [Verbano & Crema \(2016\)](#); [Jordo *et al.* \(2017\)](#); [Wu \(2014\)](#).

The major focus of this study was to first study the relationship between knowledge management and performance in project based organizations in context of Pakistan. Alongside, the mediating role of project based learning is assessed and role of intellectual capital (human capital) is assessed as a moderator between knowledge management and project performance.

The study suggests that knowledge management has a positive impact on project performance which means that if there is systematic knowledge management in a project based organization the performance of the project improves. Also, a positive association has been found between knowledge management and project

based learning. Hence H1, H2 and H3 are accepted since a positive relationship between project based learning and project has been found such that if performance improves with project based learning.

Likewise, project based learning plays the role of mediator between the relationship of knowledge management and project performance, therefore fourth hypothesis H4 has also been accepted. Furthermore, it has been found that intellectual capital (Human capital) turns out to be the insignificant moderator and negatively influences the relationship between knowledge management and project performance. The comprehensive discussion on each hypothesis is as following:

5.1.1 Hypothesis H1: There is a positive association between knowledge management and project performance

Hypothesis 1 anticipated that knowledge management and project performance have a positive relationship and the results of the hypothesis ($\beta = 0.49$, $t = 11.43$, $P = .00$) also proved the existence of significant relationship between both the variables. The co-efficient is found to be 0.49 which illustrates that if there is a one unit change in knowledge management then there is a likelihood that project performance would be increased by 49%. It is evident from the past research that knowledge is considered as a key organizational asset that stimulates its performance when it encloses all the key functions of knowledge management that is its acquisition and dissemination rather than only having a document repository (Wiig (1997); Hart & Banbury (1994); Birasnav (2014)). The study also supports the findings reported by Adam (2017) indicating that an organization and its human resource that are involved playing their roles in multiple knowledge management process chains contribute to the organizational performance. A study conducted by Wei & Miraglia (2017) also indicates that knowledge significantly contributes to the improvement in project performance.

Knowledge plays a pivotal causative role in projects in enhancing and improving its performance. When the knowledge is systematically managed in a projects

which mean that it has all the underpinning functions that is its creation, organization, dissemination and application, this has direct implications on the improvement of project performance [Kiessling et al. \(2009\)](#); [Birasnav \(2014\)](#); [Chen & Fong \(2015\)](#). Therefore, knowledge management generates improvements in project performance by having embedded functions in place for generating acquiring knowledge, generating new knowledge by applying it at the workplace and also sharing the knowledge across the project team. This facilitates in providing better outcomes that is the actual output achieved coincides with the initially set targets. In Pakistans context, the vital role of knowledge management has been recognized and systems/processes are in place either in a formal or an informal way for ensuring the sharing of knowledge so that new knowledge can be created and disseminated across the organization which ultimately contributes towards the enhancement of projects performance.

5.1.2 Hypothesis H2: There is a positive association between knowledge management and project based learning

Hypothesis 2 assumed that there is a positive association between knowledge management and project based learning and the results ($= 0.60$, $t= 12.78$, $P= .00$) of the hypothesis also underline the presence of said significant relationship. The co-efficient turned out to be 0.60 which shows that if there is a one unit change in knowledge management then there is a likelihood that project based learning would be increased by 60

Past studies have shown evidences on the relationship between knowledge management and organizational learning [Arag?n-Correa et al. \(2007\)](#). Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, & Rezazadeh (2013) suggest that manufacturing firms have a streamlined knowledge management system if they have successful organizational learning processes in place. Studies by [Linda & Manpreet \(n.d.\)](#); [King \(2009\)](#) indicated in his study that organizational learning is the facilitator

of knowledge management. Similar evidence has been obtained from this study when applied in context of project based organisations.

Project based learning is cyclic in nature and is built on knowledge. Project based learning plays a very critical role in project based organizations since it is necessarily important to acquire new knowledge for utilization in the future projects. Key element in learning process is conversion of acquired data into meaningful information and generation of new knowledge. Project based learning is change in the state of the knowledge meaning that exploiting and developing the already existing knowledge and it travels from project to project. When the project based organizations have the ability to develop knowledge and to associate between the past and the future projects experiences only then there is existence of successful project based learning. Therefore, for any type of project being executed in Pakistan, be it software development, education and services project or an infrastructure project, systematic knowledge management needs to be there in the organization to have project based learning so that teams can share and generate new knowledge required for the successful implementation of the projects, since learning is the actual development and up gradation of knowledge.

5.1.3 Hypothesis H3: There is a positive association between project based learning and project performance.

Hypothesis 3 presumed that there is a positive association between project based learning and project performance and the results ($\beta=0.52$, $t= 11.56$, $P= .00$) of the hypothesis also underline the presence of a substantial relationship between the two variables. The co-efficient appeared to be 0.52 which shows that if there is a one unit change in project based learning then there is a probability that project performance would be increased by 52

The study supports the findings of the past studies that organizational learning is considered to be playing a critical role in improving the performance of project based organizations [Stata \(1989\)](#); [Senge \(1990\)](#); [Argote \(2011\)](#); [Wong \(2012,?\)](#);

Oztrk & Arditi (2016) . Organizational learning takes place when the team members individually or by grouping together create new knowledge stock during implementing different projects and using that knowledge they solve project related issues also, further that stock of knowledge is used at organizational level and becomes part of the best practices to be used throughout the organization Koskinen (2014).

Projects are involved in the development of new products and services, it can be anticipated that such organization dealing with projects implementation can build on good practices and lessons and also to further develop key competences, strengthen technology and also decreasing the project growth time. In the light of this, practice groups in projects which serve as the learning loci which provide effective and efficient solution to the organization for knowledge management and learning development in project based organization Serrat (2017). The results of the study indicate that in project based organisations of Pakistan, the strength of project based learning is known and best practices of sharing and learning from past experiences have been adopted that facilitate in improving the project performance. When there are mechanisms for creating and developing knowledge in projects than the probability of repeating the mistakes leading towards failure are reduced to a maximum level.

5.1.4 Hypothesis H4: There is a mediating role of project based learning between knowledge management and project performance.

Hypothesis 4 assumed that project based learning mediated the relationship between knowledge management and project performance and the results of the hypothesis depict significant results as the upper and lower limit (.23, .42) indicated by the unstandardized regression co-efficient are both positive and there exist no zero in the bootstrapped 95% interval around the indirect effect of the relationship of knowledge management and project performance through project based learning. Therefore the hypothesis is accepted.

Though there is no research study being conducted on mediating role of project based learning. However, studies conducted by Heisig, Suraj, Kianto & FathiEasa (2016) and Garca (2017) indicate that KM appears to be an important factor significantly correlated to organizational performance. Based on the previous studies it can also be observed that knowledge management and organizational learning are considered one of the key factors for improving and enhancing organizational performance Birasnav (2014); Heisig *et al.* (2016).

Knowledge is the key asset for an organisation, be it a project based organisation or a simple organisation, and knowledge management is the access to improved organizational performance. Knowledge management enhances use of organizational knowledge by adopting best practices of information management and organizational learning leading to improved organizational performance Ahmad *et al.* (2017). Therefore, it is also evident from the results that in Pakistan in context of project based knowledge management stimulates project performance through project based learning.

5.1.5 Hypothesis H5: Intellectual capital moderates the relationship between KM and Project performance.

The study also examined the moderating effect of intellectual capital (Human Capital) between knowledge management and project performance in hypothesis 5 which showed insignificant result. The analysis showed that there is an insignificant effect of intellectual capital ($\beta = -0.17$, $t = -3.5$, $P = .00$). Co-efficient comes out to be -0.17 which shows that if there is a one unit change in intellectual capital then it will bring an impact of 1% in the relationship between knowledge management and project performance. The bootstrapped results at 95% of the confidence interval indicates that its upper and lower limit (-0.26, -0.07) contains negative signs which proves that as intellectual capital grows in an organization the relationship between KM and project performance is weakened which leads to the rejection of the H5 hypothesis that intellectual capital (human capital) moderates the relationship between KM and Project performance.

Though it is evident from the past studies that human capital plays an important role in improving organizational performance [Cabello-Medina *et al.* \(2011\)](#); [Kianto *et al.* \(2017\)](#). Cabello-Medina, Lopez-Cabrales and Valle-Cabrera (2011) stated that human capital has a direct impact on innovativeness that improves organizational performance. It is evident from the study of Wiig (1997) that intellectual capital and knowledge are important asset of an organisation that contribute to organizational performance provided employee competence and knowledge are utilized and developed regularly. However, studies suggest that other dimensions of IC that is human, structure and relationship capital have positive correlation with organizational performance. According to Stewart (1997), intellectual capital is having three broad dimensions that is human, structure and relationship capital. Where human capital includes employees knowledge, competence and experience, relationship capital is linked to the customer loyalty to brands and company reputation, while structure capital includes culture, organizational structure and information systems. Dimensions of intellectual capital suggested by Edvinsson & Malone (1997) and Brooking (1996) also include the same as indicated by Stewart (1997). Xu, Yang, Zhan, Liu, Zhou & Hu (2017) suggest that structural capital contributes to intellectual capital by interrelating and interacting with human capital. It involves another dimension also that is organizational culture and also customer relationships, unless these factors are not there its not easy for improving organizational structure.

Since this study only took one dimension of intellectual capital for analysis, this serves as one of the reasons that it lead to the rejection of hypothesis. Also when taking Pakistani organsitaional context into consideration, it is observed that when there is a highly experienced and knowledgeable employee in an organization and also the organization is heavily found dependent on that one or few persons holding such intellectual treasury, wave of power loss prevails there. Such human capital does not feel comfortable sharing knowledge and experience with the fellow colleagues. Another aspect is also that if the organisations make best use of structure capital, it will ultimately maximize the value of intellectual capital overall. It will work best when it is clubbed with human capital which means that

when there will be strong organizational culture where employees follow set mechanisms, policies and procedures of the organization for creating innovative ideas, creating new knowledge and there are also well established advanced information systems. Deploying such advance technological systems in organizations breaks the barrier of communication, knowledge sharing and dissemination, this leads to learning and development of new ideas and knowledge which leads to improvement of organizational performance.

Prior these variables have been studied in organisations other than project based organisations therefore the results also suggest that they must be studied by including the other dimensions of intellectual capital in context of project based organization in Pakistan.

5.2 Practical and Theoretical Implication

This study has contributed in literature where the exploration of variables like intellectual capital, organizational learning and business performance had been directed [Heisig *et al.* \(2016\)](#). The current study has made specific contributions to the project management domain of knowledge management. This is very important contribution to literature since prior no such research outlining the impact of knowledge management on project performance has been conducted in Pakistani context.

The study has brought together the significant aspects of project based learning towards the past literature by analyzing its mediating role between knowledge management and project performance. The findings of the study are practically relevant since the direct relationship between knowledge management and project performance is equally important to the researchers and the practitioners. Furthermore, the findings of the study also illustrate the indirect importance of project based learning and the direct impact on project performance. The study provides information and makes recommendations to the project managers and the top management that in order to increase and improve performance of the projects, adoption and deployment of the best practices of knowledge management should be

made mandatory in the project based organizations. The environment for knowledge creation, sharing and dissemination should be encouraged and the manager should deploy and monitor the mechanisms that enable organizations to learn, change and adapt to account for the acquisition of new knowledge whereby paying emphasis on project based learning.

Moreover, one of the components of intellectual capital that is human capital being studied suggested that it insignificantly moderates the relationship between knowledge management and project performance which recommends that though competence and capabilities of the employees are very crucial for any kind of project, however, when an project based organization has competent and skillful personnel in place, it should also have proper mechanisms and structures in place to educates its employees, because human capital and structure capital together contribute significantly to improve projects performance. Intellectual capital and knowledge are considered to be the most valuable asset of an organization and the managers should to realize it more and pay emphasis on it as these define the potential future and long term viability of the organization in context of performance and success.

5.3 Limitations of Research

This study has certain limitations which happened mainly due to inadequate resources and time restraints. Medium size sample was selected due to time and cost constraints. Also the study is directed only to the project based organisations of Pakistan and the results may not be generalized to other sectors. Another limiting factor that since the questionnaire was dyadic and it was supposed to be collected from project managers and the stakeholders. The contact with the relevant stakeholder was real challenge.

Moreover, it was practically not possible to examine all the components of intellectual capital hence only human capital was selected for the study. As, it is determined after analysis that some results are not the same as what was expected

with respect to past studies and literature, mainly due the highly power distance culture, that is why the results might not be applicable in a non-Pakistani context.

5.4 Future Research Directions

The study on knowledge management and project performance needs more attention of researchers, since the current study has been done with the focus on project based organizations only, this actually gives a way forward to the researchers examine and replicate the model in organizations (both public and private) other than project based in order to examine the impact with a large sample size.

Furthermore, human capital clubbed with other dimensions of intellectual capital that is structural capital which includes organizational culture, organizational structures, advanced technological systems & procedures and relationship capital including stakeholders relationships should be studied to further explore the influence of combined dimensions of IC on the relationship between knowledge management and project performance.

The results and significance of the study will be useful for the future researchers focusing on this area to link knowledge management to various other variables for instance innovation and creativity. As in this study project based learning was examined as a mediating variable (less support from literature), researchers can investigate what other variables can fit into the mediator and moderator relationship.

5.5 Conclusion

This study has made an attempt to assess the relationship between knowledge management and project performance in project based organisations of Pakistan. Data was collected from project based organisations (DFID, PYDP, IESCO, ILO, Care international, USAID, UNDP and GIZ) of Pakistan through a questionnaire survey to measure the extent to which knowledge management impacts project

performance with mediating role of project based learning and moderating role of intellectual capital(human capital).

Altogether 400 questionnaires were disseminated however, only 276 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 through social exchange and social capital theory. The results of the study are also in line with social exchanges theory which illustrates social behavior. According to which interaction and communication between the individuals and the organizational units contributes to creation of new knowledge. Organizational learning is takes place when there is exchange of information or experience between individuals and teams. Likewise the results also align with social capital theory which also underlines the take for understanding and explaining the creation of intellectual capital in an organization, however the hypothesis that intellectual capital (human capital) moderates the relationship between KM and project performance in project based organisations of Pakistan is not accepted which is possibly due to the fact the only one dimension was studied and also due to the cultural context.

The study has given a holistic view of impact of knowledge management on project performance along with project based learning as mediator in project based organisations of Pakistan.

Bibliography

- Acar, M. F., Tarim, M., Zaim, H., Zaim, S., , & Delen, D. 2017. Knowledge management and ERP: Complementary or contradictory? *International Journal of Information Management*, **37**(6), 703–712.
- Adam, S. 2017. The Effectiveness of Knowledge Management Towards Organizational Performance of Internet Business in Malaysia. *Malaysian Journal of Business and Economics MJBE*, **3**(1).
- Aerts, G., Dooms, M., & Haezendonck, E. 2017. Knowledge transfers and project-based learning in large scale infrastructure development projects: an exploratory and comparative ex-post analysis. *International Journal of Project Management*, **35**(3), 224–240.
- Ahmad, N., Lodhi, M. S., Zaman, K., & Naseem, I. 2017. Knowledge management: a gateway for organizational performance. *Journal of the Knowledge Economy*, **8**(3), 859–876.
- Ahmed, P. K., Lim, K. K., & Zairi, M. 1999. Measurement practice for knowledge management. *Journal of Workplace learning*, **11**(8), 304–311.
- Akhavan, P., Ebrahim, N. A., Fetrati, M. A., , & Pezeshkan, A. 2016. Major trends in knowledge management research: a bibliometric study. *Scientometrics*, **107**(3), 1249–1264.
- Aladwani, A. M. 2002. An integrated performance model information systems projects. *Journal of Management Information Systems*, **19**(1), 185–210.

- Almashari, M., Zairi, M., & Alathari, A. 2002. An empirical study of the impact of knowledge management on organizational performance. *Journal of Computer Information Systems*, **42**(5), 74–82.
- Almeida, M. V., , & Soares, A. L. 1999. Knowledge sharing in project-based organizations: Overcoming the informational limbo. *International Journal of Information Management*, **34**(6), 770–779.
- Anderson, J. C., & Gerbing D. W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, **103**(3), 411.
- Arag?n-Correa, J. A., Garc?a-Morales, V. J., & Cord?n-Pozo, E. 2007. Leadership and organizational learning's role on innovation and performance: Lessons from Spain. *Industrial marketing management*, **36**(3), 349–359.
- Archer, N. P., & Ghasemzadeh F. 1999. An integrated framework for project portfolio selection. *International Journal of Project Management*, **17**(4), 207–216.
- Argote, L. 2011. Organizational learning research: Past, present and future. *Management learning*, **42**(4), 439–446.
- Argote, L., McEvily, B., & Reagans, R. 2003. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management science*, **49**(4), 571–582.
- Arthur, M. B., DeFillippi, R. J., & Jones, C. 2001. Project-based learning as the interplay of career and company non-financial capital. *Management Learning*, **32**(1), 99–117.
- Arumugam, V., Antony, J., & Kumar, M. 2013. Linking learning and knowledge creation to project success in Six Sigma projects: An empirical investigation. *International Journal of Production Economics*, **141**(1), 388–402.
- Awad, E. M., & Ghaziri, H. M. 2008. *Knowledge management (2nd ed.)*. Delhi: Pearson Education.

- Bakker, R. M. 2010. Taking stock of temporary organizational forms: A systematic review and research agenda. *International Journal of Management Reviews*, **12**(4), 466–486.
- Barber, E., & Warn, J. 2005. Leadership in project management: from firefighter to firelighter. *Management Decision*, **43**(7/8), 1032–1039.
- Birasnay, M. 2014. Knowledge management and organizational performance in the service industry: The role of transformational leadership beyond the effects of transactional leadership. *Journal of Business Research*, **67**(8), 1622–1629.
- Bontis, N., Crossan, M. M., & Hulland, J. 2002. Managing an organizational learning system by aligning stocks and flows. *Journal of management studies*, **39**(4), 437–469.
- Bontis, N., Seleim, A., & Ashour, A. 2007. Human capital and organizational performance: a study of Egyptian software companies, *Management Decision*. **45**(4), 789–801.
- Boyne, G., & Gould-Williams, J. 2003. Planning and Performance in Public Organizations an empirical analysis. *Public Management Review*, **5**(1), 115–132.
- Brooking, A. 1996. *Intellectual capital*. Cengage Learning EMEA.
- Byrne, B. M. 2001. Structural Equation Modeling: Perspectives on the Present and the Future. *International Journal of Testing*, 327–334.
- Byrne, D. S. 1998. *Complexity Theory and the Social Sciences: An Introduction*. Psychology Press.
- Cabello-Medina, C., Lopez-Cabrales, A., & Valle-Cabrera, R. 2011. Leveraging the innovative performance of human capital through HRM and social capital in Spanish firms, *International Journal of Human Resource Management*. **22**(4), 807–828.
- Chaston, I., Badger, B., Mangles, T., & Sadler-Smith, E. 2001. Organisational learning style, competencies and learning systems in small. *UK manufacturing*

- firms. International Journal of Operations & Production Management*, **21**(11), 1417–1432.
- Chatzoudes, D., Chatzoglou, P., , & Vraimaki, E. 2015. The central role of knowledge management in business operations: Developing a new conceptual framework. *Business Process Management Journal*, **21**(5), 1117–1139.
- Chen, L., & Fong, P. S. 2015. Evaluation of knowledge management performance: An organic approach. *Information & Management*, **52**(4), 431–453.
- Chou, J. S., & Yang, J. G. 2012. Project management knowledge and effects on construction project outcomes: an empirical study. *Proj. Manag. J*, **43**.
- Church, M. A., Elliot, A. J., & Gable, S. L. 2001. Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of educational psychology*, **93**(1).
- Cook, S. D., , & Yanow, D. 1993. Culture and organizational learning. *Journal of management inquiry*, **2**(4), 373–390.
- Cranefield, J., & Yoong, P. 2009. Crossings: Embedding personal professional knowledge in a complex online community environment. *Online Information Review*, **33**(2), 257–275.
- Crossan, M. M., Lane, H. W., & White, R. E. 1999. An organizational learning framework: From intuition to institution. *Academy of management review*, **24**(3), 522–537.
- Csath, M. 2012. Encouraging innovation in small and medium sized businesses: learning matters. *Development and Learning in Organizations: An International Journal*, **26**(5), 9–13.
- de Castro, Martn, & G. 2015. Knowledge management and innovation in knowledge-based and high-tech industrial markets: The role of openness and absorptive capacity. *Industrial Marketing Management*, **47**, 143–146.
- Dess, G., & Shaw, J. D. 2001. Voluntary turnover, social capital, and organizational performance, *The Academy of Management Review*. **26**, 446–57.

- Dimitriadis, Zoe S. 2005. Creating strategic capabilities: organizational learning and knowledge management in the new economy. *European Business Review*, **17**(4), 314–324.
- Drucker, P. 1993. *Post capitalist society*. New York: Butterworth Heinemann.
- Durst, S., , & RunarEdvardsson, I. 2012. Knowledge management in SMEs: a literature review. *Journal of Knowledge Management*, **16**(6), 879–903.
- Dyer, J. H., , & Nobeoka, K. 2000. Creating and managing a high-performance knowledge sharing network: The Toyota case, *Strategic Management Journal*. **21**(3), 345–367.
- Easterby-Smith, M., & Lyles, M. A. Eds. 2011. *Handbook of organizational learning and knowledge management*. John Wiley & Sons.
- Edvinsson, L., & Malone, M. S. 1997. *Intellectual capital. realizing your company true value by finding its hidden brainpower*.
- Eggers, F., Kraus, S., Hughes, M., Laraway, S., & Snycerski, S. 2013. Implications of customer and entrepreneurial orientations for SME growth. *Management Decision*, **51**(3), 524–546.
- Fiol, C. M., & Lyles, M. A. 1985. *Organizational learning academy of management review*, *10*(4). 803-813.
- Garcia, I. 2017. Knowledge management, soft TQM and hard TQM, and organizational performance. *Pages 70–85 of: international forum journal Vol. 14, No, vol. 14*.
- Gasik, S. 2011. A model of project knowledge management. *Proj. Manag. J*, **42**.
- Gefen, D., Straub, D. W., & Boudreau, M. 2000. Structural Equation Modeling and Regression: Guidelines for Research Practice. *Communications of the AIS*, **4**(7), 1–70.

- Gloet, M., & Terziowski, M. 2004. Exploring the relationship between knowledge management practices and innovation performance. *Journal of manufacturing technology management*, **15**(5), 402–409.
- Gourova, E., & Antonova, A. 2008. *June*). Knowledge management training at universities. Proc.
- Granados, M. L., Mohamed, S., & Hlupic, V. 2017. Knowledge management activities in social enterprises: lessons for small and non-profit firms. *Journal of knowledge management*, **21**(2), 376–396.
- Grant, R. M. 2004. and BadenFuller. C. (2004). *A knowledge accessing theory of strategic alliances*, *Journal of Management Studies*, Vol. 41 No, **41**(1), 61–84.
- Gray, R. J. 2001. Organisational climate and project success. *International journal of project management*, **19**(2), 103–109.
- Grimaldi, M., Ripa, P., , & Ruffolo, M. 2008. A methodology to evaluate the organizational impact of it on knowledge management: An Italian case study. *Journal of Information Technology Case and Application Research*, **10**(2), 8–24.
- Hanisch, B., Lindner, F., Mueller, A., & Wald, A. 2009. Knowledge management in project environments. *Journal of knowledge management*, **13**(4), 148–160.
- Hansen, M. T. 1999. The Search-Transfer Problem: The Role of Weak Ties in Sharing. *Knowledge across Organization Subunits*, *Administrative Science Quarterly*, **44**(1), 82–111.
- Hart, S., & Banbury, C. 1994. How strategy making process can make a difference. *strategic management journal*, **15**(4), 251–269.
- Heisig, P., Suraj, O. A., Kianto, A., , & FathiEasa, N. 2016. Knowledge management and business performance: global experts views on future research needs. *Journal of Knowledge Management*, **20**(6), 1169–1198.
- Hormiga, E., Batista-Canino, R. M., & Snchez-Medina, A. 2011. The role of intellectual capital in the success of new ventures, *International Entrepreneurship and Management Journal*. **7**(1), 71–92.

- Hu, L., & Bentler, P. M. 1999. Cut Off Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structural Equation Modeling*, **6**, 1–55.
- Huber, G. P.
- Jain, A. K., & Moreno, A. 2015. Organizational learning, knowledge management practices and firms performance: an empirical study of a heavy engineering firm in India. *The Learning Organization*, **22**(1), 14–39.
- Jardon, C. M., & Martos, M. S. 2012. Intellectual capital as competitive advantage in emerging clusters in Latin America *Journal of Intellectual Capital*. **13**(4), 462–481.
- Jih, W. J. K., Helms, M. M., & Mayo, D. T. 2005. Effects of knowledge management on electronic commerce: an exploratory study in Taiwan. *Journal of Global Information Management JGIM*, **13**(4), 1–24.
- Jordo, R. V. D., , & Novas, J. C. 2017. Knowledge management and intellectual capital in networks of small and medium-sized enterprises. *Journal of Intellectual Capital, just-accepted*, **00-00**.
- Kang, J. 2007. Testing impact of knowledge characteristics and relationship ties on project performance. *Journal of Knowledge Management*, **11**(3), 126–144.
- Kearns, G. S., & Sabherwal, R. 2006. Strategic alignment between business and information technology: a knowledge-based view of behaviors, outcome, and consequences. *Journal of management information systems*, **23**(3), 129–162.
- Kerzner, H. 2002. *Strategic planning for project management using a project management maturity model*. John Wiley & Sons.
- Kianto, A., Senz, J., & Aramburu, N. 2017. Knowledge-based human resource management practices, intellectual capital and innovation. *Journal of Business Research*, **81**, 11–20.

- Kiessling, T. S., Richey, R. G., Meng, J., & Dabic, M. 2009. Exploring knowledge management to organizational performance outcomes in a transitional economy. *Journal of world business*, **44**(4), 421–433.
- Kim, T. T., Kim, W. G., Park, S. S. S., Lee, G., & Jee, B. 2012. Intellectual capital and business performance: what structural relationships do they have in upperupscale hotels, *International Journal of Tourism Research*. **14**(4), 391–408.
- King, W. R. 2009. Knowledge management and organizational learning. *In: Knowledge management and organizational learning pp.*
- Koskinen, K. U. 2014. Problem absorption as an organizational learning mechanism in project-based companies: Process thinking perspective. *Int. J. Project Manage.*, **30**(3).
- Landaeta, R. E. 2008. Evaluating benefits and challenges of knowledge transfer across projects. *Engineering Management Journal*, **20**(1), 29–38.
- Lee, K. C., Lee, S., & Kang, I. W. 2005. KMPI: measuring knowledge management performance. *Information & management*, **42**(3), 469–482.
- Liao, S. H., & Wu, C. C. 2009. The relationship among knowledge management, organizational learning, and organizational performance. *International Journal of Business and Management*, **4**(4).
- Liao, S. H., & Wu, C. C. 2010. System perspective of knowledge management, organizational learning, and organizational innovation. *Expert systems with Applications*, **37**(2), 1096–1103.
- Lim, K. K., Ahmed, P. K., , & Zairi, M. 1999. Managing for quality through knowledge management. *Total Quality Management*, 615–621.
- Linda, Argote, & Manpreet, Hora. (2016). *Organizational Learning and Management of Technology*.
- Linderman, K., Schroeder, R. G., & Sanders, J. 2010. A knowledge framework underlying process management. *Decision Sciences*, **41**(4), 689–719.

- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. 1996. Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychological Methods*, **1**(2).
- Marr, B., & Roos, G. 2005. *A strategy perspective on intellectual capital*. Perspectives on intellectual capital.
- Martinez-Conesa, I., Soto-Acosta, P., , & Carayannis, E. G. 2017. On the path towards open innovation: Assessing the role of knowledge management capability and environmental dynamism in SMEs. *Journal of Knowledge Management*, **21**(3), 553–570.
- Masadeh, R. E., Shannak, R., Maqableh, M, & Tarhini, A. 2017. The impact of knowledge management on job performance in higher education: The case of the University of Jordan. *Journal of Enterprise Information Management*, **30**(2), 244–262.
- Massingham, P., Holaibi, Al, & M. 2017. Embedding Knowledge Management into Business Processes. *Knowledge and Process Management*, **24**(1), 53–71.
- Matthews, Rupert Lawrence, MacCarthy, Bart L., & Braziotis, Christos. 2017. Organizational learning in SMEs: a process improvement perspective. *International Journal of Operations & Production Management*, **37**.
- Nahapiet, J., , & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, **23**(2), 242–266.
- Nonaka, I. 1994. A dynamic theory of organizational knowledge creation. *Organization science*, **5**(1), 14–37.
- Nonaka, I., & Takeuchi, H. 1995. *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press. Newyork.
- Noruzy, A., Dalfard, V. M., Azhdari, B., Nazari-Shirkouhi, S., , & Rezazadeh, A. 2013. *Relations between transformational leadership, organizational learning,*

- knowledge management, organizational innovation, and organizational performance: an empirical investigation of manufacturing firms.* The International Journal of Advanced Manufacturing Technology.
- Oztrk, G. B., & Arditi, D. 2016. Gunaydn. H. M., & Yitmen, . (2016). *Organizational Learning and Performance of Architectural Design Firms in Turkey.* *Journal of Management in Engineering*, **32**(5), 05016015.
- Pemsel, S., , & Wiewiora, A. 2013. Project management office a knowledge broker in project-based organisations. *International Journal of Project Management*, **31**(1), 31–42.
- Prencipe, A., & Tell, F. 2001. Inter-project learning: processes and outcomes of knowledge codification in project-based firms. *Research policy*, **30**(9), 1373–1394.
- Quigley, N. R., Tesluk, P. E., Locke, E. A., & Bartol, K. M. 2007. A multilevel investigation of the motivational mechanisms underlying knowledge sharing and performance. *Organization science*, **18**(1), 71–88.
- Raykov, T., & Marcoulides, G. A. 2000. A Method for Comparing Completely Standardized Solutions in Multiple Groups. *Structural Equation Modeling*, **7**(2), 292–308.
- Reich, B. H., Gemino, A., & Sauer, C. 2012. Knowledge management and project-based knowledge in it projects: A model and preliminary empirical results. *International Journal of Project Management*, **30**(6), 663–674.
- Reich, B. H., Gemino, A., & Sauer, C. 2014. How knowledge management impacts performance in projects: An empirical study. *International Journal of Project Management*, **32**(4), 590–602.
- Roos, G., Bainbridge, A., & Jacobsen, K. 2001. Intellectual capital analysis as a strategic tool. *Strategy and Leadership*, **29**(4), 21–26.
- Sankarasubramanian, S. 2009. *Knowledge management meets project management.* Project Management Institute.

- Seleim, A., Ashour, A., & Bontis, N. 2007. Human capital and organizational performance: a study of Egyptian software companies. *Management Decision*, **45**(4), 789–801.
- Senge, P. 1990. *The Fifth Discipline*. New York: The Art and Practice of the Learning Organization.
- Serrat, O. 2017. Managing knowledge in project environments. *Pages 509–522 of: Knowledge Solutions*.
- Shannak, R. 2010. Knowledge-based systems support for strategic decisions. *European Journal of Economics, Finance and Administrative Sciences*, **21**, 7–20.
- Sharabati, A. A. 2010. A., Jawad. S.N. and Bontis, N. (2010). *Intellectual capital and business performance in the pharmaceutical sector of Jordan*, *Management Decision*, Vol. 48 No, **48**(1), 105–131.
- Shih, K. H., Chang, C. J., & Lin, B. 2010. Assessing knowledge creation and intellectual capital in banking industry. *Journal of intellectual capital*, **11**(1), 74–89.
- Smith, P. A. 2012. The importance of organizational learning for organizational sustainability. *The Learning Organization*, **19**(1), 4–10.
- Spender, J. C. 2008. *Organizational learning and knowledge management: whence and whither?* *Management learning*, *39*(2). 159-176.
- Stata, R. 1989. Organizational learning. The key to management innovation. *Sloan Manage. Rev.*, **30**(3).
- Stewart, T. A. 1997. *Intellectual capital*. The new wealth of organizations.
- Subramaniam, M., , & Youndt, M. A. 2005. The influence of intellectual capital on the types of innovative capabilities. *Academy of Management journal*, **48**(3), 450–463.
- Sveiby, K. E. 2002. *Measuring intangibles and intellectual capital*. Knowledge Management.

- Tam, S., & Gray, D. E. 2016. Organisational learning and the organisational life cycle: the differential aspects of an integrated relationship in SMEs. *European Journal of Training and Development*, **40**(1), 2–20.
- Tam, S., & Gray, D. E. 2017. Organisational learning and the organisational life cycle: the differential aspects of an integrated relationship in SMEs. *British Journal of Social Work*, **47**(8), 2406–2420.
- Urban, B., & Joubert G. C. D. S. 2017. Multidimensional and comparative study on intellectual capital and organisational performance. *Journal of Business Economics and Management*, **18**(1), 84–99.
- Vargas, N., & Lloria M. B. 2017. Performance and Intellectual Capital: How Enablers Drive Value Creation in Organisations. *Knowledge and Process Management*, **24**(2), 114–124.
- Verbano, C., & Crema, M. 2016. Linking technology innovation strategy, intellectual capital and technology innovation performance in manufacturing SMEs. *Technology Analysis & Strategic Management*, **28**(5), 524–540.
- Wang, K. Y., Hermens A. Huang K. P. & Chelliah J. 2015. Entrepreneurial orientation and organizational learning on SMEs' innovation. *International Journal of Organizational Innovation*. statement?. *International Journal of Technology Management*. *International Journal of Technology Management*, **18**(5-8), 648–659.
- Wei, Y., & Miraglia S. 2017. Organizational culture and knowledge transfer in project-based organizations: Theoretical insights from a Chinese construction firm. *International Journal of Project Management*, **35**(4), 571–585.
- White, D., & Fortune J. 2002. Current practice in project management An empirical study. *International journal of project management*, **20**(1), 1–11.
- Wiig, K. M. 1997. Integrating intellectual capital and knowledge management. *Long range planning*, **30**(3), 399–405.

- Williams, T. 2007. Post-project reviews to gain effective lessons learned. *Project Management Institute*.
- Wong, P. S., Cheung S. O. & Fan K. L. 2009. Examining the relationship between organizational learning styles and project performance. *Journal of Construction Engineering and Management*, **135**(6), 497–507.
- Wong, P. S., Cheung S. O. Yiu R. L. & Hardie M. 2012. The unlearning dimension of organizational learning in construction projects. *International Journal of Project Management*, **30**(1), 94–104.
- Wu, I. L., & Chen J. L. 2014. Knowledge management driven firm performance: The roles of business process capabilities and organizational learning. *Journal of Knowledge Management*, **18**(6), 1141–1164.
- Wu, W. Y., Chang M. L. & Chen C. W. 2008. Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation. *R&D Management*, **38**(3), 265–277.
- Xu, X. L., Yang X. N. Zhan L. Liu C. K. Zhou N. D. & Hu M. 2017. Examining the relationship between intellectual capital and performance of listed environmental protection companies. *Environmental Progress & Sustainable Energy*.
- Youndt, M. A., Subramaniam M. & Snell S. A. 2004. Intellectual capital profiles: An examination of investments and returns. *Journal of Management studies*, **41**(2), 335–361.
- Zahra, S. A. 2012. Organizational learning and entrepreneurship in family firms: Exploring the moderating effect of ownership and cohesion. *Small business economics*, **38**(1), 51–65.
- Zhao, Y., Lu Y. & Wang X. 2013. Organizational unlearning and organizational relearning: a dynamic process of knowledge management. *Journal of Knowledge Management*. *Journal of Knowledge Management*, **17**(6), 902–912.

Appendix-A

Research-Questionnaire (Project core team)

Dear respondent,

I am MS Scholar at Capital University of Science and Technology, conducting research on "Impact of Knowledge Management on Project Performance with the mediating role of Project based Learning and moderating role of Intellectual Capital within projects" for the completion of my research thesis. The specific objectives of the study are to; Explore the relationship between KM and project performance through project based learning. Examine the moderating effect of project intellectual capital on the relationship of KM and project performance. Test empirically and establish the proposed relationships in the developmental projects of Pakistan. In this regard, You are requested to fill the following questionnaire, please note down that your identity as respondent is concealed. You can freely express whatever the ground realities you see and face. All the information obtained for this research will be used only for academic purposes. Thank you very much. Your active contribution is the real strength of this research study.

Profound Regards

Sadia Abbasi

Section: 1	Demographics
Your gender:	1- Male 2- Female
Your age:	1 (18-25), 2 (26-33), 3 (34-41), 4 (42-49) 5(50 and above)
Your qualification:	1 (Matric), 2 (Intermediate), 3 (Bachelor), 4 (Masters) 5(MS/MPhil), 6(PhD)
Experience:	1(5-10), 2(11-16), 3(17-22), 4(23-28), 5(29-35), 6(36 and above)

Section-2: Knowledge Management

Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly agree: 5

1	Knowledge and intellectual capital are viewed , as key organizational assets	1	2	3	4	5
2	We invest heavily in the capture, assimilation, and dissemination of knowledge	1	2	3	4	5
3	We have ready access to expert knowledge within the organization	1	2	3	4	5
4	Organizational knowledge is codified and made available to all workers	1	2	3	4	5
5	We have processes for identifying and exploiting our knowledge stocks	1	2	3	4	5

Section-3: Intellectual Capital Human Capital

Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly agree: 5

1	Our employees are highly skilled	1	2	3	4	5
2	Our employees are widely considered the best in our industry	1	2	3	4	5
3	Our employees are creative and bright	1	2	3	4	5
4	Our employees are experts in their particular jobs and functions	1	2	3	4	5
5	Our employees develop new ideas and knowledge	1	2	3	4	5

Section-4: Project based learning Organizational learning

Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly agree: 5 Do you agree that your firm practiced the followings during the project

1	Working (and considering corrective actions if required) under a set of clearly identified project goals	1	2	3	4	5
2	Referring the firms past experience to interpret the performance feedback	1	2	3	4	5
3	Identifying the root of the problem before taking improvement action	1	2	3	4	5
4	Seeking and adopting new management and working approach through evaluation of current practice	1	2	3	4	5

Section-5: Project Performance

Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly agree: 5 How does your most recently completed project rate on

1	Efficiency of operations	1	2	3	4	5
2	Adherence to schedules	1	2	3	4	5
3	Adherence to budgets	1	2	3	4	5
4	Amount of produced work	1	2	3	4	5
5	Quality of produced work	1	2	3	4	5
6	Effectiveness of interactions with consultants	1	2	3	4	5
7	Ability to meet its goals	1	2	3	4	5

Thank you for your time and cooperation

Research-Questionnaire (stakeholders)

Dear respondent,

I am MS Scholar at Capital University of Science and Technology, conducting research on "Impact of Knowledge Management on Project Performance with the mediating role of Project based Learning and moderating role of Intellectual Capital within projects" for the completion of my research thesis. The specific objectives of the study are to; Explore the relationship between KM and project performance through project based learning. Examine the moderating effect of project intellectual capital on the relationship of KM and project performance. Test empirically and establish the proposed relationships in the developmental projects of Pakistan. In this regard, You are requested to fill the following questionnaire, please note down that your identity as respondent is concealed. You can freely express whatever the ground realities you see and face. All the information obtained for this research will be used only for academic purposes. Thank you very much. Your active contribution is the real strength of this research study.

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Sadia Abbasi

Section: 1	Demographics
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Experience:	1(5-10), 2(11-16), 3(17-22), 4(23-28), 5(29-35), 6(36 and above)

Section-1: Project Performance

Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly agree: 5
How does your most recently completed project rate on

1	Efficiency of operations	1	2	3	4	5
2	Adherence to schedules	1	2	3	4	5
3	Adherence to budgets	1	2	3	4	5
4	Amount of produced work	1	2	3	4	5
5	Quality of produced work	1	2	3	4	5
6	Effectiveness of interactions with consultants	1	2	3	4	5
7	Ability to meet its goals	1	2	3	4	5

Thank you for your time and cooperation