CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Impact of Customer Knowledge Management Capability on Project Performance with Mediating Role of Agility and Moderating Role of Team Skills

by

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First of all, I thank ALLAH Almighty who is the most merciful and beneficent.ALLAH created us and showed us a correct pathway. ALLAH always secretes sins and protects us from social troubles. I also dedicate my study to my parents and my teachers

CERTIFICATE OF APPROVAL

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Abstract

Business environments today are characterized as being very dynamic and hyper competitive. Organizations in these environments have to be agile in order to adapt their strategies and actions to be successful. While scholars have not conducted enough empirical studies that offer convincing evidence for the use of the customer knowledge management capability and relevant linkages. This study, therefore examines the relationship between customer knowledge management capability and project performance through mediating role of agility and the moderating role of team skills, Data were collected from 307 respondents that were working on various IT-oriented and non IT-oriented project-based organizations from Rawalpindi, Islamabad Pakistan. Confirmatory factor analysis confirmed the distinctiveness of variables used in the study. The results empirically substantiated that customer knowledge management capability has a significant and positive impact on project performance. The mediating role of agility has been tested and proved to be a potential mediator between customer knowledge management capability and project performance and have a positive and significant mediation relationship between the two. Team skills act as a moderator between customer knowledge management capability and agility, but despite of strengthening, it is weakening the impact of customer knowledge management capability on agility. The study contributes towards the literature, specifically towards project management literature. The study also significantly towards the project based firms primarily within the context of Pakistan.

Key words: Customer knowledge management capability, Agility, Team skills, Project performance.

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Abbreviations

CKMC	Customer knowledge management capability
PP	Project performance
A	Agility
TS	Team skills
CIMS	Customer information management system
IT	Information technology
IoT	Internet of things
CFA	Confirmatory factor analysis
GFI	Goodness of Fit Index
CFI	Comparative Fit Index
TLI	Tucker-Lewis Index
AGFI	Adjusted Goodness of Fit Index
RMSEA	Root Mean Square error of approximation

Chapter 1

Introduction

The introduction part explains the background of the study, gap analysis, problem statement, research questions, research objectives, research significance and importance of the study, supporting theory, definitions of studying variables used in this research study.

1.1 Background of the Study

Customer knowledge management capability (CKMC) is considered as one of the most significant variables that contributes in the project performance (Gibbert et al., 2002; Lopez-Nicolas and Molina-Castillo, 2008; Korhonen-Sande and Sande, 2016; Wang and Xu, 2018). CKMC helps the organizations leverage their unique customer knowledge to improve the new product performance, enhance product/service quality, also reduce cost and enhance the competitiveness of organizations (Salojärvi et al., 2013). However, organizations desiring to construct a well-functioning customer knowledge management capability to face challenges (Wang, 2015). Explicitly, there is a lack of study on how organizations should guide project team members, operational and technical conditions to oversee customer knowledge and become increasingly receptive to customer needs (Garrido-Moreno and Padilla-Meléndez, 2011).

Though a few examinations have tended to that organizations burned a huge number of dollars to get CKMC and design information warehousing system to possess and control the knowledge (Rai et al., 2015; Braganza et al., 2017). Because of the changing environments in which business enterprises operate have produced new difficulties for contemporary organizations. These include the essential for value creation with clients, preparation to adjust to changes, just as having the option to quickly react to clients' needs. Therefore, customer knowledge become demonstrably crucial, to understand the customers demand of a project surpasses his or her pre-created desires (Um and Kim, 2018). In projects, customer interests are the key points, because of their buying behavior clearly affects the projects financial performance as well as making other new business opportunities (Servaes and Tamayo, 2013).

Existing studies emphasizes that organization must be recognized and collectively needs to be observed on the advancement of information technology (IT) competition, increase globally, which put extra pressure on the organizations and transformed the business landscape by accelerating connectivity, transparency, market uncertainty and change customer expectations (Johnsen and Lacoste, 2016), consequently new markets are establishing, like the collaborative economy and peer-to-peer services (Tan et al., 2017; Heinonen and Strandvik, 2018). Likewise, life-cycle of items is getting to be shorter, while their prevalence will in general be more noteworthy. New technological measures are continually showing up and they result, both in item development and improvements of the project performance. Specifically, in project management, customer satisfaction has a significant direct impact on project success (Haverila and Fehr, 2016). In today's uncertain business environment, when a project need achieve pre-defined goals, such as ending by a certain date within budget (Austen et al., 2012; Yaghootkar and Gil, 2012).

Although some studies in the knowledge management literature have addressed CKMC (Korhonen-Sande and Sande, 2016), a few number of studies that thoroughly examine CKMC have been found. In these studies, it is seen that the organizations spend too much cost on customer knowledge gaining, innovation, and constantly increasing their customer knowledge management capability standard

(Khodakarami and Chan, 2014). However, they may suffer from the expenses of knowledge gaining without picking up the advantages of exploitation (Kale et al., 2019). Organizations need to develop the ability to respond rapidly to the solicitations of a developing number of digitally savvy customers (Sia et al., 2016). Ofoegbu and Akanbi (2012) establish that agility has a significant influence on CKMC, and basic asset for associations to pick up a competitive edge and increase their project performance.

Recently, agility has acquired the researchers attention because of the significant impact on project success (Inman et al., 2011). Agility gives the opportunity by reorganizing the system, respond quickly to change, capable to reforms, be flexible, and develop procedures to control the environmental changes and uncertainty (Sherehiy et al., 2007; Gao et al., 2015). However, previous research has ignored major factors of agility; innovation capability is the ability to introduce novelty and uniqueness through experimentation and innovative procedures to create new items and services, as well as new procedures (Gemünden et al., 2018) and apply that new knowledge to the generation of new items and market improvement, it will be more effective in advancing development yield (Santoro et al., 2018; Xie et al., 2018). To acquire the extreme project, strategic advantages associations frequently need an intelligent team equipped with customer data-driven skill (Akhtar et al., 2018; Al-Qatawneh et al., 2019). CKMC and team skill may provide better opportunities to get into agility and improve buyer-seller relationships (Jung et al., 2017). Though, customer satisfaction is widely recognized as an important part of project success. But few researchers have analyzed precisely how projects should be managed to accomplish it(Williams et al., 2015).

Due to expanding globalization and competitiveness between organizations, project team struggles to understand customer requirement and project teams are challenged to leave routine practices and enhance their work procedure or build novelty through innovative and experimental thinking (Anderson and Tushman, 2004). Regardless of understanding the significance of customer knowledge, a few organizations fail to give what customers need and incompetent to understand their preferences.

Previous studies, perceived that happened in light of the facts that organizations often turn careless, taking their understanding of customers based on past information and their achievements with respect to the customer requirements. Due to the advancement of technology, the customers changing their needs alter over time, and their expectations about product features. The team needs high quality and timely information about their customers, while meeting with the client, and expertise to distinguish their needs and wants, how best to fulfill those needs (Bachrach et al., 2017). Even though, the advancement of organizations database-management system (DBMS) and online sources provide customer information and phenomenal ability to create unique and innovative designed for their client and other partners (Brooks et al., 2016). Though, the project team needs training because team skills influence the internal processes which in turn directly impacts on project performance. Researcher suggests that highly skilled teams motivate and develop new a customers oriented procedure; it gives chances to the organization to continue changing and construct robust relations with their potential customers which helps to improve project performance (Im et al., 2016).

The purpose of this research is to exhibit the concept of customer knowledge management capability, and especially its effect on making a competitive advantage and, in concern, on a project performance. Also, uncover the instrument through which the effect would happen and the condition under which the project would be overhauled. Since, the changing condition created new challenges for project teams can be affected by agility which empower them to more quickly, more skillfully and more proficiently react to the opportunities innovation. While client information builds up a typical vision and supports new methodologies. This thesis study has the form of an overview study and it reveals the cross-level coordinating effects of CKMC as the breaking point limitations for creating a competitive advantage and on project performance.

1.2 Gap Analysis

Collecting, overseeing, and sharing customer knowledge can be a critical tool that associations and scientists overlooked earlier (García-Murillo and Annabi, 2002). Recently, associations have recognized the importance of customer knowledge management because of their ability to efficiently utilize their knowledge to reform and react to quick changing customer desires (Jasimuddin et al., 2006; Singh Sandhawalia and Dalcher, 2011). Furthermore, its impact on on project performance which has been considered in projects like manufacturing organizations, banks, small and medium (Martinez-Conesa et al., 2017; Granados et al., 2017), which inclines to be a potential gap that present studies did not investigate these components in context of project based organizations.

The current study adds to the project management literature's in various ways, for instance, it investigates the impact of CKMC on project performance, which has been neglected in the existing research. The study also identifies potential mediator and moderator, agility (market-capabilities, and innovation-capabilities) as mediator come into play in the CKMC and project performance relationship (Akhtar et al., 2018; Acosta et al., 2018; Al-Qatawneh et al., 2019). The further important aspect is that we discuss the literature background of agility because it has not been well established in the domain of project management. However, inclusion of team skills as a moderator is one of the unique domains which are still needed to be explored in the context of project management because in the future, enterprises can be fully depending on IT to communicate with each other. Since, IT is perceived as one of the most significant parts of future technology (for example: Business intelligence applications) enable human-to-machine and machine-to-machine communication with a reliable and robust manner (Lee and Lee, 2015). The insufficient information obstructs the team and customer relationships from operational and strategic perspectives (Carmeli et al., 2017). Project team required skills (for example, the abilities expected to manage the IoTs/data and information processing capabilities (Sousa and Rocha, 2019)). However, the information technology (IT) is a foundation capacity as it empowers information

stream and reduces obstacles and supporting the association to impart the customer knowledge with their team. Therefore, the project team dynamic data understanding capabilities will improve project performance (Bachrach et al., 2017). Third, this study investigates the framework by comparing non IT-oriented with IT- oriented organizations (Bresciani et al., 2018) ones in the domain of the CKMC under the circumstances of Pakistan. Finally, this study test the framework on quantitative data set and give critical data by following an entire explanatory methodology and utilizing an exceptional data set.

1.3 Problem Statement

According to the extant literature, the current study argues that CKMC don't only have a positive relationship with project performance directly, but also influence agility, which is in turn related to project performance. Therefore, the current study aims to find out whether and how is customer knowledge beneficial for project performance. Therefore, the problem statement of the study: *How does customer knowledge management capability affect the project performance, through agility?* by testing the relationships among variables will help to identify the impact of CKMC on project performance and help to enhance the existing literature of CKMC and project performance.

These all variables are considered in the literature: however, researchers are not model together in a single logical model. The current study constructs a model of these variables by analyzing how customer knowledge management capability cause project performance with agility as a mediating role and team skills as a moderating role is yet to be explored in project managements domain and contextual setting of Pakistan.

Moreover, this particular research is on employees of project base industry in Pakistan (Rawalpindi & Islamabad). At the present time, the focal point of many services sector is underwriting representatives' ability to make and execute new plans to improve administration quality. This particular study, which is on the role of CKMC on project performance will be very helpful for employees of the project

base industries that how they can be more innovative by managing the information of their clients, associations are more likely to identify emerging business sector openings before their rivals, to challenge the built up shrewdness of "getting things done around here", and to significantly more quickly make financial impetus for the association, its sponsors, and last, yet not least, its clients. CKMC is the essential strategy by front line associations free their clients from inactive beneficiaries of items and administrations, to strengthening as information accomplices. Customer knowledge management is tied in with extending, sharing, and the information living in client, to both client and corporate advantage. It can show up as shared headway, team based co-learning, and methods of training.

1.4 Research significance and Importance

This research will not only add up to the theoretical content to project management, but it will also be giving concrete evidence that how the projects can come to halt in various situations, because of not profiting the customer and organization or providing ample revenue even if they are executed as scheduled, within cost and accomplish the planned performance goals (Dvir et al., 2003). This research intends to empirically test a new model and novel thought to determine a direct relationship of CKMC and its impact on the performance of the project in Pakistani context.

Our study also facilitates in the existing literature of CKMC and project performance. Though, the importance of this study is that it will enable the IT-oriented and non IT project-based organization in Pakistan to adopt customer knowledge management capability that are necessary for the performance of the projects with the ultimate goal of customer satisfaction. Our study will provide assistance to project-based organization to incorporate creativity and inventiveness's in their ideas with confidence. It can be achieved by seeking out opportunities in the market and taking risks (financial business, etc.) in order to carve those ideas into reality. This will help in not only enhancing profits through the successful execution of their ideas but also to provide them the competitive edge.

Over the most recent five years' publications began to show up regarding this matter concerning empirical research went for examining the impact of customer knowledge management capability on project performance with mediating role of agility and moderating role of team skillsin one model that has never been studied before. The important debate in this regard is the how to measure agility. Researchers who are engaged in this area of study have still not been able to concur on the best strategy for measuring agility, and the assessments made so far are regarded basically as methods which can contribute to building up an exact measurement tool. Through, the interpretation of inventive thoughts into fruitful projects requires support from agility (Al-Qatawneh et al., 2019).

1.5 Theories supporting research

Several theoretical perspectives have been presented by different researchers, which are used worldwide to support the studies of CKMC and project performance like social learning theory, dynamic capability theory, organizational learning theory, but the current model find theoretical support of knowledge management theory Nonaka (1995) can cover all the variables of the present study. Recently, there has been growth in the use of information technology, communication between team and customer is limited which make it hard for project teams to understand the customer requirements. Team needs timely customer information and their interest to come up with more innovative ideas, which leads to enhances project performance (Leonardi, 2014). This study aim is to find out the importance of CKMC with agility to increase innovation and improving team skills to make the project successful.

1.6 Definitions of studying variables

1.6.1 Customer Knowledge Management Capability

Today the customer is known the most significant wellspring of knowledge for projects. The researchers accept when customer utilize the service or an item they get a lot of knowledge and experience. This knowledge has turned into a significant asset for associations and getting it has turned into another competitive advantage for associations. Customer knowledge management capability (CKMC) is characterized as the blend of involvement, disseminating, renewing, and updating the data which is required, made and ingested during the procedure and trade between the clients and associations for getting project objectives (Gebert, Geib, Kolbe, and Riempp, 2002; Awad and Ghaziri, 2008). As indicated by Mitussis et al. (2006) the customer knowledge management is set apart as one of the all the more confounding kind of information the executives, as client learning from various sources and channels can be caught. O'Dell and Grayson, (1998) clarified the possibility of knowledge management a intellectual methodology of getting the correct data for the opportune individuals at the perfect time and encouraging people to share and exploiting and applying information that endeavors to improve project performance.

1.6.2 Project Performance

Performance in projects was a conceptualized as a multidimensional construct (Gable et al., 2008; Pollanen et al., 2017). Boyne and Gould-Williams (2003) and Reich et al. (2008) defined project performance as a combination of budget and schedule variances alongside considered cost and efficiency, service, and provide actual quality that was initially expected, which capture the characteristics of performance.

1.6.3 Agility

The idea of agility at first showed up in 1990's by Iacocca Institute study situated in the United States and concentrated on capability based, adaptable and agile creation to experience the rapidly changing needs of the market (Iacocca Institute, 1990). Later on the meaning of agility has extended and differentiated. Goldman and Nagel (1993) argued that agility is seen as to comprehend the eccentric and keeps changing customer request into gainful capacity in a competitive environment, creating and alive in a circumstance that is irregular and unforeseen (Gunasekeran, 1999; Dove, 2001), respond emphatically against changing conditions and making opportunities form change (Bessant et al., 2001).

Agility helps to achieve high quality, flexibility, reacting to innovation, quickly changes and ease so as to have an advantage in a focused circumstance association (Ustasleyman, 2008; Ileri and Soylu, 2010). Association needs agility to compete with, global competitors, and effectively meeting the changing needs of customers, presenting new things, in adjusting to negatively progressing political change, in forming significant relations, and in offering top-level administration (Oyedijo, 2012).

1.6.4 Team Skills

The importance of team skills in project management should not be underestimated (Scott-Young and Samson, 2008). A project team can be described as a group of cross functional individuals working together towards a common project goal. Members are usually assembled by acquiring resources from different functions and departments within the organization. Project teams usually get disengaged after the project is complete, or assigned to other projects where deemed necessary. Literature proved that highly skilled project team member improved the project performance (Schutz 1996; Guinan, Cooprider, and Faraj, 1998; Wong 2009; Pollack and Matous, 2019).

1.7 Research Questions

Research question defines the broader problem area, which is defined in our problem statement as well. Based on our problem definition of the study, following research questions are derived.

1. Does customer knowledge management capability is related to project performance?
2. Does customer knowledge management capability is related to agility?
3. Does agility is related to project performance?
4. Does agility play a significant role as mediator between customer knowledge management capability and project performance?
5. Does a team skill, as a moderator, has any impact on agility?

1.8 Research Objectives

Research objectives comprise the reasons to study particular relationships. Based on the typology of research objectives, we derived the following objectives of our research.

1. To examine the relationship between customer knowledge management capability and project performance.
2. To examine the relationship between customer knowledge management capability and agility.
3. To examine the relationship between agility and project performance.
4. To examine the mediating effect of agility between customer knowledge management capability and project performance.
5. To examine the moderating effect of team skill on the relationship between customer knowledge management capability and agility.

Chapter 2

Literature Review

2.1 CKMC and Project Performance

The concept of knowledge management (KM) was presented in mid-1990's. Traditional KM is about proficiency gains (evasion of "re-developing the wheel"), while, CKMC is not the same as traditional KM. Customer knowledge is about innovation and growth. In light of knowledge management theory (Alavi and Leidner, 2001), this research builds a hypothetical support for setting up a positive relationship between customer knowledge management capability (CKMC) and project performance (PP). Knowledge management is the art of acquiring, creating, transforming and holding information about clients, just as utilizing that knowledge improved project execution and innovation.

Previous studies have proven that while developing new product, manufacturers should not emphasize only product, process methods and technology they should consider a customer requirement as it becomes a critical factor in product innovation (Fidel et al., 2015; Chang, 2017). Due to the high cost of innovation and the project failure risk organization should have the capacity to distinguish and comprehend the changes that are required and how these developments can be executed as a component of their key approach (Yeow et al., 2018).

At the point when client requirements change and new needs are created, which cause new markets to develop (Battistella et al., 2017). Kim et al. (2011) describe within few years online shopping system, increase worldwide, and enables the customer to directly purchase a product from a supplier over the Internet (e.g., Amazon.com, OLX.com). Online shopping makes less interaction with customers. Thus, Customer uncertainty and less customer knowledge make it difficult to understand customer requirement (Meyer et al., 2015).

Customer knowledge managers look for open doors for cooperating with their customer as equivalent co-makers of business worth. Additionally as a conspicuous difference to the longing to keep up and support a current customer base. Lamentably, holding turns out to be gradually difficult during a time where rivals product offerings are frequently close impersonations and just three mouse-clicks away. Subsequently, client information supervisors are considerably less worried about customer holding figures. Rather, they center on how to produce growth for the enterprise through gaining new clients and through taking part in a functioning and worth making exchanges with them. To overcome the issue firm start, engage the customer for online reviews; such surveys give them a glimpse of purchase and utilization experience of different clients (Thakur, 2018). While suppler-customer interaction improve innovation related knowledge (Schaarschmidt et al., 2018).

The Internet retailer like Amazon.com, monitor customer information effectively through online surveys, maintain their order histories, and adapted proposals subject to prior requests. Successfully, amazon is a business undertaking; they built up a stage to trade knowledge by inspiring customers to share their insight and ideas. By getting such sort of significant data, amazon gets striking accomplishment. However, customer knowledge management capability isn't restricted to, effective Internet organizations. Fashion designs, car manufacturing companies, etc. do it, as well. Meanwhile, IT industries face problems in the form of Big Data because the vast majority of the product and equipment to need store and oversee a lot of information (Del Vecchio et al., 2018; Sousa and Rocha, 2019). To handle data firms, use customer knowledge management tools, perform an essential role

in clarifying certain customer online behavior (Lopez-Nicolas and Molina-Castillo, 2008).

H1: CKMC has a significant positive impact on project performance.

2.2 CKMC and Agility

In the present economy, the technology spreads rapidly and the CKMC transforms into an unavoidable part to think about so as to fortify any association's upper hand in the market paying little respect to a product or service type. Where a client is an incorporated accomplice to improve development and from that point guaranteeing a competitive advantage over the long run (Sofianti et al., 2010). Campbell (2003) shows the customer knowledge alludes to the organized and sorted out information identifying with the customer driven by systematic preparing. Regarding the customer knowledge literature, Gebert et al. (2002); Desouza and Awazu (2005) described customer knowledge into three significant classes. The first type called knowledge "from"customer recommends to learning about items, markets and providers associated with satisfying customer's information needs. The resulting type alludes as knowledge "about"customers, which is prepared based on the investigation of true customers' data and information. The third sort, which is known as knowledge "for"customers, alludes to the customers' reactions. Another kind of customer knowledge communicated by Smith and McKeen (2005) is joint effort information. This information can be discovered during the cooperation between a firm and its customers. As per (Sofianti et al., 2010), CKMC is the key practice dependent on which forward looking firms unshackle their customers from being pleasing recipients of items and administrations to help as the information accomplices. The customer knowledge management identifies with procuring, sharing, and using the learning inside customers to serve those customers just as the affiliation. It is named as a continuous daily schedule with respect to making, coursing and utilizing customer information inside a specialty unit and between a specialty unit and its customers.

The customer knowledge management theoretically recognizes the explanation relies upon a method. The management of CKMC is significantly settled in a procedure direction. Akhavan, Ashtar, and Heidari (2008) clarify the customer knowledge use, its development and origination. ALHawari et al. (2008) explain about the design, the capability, and the dispersion of client information. Unequivocally appeared by Paquette (2005) the customer knowledge management capability is described as a ton of methodology of distinguishing, obtaining, development and utilization of customer knowledge. The customer knowledge management capability bolsters us to expect that the act of nimbleness would propel the learning the board procedure which can provoke to item and administration productivity (Durmuolu and Barczak, 2011). Also, regarding to the undertaking group aptitudes, most researchers concur that customer knowledge relies upon the group execution, including abilities, experience, inspiration, qualities, and convictions (Attafar et al., 2013).

Doz and Kosonen (2008) explain agility as the ability to constantly alter and clarify decisions to the varying event of the external condition this sustains esteem foundation. The concept of "agility"was established from the assembling division and gradually associated with others field. Lusch et al. (2007) place that shared capability exceptionally defines the association's capability to procure the knowledge for a economical benefit. Fang, Palmatier, and Evans (2008) show that client support in another item improvement positively influences data sharing and coordination effectiveness. Such capabilities for knowledge generation transform raw information into unequivocal and helpful data that system accomplices can use to build up their spryness (Uden and He, 2017). Without such abilities, associations would be not able compete adequately and build up the superior influences linked to being agile and first in getting to business sectors (Heisterberg and Verma, 2014). CKMC is seen as a significant asset that can be figured out how to help new item advancement, to encourage the detecting of developing business sector openings and to improve long haul client connections. Accordingly, CKMC is worried about the management and exploitation of client related information (Wu et al., 2013). CKMC and agility both give the capacity to the association to react

to the requirements of the clients rapidly, high responsiveness and high adaptability pick up a focused edge over rivals in the business sectors (Dubey et al., 2014).

H2: CKMC has a significant positive impact on agility.

2.3 Agility and Project Performance

In dynamic and quick paced business condition, agility assumes an imperative role in firm performance. Agility is the capability to reliably change and delicate the business condition. Temporary projects should most likely turn rapidly and change without losing any solidarity to continue in the business world. Associations are required to take advantage of the progressions and dissemination in the business condition. Agility is fast strategy game where development and steady improvement of new capacities as the upper hand (Doz, 2014). Agility gives chance to the brief undertakings to limit the risk and project performance.

Agility is identified with the capacity to meet startling changes and exploit the change as an opportunity (Zhang and Sharifi, 2007) and can have benefit or, piece of the overall industry and pull in clients. Agility considers a few crucial capabilities that incorporate responsibility, competency, adaptability and speed. Different meanings of agility have been giving yet. Agility is a fruitful execution of the focused standards, for example, speed, adaptability, advancement and quality by reintegrating assets and best practices to give client situated items and administrations in a domain with quickly changes. Agile associations are intended to comprehend and anticipate changes in the business and they manage their organized. Satisfaction of clients and representatives is one of the agile association's objectives. Agile enterprise needs to structure its association, procedures and items so that it can react to changes properly inside a particular time period.

As also define by (Zhou et al., 2018) the term agility has been utilized in various investigations from various business levels, for example, store network (Dubey, Gunasekaran, and Childe, 2018), association (Ghasemaghaei, Hassanein, and Turel, 2017), business process (Raschke, 2010), the executives (Winby and Worley, 2014),

among others. The normal point in all the referenced examinations is this that undertakings need a unique ability to confront unexpected changes in the business environment. They should respond quickly to adapt to fast and sudden changes in a word, to be agile (Tan et al., 2017). Researchers have described agility as the capacity of the firm to modify strategies and tasks inside its supply chain to react to environmental changes, opportunities, and threats (Dubey et al., 2018). From an association point of view, agility is the capacity to detect opportunities for advancement and react to those chances and to quickly update procedures to exploit business conditions (Kitchens et al., 2018).

Seo and La Paz (2008) consider that agility incorporates various procedures that give a chance to a firm to detect environmental changes and react to them in an timely and cost-effective way. Teece, Peteraf, and Leih, (2016) explain agility as the 'ability of an association to proficiently and adequately redeploy/divert its assets to value making and worth ensuring higher yield exercises as inward and outer conditions . Hence, the capability to adjust to unanticipated changes in the worldwide market is a principal component for getting by in such a turbulent environment.

Three main practices, covering exploring earlier information, checking present actions and anticipating the upcoming, ought to be high priorities. According to this, organizations must keep up a procedure of getting ready and embracing a strong situation for suitable decision-making (Stieglitz et al., 2018; Rouhani et al., 2018). Although the certain role of agility, a vast set of studies on IT related issues have overlooked agility as a potential result and only highlighted firm performance (e.g., (Mithas et al., 2011)). Through some prominent exemptions Tallon and Pinsonneault (2011) describe the past research does not completely address the relationship between customer knowledge related issues and agility to improve the performance of the project.

H3: Agility has a significant positive impact on project performance.

2.4 Mediating role of Agility

Projects are assumed to be unique and short-term task and are constantly initiated to accomplish a specific set of objectives (Hobday, 2000), likewise having uncertainty in extent of work and goals that should be accomplished when responding to the environment of project performance (Turner and Cochrane, 1993), subsequently Cegarra-Navarro et al. (2016) presented a mediating role of agility on the impact of KM and venture execution. In order to meet customers' desires in a frequently changing market, a enterprise must adopt instant actions to keeping its high ground. In earlier research, there are a limited number of studies examining the mediating role of agility.

The impact of agility on project performance was also examined by Vazques Bustelo, Avella and Fernandez, whose objective was to confirm whether industrial agility might be the important success component in numerous businesses (Vazques-Bustelo, Avella, Fernandez, 2007). (Tallon and Pinsonneault, 2011) establish a mediating role of agility in the influence of IT position on project performance. Yang and Liu, (2012) given research corresponded associations execution through its readiness and structure of the system.

In additional research, the mediating role of agility is established in the association among agility and organizations performance (Martinez-Sanchez and Lahoz-Leo, 2018). It is essential to lead more investigation into the impact of agility on making a competitive advantage and on project performance. The exploration directed so far has been extremely broad and does not clearly demonstrate which parts of agility in organizing tasks can assume a crucial role in increasing performance. Considering the previous studies, it would appear to be especially valuable to recognize the CKMC with agility, can deliver an advancement in a project performance. Kumkale (2016) highlighted agility as resources, giving a viable lead, to confirm agility, inside and outside situations need continually be analyzed, information needed to be assembled and utilized rapidly, and quickly respond to the changing environments, also recognized that when the project come to be strategically agile, they can achieve a economical benefit and improve their project

performance.

According to the literature, Reich et al. (2014) explain the customer knowledge management capabilities dont have a direct effect on project performance, but through agility also have an indirect impact on project performance. Agility has a complete mediating influence between CKMC and project performance. (Queiroz et al., 2018) also used agility as mediator. In recent times, there has been wide research on customer knowledge management and dynamic capability theory Teece, Pisano, and Shuen defined "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments"(1997, p.516). Doz and Kosonen, (2010) defined agility as organizations need the ability to stay competitive in their business by modifying and changing the new creative idea and using these ideas to make new item and services and new strategic models.

Dynamic environment makes it difficult for identifying the benefit plan of action or proper strategy is challenging, and dis-satisfactions are expected (Anderson, Covin, and Slevin, 2009). Agility is an emerging approach that is making progress, particularly innovational organizations and Information processing advancement ventures. According to the Shin et al. (2015), in their study on Korean small and medium association, establish the agility has a positive impact on project performance. This strategy has progressed from the time when the course of action of the Agile Manifesto for Software Development (www.Agile manifesto.org) in February 2001 by a group of expert suggested various "agile"(or lightweight) strategies, devices and practices utilized at present. The term "agility"generally consists of three dimensions: the ability to respond, execute rapidly change in the business scenario, and at a low cost. Agility recognizes and effectively translates feeble signs, CKM is the key enhancement from which uncertainty and opportunities will more than likely rise (Zerjav et al., 2018).

The literature suggests that agility is an idea to organize and address intensity in the present quick paced and unstable market environment; agility is not the capacity to retain the change inside pre-set up framework; however, the capability to revamp efficiently, as it suggests the essential change in the course of action itself. Serrador and Pinto (2015) also reported that by using the agile method in

a project give a measurable critical effect on each of the three measurements of project success, as evaluate by effectiveness, partner fulfillment, and perspective of general project performance. Further pointed out Wang et al., (2018) customer collaboration and active involvement gives a benefit in CKM, and construct open doors of communication with the firm, and enable firms to better understand potential Customer demands. So as to meet clients desires in the always changing market,enterprises need attempt immediate activities aimed at sustaining its viable edge. Firms should present novelty in the manufacturing procedure as well as information and communication technologies, which need a reorganization of the association and new advertising techniques.

We additionally contend that an organizations innovation capacity gives them the adaptability to design asset activity systems that could be leased yielding. This complementary view recommends organizations that have the better IT ability have the potential to be agile (Ravichandran, 2018). The cultural level knowledge management capability increases customer awareness and minimizes the social system risk and improves project performance (Zhang et al., 2018). Project market level capability provides the ability which required adjusting its practical advertising capacities to better serve dynamic markets (Mu et al., 2018).

Besides, the degree to which these web-based advertising technologies are all coordinated through the organization will encourage advertising capability development, enhance client relationships, and increase consumer loyalty. (Turner, 2018) Recognized that standard project management practices more focusing on control and following the standard rather than focusing on innovation, distinguished competency traps, and tend to bolt individuals into the traditional methods for working as, and opposed to attempting new things.

H 4: Agility mediates the relationship between CKMC and project performance.

2.5 Moderating role of Team Skills

Customer knowledge management capabilities refer to a project teams skills to acquire new information, integrate it, and apply the customer-related knowledge to develop new products Project team learning perspectives also indicate that acquiring and sharing customer knowledge among the project teams offer to build the future innovations (Im et al., 2016). Any information or knowledge about both customers and competitors are irrelevant unless and until the gathered knowledge is being shared and communicated through each functional department that helps a project team to produce the exact outcome which satisfies the necessities and desires of the ideal target individuals and provide a competitive edge in the market. This adaptation from the market will give productive bits of knowledge to the project teams that eventually use that information and implements to build up an effective item in the market.Diverse skills give project teams competitive edge and increase the productivity they can develop new products more rapidly (are expert in developing products), and more creatively and will be able to make their new product successful.

More over knowledge management enhances the firm level to obtain high quality product technologies from the knowledge that is acquired by the key individual from external sources through an interaction between knowledge storage and creating values among employees of certain teams to work accordingly to accomplish the essential purposes and goals set by an organization (Tzokas, Kim, and Dajani, 2015).The knowledge based view of an organization as discussed by the De Clercq et al. (2015) is based on the exchanges between different areas and domains of different knowledge that ultimately explains how well an organization will expand its innovative activities through increased coordination and sharing of knowledge within an organization. Such exchanges not only enhance the effectiveness, but allow employees to produce productive ideas through teamwork, creativity and increase the concept of new knowledge about new product development. Moreover, identifying the usage of the CKMC to develop skills individually and within teams to easily understand the customer requirement. Customer Knowledge is the

critical source for project constant competitive advantage and also for retaining the existence in the knowledge based and evolving high technological businesses.

Therefore, when the association further split into project teams, CKMC turns out to be fundamentally significant (Hanisch et al., 2009). Similarly, learning in project setting is of utmost importance for the project success both in terms of project agility and project performance. However, it has been established that only a few quantity of project based association have frameworks set up for recognizing and transferring knowledge from past to future related ventures Kang (2007). Therefore, continuous learning and advancement has been considered as the establishment stone in context of project management development Williams (2007).

Though the concept of project team skill is being broadly discussed in literature of management. Von Krogh, (2012) explains the International organization hires professional consultant for their project planning to get the customer knowledge management capability. The consultant said, by using IoT (internet of thing) collecting and analyzing customer information has become easier (McIver et al., 2018). Project team (IoTs & information processing capability) skills set up the relationship between the project team and customer (Bresciani et al., 2018). Therefore, team skills playing a significant role as a moderator between CKMC and agility (Crte-Real, Oliveira, and Ruivo, 2017). The term "the Internet of Things"is used for those gadgets that have network connectivity and the ability to send or get information and data to other connected devices.

In recent times, the Information technology observes as an important resource for CKM for successful relations between customer and project team, organizations develop information systems for rapid change (Lowry and Wilson, 2016). Agility encourages informal communication, face-to-face interaction between project team and customer, and information sharing through social practices the effective knowledge sharing improves project performance (Xiang, Yang, and Zhang, 2016).Conforto et al. (2016) is defined agility as "Agility is the project team's ability to quickly change the project plan as a response to the customer or stakeholders

needs, market or technology demands in order to achieve better project and product performance in an innovative and dynamic project environment".

Dynamic capabilities can direct the advancement of noteworthy solutions or reasonable tool and strategies that can be utilized by managers to enhance performance (Wang and Hsu, 2018). Team learning orientation and knowledge sourcing enhance project team creativity and problem solving capability (Khedhaouria, Montani, and Thurik, 2017; Abrantes, Passos, e Cunha, and Santos, 2018). The project team skills put a major impact on the clients approach towards the project performance, and are probably going to impact both consumer loyalty and relationship quality. IT-oriented firms have a highly skilled project team because the expert abilities that individuals need to manage a venture or program recognized in the non-exclusive competency frameworks and collections of learning created by organizations (for example, the Project Management Institute and Association for Project Management). Kim, Shin, Kim, and Lee, (2011) highly skilled team and dynamic capability is playing a key role to enhance project performance. Cram and Marabelli, (2017) believed that project team members play a part in the requirement analysis work in different ways, few members communicate with customer and educate them to describe their actual needs, and remaining member build the model framework and showed them to the customer to find the problems to be made progress. Hence, project team requiring greater customer knowledge for identifying what customers think and how they feel, then there will be a greater chance of quality decision making and high team performance.

This study recommends that it is essential for the project team to build the trustworthy relationship with the customer by utilizing the diverse expertise and frequent interactions since the trust will influence knowledge sharing. Knowledge sharing prompts a more prominent awareness of the unsolved issues and current information among team members, which contributes to improved decisions (Park and Lee, 2014; Yap et al., 2017).

H 5: Team skills moderates the relationship between CKMC and agility.

2.6 Research Model

The current study aims at examining the direct impact of between CKMC and project performance, along with considering the mediating role of agility and the moderating role of team skills. In this research model (Figure 2.1), CKMC is an independent variable, project performance is a dependent variable, agility is a mediator and creative team skills is a moderator.

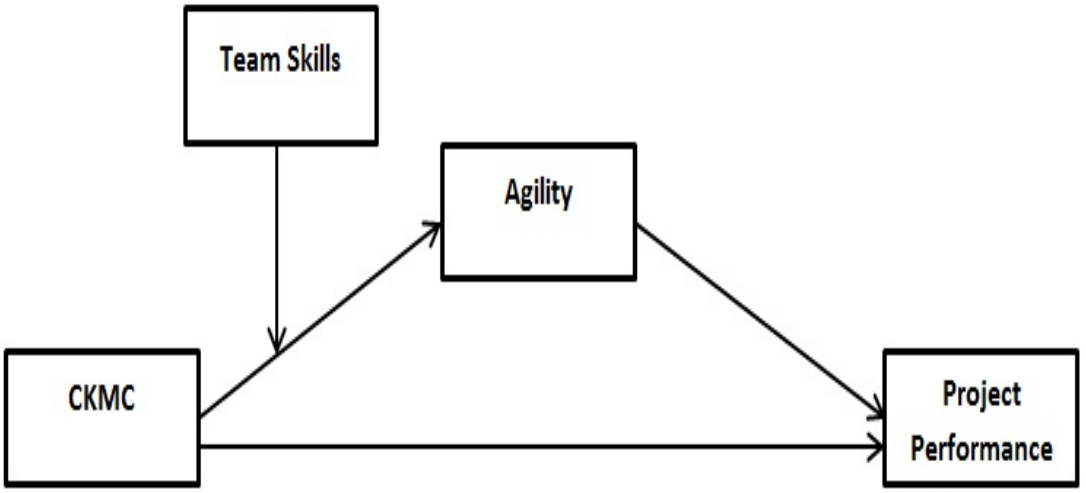

FIGURE 2.1: Conceptual model of the study

2.7 Research Hypothesis

H1: CKMC has a significant positive impact on project performance.

H2: CKMC has a significant positive impact on agility.

H3: Agility has a significant positive impact on project performance.

H4: Agility mediates the relationship between CKMC and project performance.

H5: Team skills moderates the relationship between CKMC and agility.

Chapter 3

Research Methodology

3.1 Introduction

The aim of this methodology chapter is to discuss the research process and specifically the process that was applied to this study. Research methodology mainly focuses on research design, data analysis and data collection techniques (population and sample), estimations, ethical issues, pilot study, their and reliability indexes along with the items involved in this research which were applied to get the results.

3.2 Research Design

A research design is usually defined as frame of planned action of research in order to carry out the research study. Zikmund (2003) and Zikmund et al. (2015) characterizes the research design contain the researchers proposal to recognize the strategy as well as process for gathering and exploring essential data to extract the relevant information. The research design includes types of study, study setting (the type of work, environment and level of the respondents etc.), time horizon (where, when and how long will it take to collect the data), ethical Issues, and the unit of analysis (individuals, teams, organizations etc.).

3.3 Types of Study

The present study is used to emphasize the impact CKMC on project performance with mediating role of agility and the moderating role of team skills. In this regard, IT project based organizations of Pakistan have been targeted to collect the required data needed to get the authentic results. This will support to simplify the outcomes of this study and since the sample statistics that is probably going to be shown by the entire project based association's population of Pakistan.

3.4 Study Setting

The respondents of the research are mostly from the IT project based organizations of Pakistan and the general population working in these associations. The questionnaires were directly distributed to them so that they could fill them as specified by their actual work settings.

3.5 Time Horizon

The data have been collected within four months (i.e, September and December 2018) for this study, the present study is not time-lagged study and the data were collected at one time, so the design is cross-sectional in nature.

3.6 Ethical Issues

While conducting this research study following ethical concerns has been contain which are:

1. Informed Consent.

2. Research integrity assurance.

3. Protecting privacy of respondents.

3.7 Unit of Analysis

In research any component which is inspected by the scholar is known as a unit of analysis. The unit of analysis relies upon the purposes and nature of research. The unit of analysis can be either individual, industries, organization, countries, group, or culture from where data are gathered (Khan, 2014). But for this present research unit of analysis were focused on the individuals of software firms from both (public & private) sector project based association from Islamabad and Rawalpindi.

3.8 Population and Sample

A population is a collection event, things and people that are associated with an interest that the researcher wants to analyze. It is challenging for any researcher to gather data from each and every person of the population, so it is essential to select the sample to make research reliable and gather information in a way that is the best representative of the whole population. The present study, seeks to focus on project based IT-oriented or non IT-oriented public and private sector association operating in the twin cities Islamabad and Rawalpindi. The current study population is the project supervisors, team members working on different project based software organizations.

The reason to choose IT industry of Pakistan is that various projects running in different fields such as infrastructure, education, energy, hydro power, social services, etc. IT sector strengthens the economy of Pakistan, by dragging overseas investors and this industry is also supported to the worldwide acknowledgment of Pakistan as an emerging country (Hussain, 2011). According to the Pakistan Software Export Board (PSEB) the total size of IT industry is approximately US $ 6.5 billion, by continuing both exports and domestics turnover is expected to grow at least 3.5 percent in the next five years. The chief executive officer of Pakistan National Technology declares the IT industry growth will be twice in year 2020 (Talib et al., 2017).

3.9 Sample and Sampling Technique

The sample is a composition of the population represents the whole population for that study, which explain the two diverse practices, probability and non-probability (Hair Jr et al., 2015). It is not possible to gather information from all the populace because of the resource and time constraint that is the reason sampling is utilized to gather and investigate data. The non-probability technique is utilized to gather information from well representative of the populace. In this study simple convenience sampling method was used to collect the data because it expels bias from the data collection process and ought outcome in illustrative samples and also cover a wide range of population for studying the impact of CKMC on the performance of the project.

However, different kinds of project are currently working in Pakistan. The data were obtained from 50 different projects based organizations operating in Islamabad, Rawalpindi (Appendix-A List of organizations). Although this study focused on IT-oriented and non IT-oriented public and private sector organizations, running various projects in the field of manufacturing, IT firms, Telecom sector, banks and services. The researcher approached the respondents through personal and professional contacts. Data were collected by visiting work sites.

In order to avoid common method variance, the respondents supervisors were approached to collect data on employees customer knowledge management capability, agility and team skills. Whereas data on project performance were self-reports. Due to time limitations and to capture the maximum variance, the study targeted project based organizations located in the capital city Islamabad, and Rawalpindi to get the required data needed to get the authentic results. Initially 450 questionnaires were set as a target, but 307 genuine responses were collected. Besides, this will assist to simplify the outcomes from the sample statistics that will prone to be shown by the entire populace of Pakistan.

The target sample of this research is enclosed project employees who filled out the questionnaires. The introductory part of questionnaire reflects the aim of the study and assurance that the identity of the participants would be strictly private

and gathered information will only be used for scholastic research and not to be imparted to any one.

3.10 Data Collection

In this study, questionnaires were used for data collection and they were adopted from previous literature, primary source of data has been utilized for gathering information data from the developing sector of Pakistan, which implies that first hand data has been collected for accomplishing the research targets and addressing the research questions. The time period spends in information gathering was four months. A total of 450 questionnaires was distributed in 50 different IT-oriented and non IT-oriented public and private sector organizations, but only 307 appropriately filled were gotten from the disseminated questionnaires that were incorporated for analysis and the response rate is 73%.

Necessary sample size (n) = (Z-score) * Standard Deviation (1 SD) / Margin of error Z-score was taken at 90% (1.645) and standard deviation was taken at 0.5, whereas, margin of error was taken at confidence interval +/- 5%.

3.11 Sample Characteristics

Total number of respondents were 307. The Demographics used in questionnaires were gender, age, education level, work experience, Organization and Customer Information Management System. The sample characteristics of the respondents from whom the data were collected are indicated in the following tables.

3.11.1 Gender

Gender is an important component of demographics. Which highlights the reason to keep up gender equality, so it is also analyzed as the significant part of the demographic because it highlights the ratio of male and female in a given population sample. It has been seen that the ratio of male respondents was greater than

female respondents because in software organizations mostly business managers were male.

Table 3.1 displays that the gender formation of the sample in which males were 70.7%, while the female appears to be only 29.3%.

Table 3.1: Gender

Gender	Frequency	Valid Percent	Cumulative Percent
Female	90	29.3	29.3
Male	217	70.7	100.0
Total	307	100.0	

3.11.2 Age

Age is one of the most significant parts of demographics, however a few respondents feel reluctant to reveal their age. So instead of asking exact age, five different age ranges were used to avoid the discomfort of respondents.

Table 3.2 demonstrates the composition of the sample with situation to age groups in which 48.9% of respondents age were less than 25 years of age, 48.2% respondent age were of 26-40 years of age, 1.6% respondent were in the age group of 41-50 years and 1.3% of the respondents were in the age group of over 50 years. In that review, the levels of less than 25 respondents are high.

Table 3.2: Age

Age	Frequency	Valid Percent	Cumulative Percent
Less than 25	150	48.9	98.7
26 to 40 years	148	48.2	48.2
41 to 50 years	5	1.6	49.8
More than 50 y	4	1.3	100.0
Total	307	100.0	

3.11.3 Education Level

Education level is a fundamental piece of demographics like age and gender since education provides chances for student to enhance their information,technique and skill that allow them to compete with the student among worldwide, education is essential for any country success. Four diverse types of degrees were mentioned in the questionnaire in order to gather data about education.

Table 3.3 explains that (35.8%) respondents were Bachelor degree holders, (34.9%) possesses Master degree, (26.1%) were MS/M.Phil.,and (3.3%) with PHD level degree. The bachelor degree holders rate is high.

TABLE 3.3: Education Level

Education Level	Frequency	Valid Percent	Cumulative Percent
Bachelor	110	35.8	35.8
Master	107	34.9	70.7
MS/M.Phil.	80	26.1	96.7
PHD 10	3.3	100.0	
Total	307	100.0	

3.11.4 Experience

Work experience expands individual skills and inventiveness with the goal that's the reason it is a significant part of demographics. To collect data concerning the experience of the respondents. There were four distinct ranges used to gather information of employee tenure, these years range made suitable for representatives to pick work experience with their particular field of ventures.

Table 3.4 shows that 53.1% of the respondents had (less than 3 years) of experience, 25.7% respondents were in the range of (3 to 5 years), 11.4% respondents were having a work experience range of (6 to 10 years) and 9.8% respondents had work experience of (11 to 15 years). This means that the high percentage of respondents work experience is less than 3 years.

Table 3.4: Experience

Experience	Frequency	Valid Percent	Cumulative Percent
Less than 3 years	163	53.1	100.0
3 to 5 years	79	25.7	5.5
6 to 10 years	35	11.4	46.9
11 to 15 years	30	9.8	9.8
Total	307	100.0	

3.11.5 Organization

Organization type is an important part of the demographics, it provides opportunities for researchers to recognize the difference between IT-oriented and non IT-oriented organization which one of them enhance project performance . Two diverse ranges were declared in the questionnaire in order to gather data regarding organization.

Table 3.5 shows that 61.6% of the respondents were working in IT-oriented organization and 38.4% are doing job in non IT-oriented organization.IT-oriented organization rate is high.

Table 3.5: Organization

Organization	Frequency	Valid Percent	Cumulative Percent
IT-Oriented	189	61.6	61.6
NON IT-Oriented	118	38.4	100.0
Total	307	100.0	

3.11.6 Customer Information Management System

The customer information management system (CIMS) is a vital part of demographics, which mentions the tools and the procedures that a enterprise practices to collect, manage, stock, and examine information about its customers, for the reasons of competitive advantage and the creation of new items.

Table 3.6 explains that (68.4%) respondents were doing a job in those organizations they have CIMS, (31.6%) respondents organizations dont have CIMS.

Table 3.6: Customer Information Management System (CIMS)

CIMS	Frequency	Valid Percent	Cumulative Percent
Yes	210	68.4	68.4
No	97	31.6	100.0
Total	307	100.0	

3.12 Research Instruments

The survey questionnaire was written in English language. In Pakistan, English is instructed as a necessary subject started from high school. Guideline at the university level is also directed in English. Since the greater parts of the respondents were college graduates, they must not to have had any issues understanding the questionnaire. All the items were measured using a closed ended questionnaire. A Likert scale with five response options ranging from "1=strongly disagree"to "5=strongly agree"was used to measure all the items.

According to the nature of research, questionnaire was divided into two sections. The first part contains items about the respondent demographics (gender, age, experience, education, type of organization and customer information management system). The second part is about the independent variable (CKMC), dependent variable (project performance), mediating variable (agility) and moderating variable (team skills). 450 questionnaires were distributed in a total of 50 different projects, but only 330 were received. But the actual numbers of questionnaires used for the analysis of data for demonstrating the results were 307. The rejected questionnaires out of 330 questionnaires were those which were not having the whole information or many of the questions were blank in those questionnaires hence making them not suitable for the research.

For each variable the data were collected through adopted questionnaires from different reliable sources. Roughly 10-30 questionnaires were distributed in each project based associations that have been visited during data collecting time period. Also, distributed the questionnaires online to the websites of project based organizations for the quick response. Previous researches suggest that, online collection information have a few significant points of interest over paper-and-pencil

surveys and more convenient method of data collection, as respondents find it more easier way to fill the surveys rather than the process of filling surveys by paper-pen method and furthermore decreased reaction time, reduced cost, easy to enter data, adaptability of and command over design, regardless of data gathering approach, there is no significant effect on the nature of information while using any of the two previously mentioned strategies (Granello and Wheaton, 2004).

3.12.1 CKMC

Regarding the independent variable, a 4-item scale developed by Tanriverdi (2005) was used to measure CKMC. Sample items include "Creating marketing skills and knowledge that are applicable across multiple business units,"and Cronbachs alpha reliability for CKMC was 0.82.

3.12.2 Project Performance

A 5-items scale adopted by Um and Kim (2018) was used to measure the dependent variable Project Performance. Sample items to measure the performance of the projects include "The project results, or deliverables, are in line with client objectives,"and Cronbachs alpha reliability for Project Performance was 0.76.

3.12.3 Agility

As mediator agility was measured using Queiroz et al. (2018) 8-item scale. This measure was also validated by Tallon and Pinsonneault (2011). Sample items include "Respond to changes in aggregate customer demand, "and Cronbachs alpha reliability for agility was 0.79.

3.12.4 Team Skill

Team skill as moderator was measured using a 4-item scale developed by (Guinan et al., 1998). Sample items include "Members of our design team have example

expertise for doing the work, "with an alpha reliability of 0.61. As the reliability above the threshold of 0.6, is considered acceptable (Xatignon and Xuereb, 1997; Hair, Anderson, Tatham, and Black, 1998).

TABLE 3.7: Research Instruments

Variable	Variable Type	Source	Items
CKMC	Independent	Tanriverdi (2005)	4
Project Performance	Dependent	Um and Kim (2018)	5
Agility	Mediator	Tallon and Pinsonneault (2011) ; Queiroz et al. (2018)	8
Team Skill	Moderator	Guinan et al. (1998)	4

3.13 Data Analysis Techniques

Data relevant to study was collected from 307 respondents. After data collection it is than analyzed by using SPSS software version 25. To perform CFA, AMOS 22 is used. A number of procedures were used for complete analysis. These procedures are as stated below:

1. Initially, the questionnaire which were filled completely and appropriately are used for analysis.
2. All variables of questionnaire were coded than after coding variables analysis is performed.
3. To explain characteristics of sample frequency table were generated which show missing values if any or demographic detail in tabular form.
4. Coefficient of Cronbach alpha is checked to find the reliability of variable used in study
5. Descriptive statistic was done by using numerical values.
6. After confirmation of datas validity One-way ANOVA test was used to find any controlled variables.

7. Correlation analysis was used to find the significance and non-significance of relationship between variables under study.

8. Regression analysis was used to determine the relationship between IV and DV.

9. Andrew F. Hayes process were used to find the role of mediator and moderator between CKMC (independent variable) and PP (dependent variable).

10. Finally to check the acceptance and rejection of proposed hypothesis, Andrew F. Hayes method is used.

Chapter 4

Results

4.1 Measurement Model

Confirmatory Factor Analysis (CFA) technique was pursued for validating the measurement model (Anderson and Gerbing, 1988), which contained of four latent variables: CKMC, Agility, Team Skills and Project Performance. The mix of various fit indices: Goodness of Fit Index (GFI) characterizes the unit of progress and covariance proportion Raykov and Marcoulides (2000).GFI explain total fit for the estimated model Gefen et al. (2000). Values lies somewhere in the range 0 and 1, though the value should close to 1 for indicating a GFI,value above than 0.8 also indicates the acceptable fit, but the value below 0.8 indicates poor model fit whereas above 0.80 is acceptable fit.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. Incremental fit index (IFI), its standard value is greater than 0.80, comparative fit index (CFI), Tucker-Lewis index (TLI) standard value is greater than 0.9 or sometimes less than 0.9 is acceptable, and root mean square error of approximation (RMSEA), was utilized to evaluate the model fit.

4.2 Latent Variables

4.2.1 Independent Variable:

Customer knowledge management capability (CKMC) was the first variable of the study coded as CKMC and the scale contain 4-items. This scale loading factor was CKMC1 = 1.00, CKMC2 = 1.09, CKMC3 = 1.06, and CKMC4= 0.97. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indicates the value to be on acceptable criteria, such as, RMSEA = 0.00, AGFI = 0.99,and GFI = 1.00.

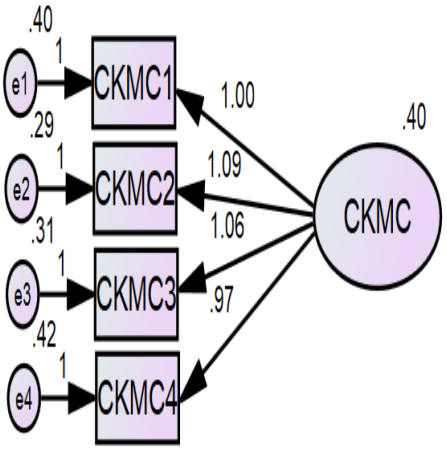

FIGURE 4.1: CFA for Customer Knowledge Management Capability (CKMC)

4.2.2 Dependent Variable:

The dependent variable of the study was project performance coded as PP and the scale contain 5-items. This scale loading factor was PP1 = 1.00, PP2 = 1.06, PP3 = 1.04, PP4= 0.84 and PP=0.73. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indicates the value to be on acceptable criteria, such as, RMSEA = 0.00, AGFI = 0.99, and GFI = 1.00.

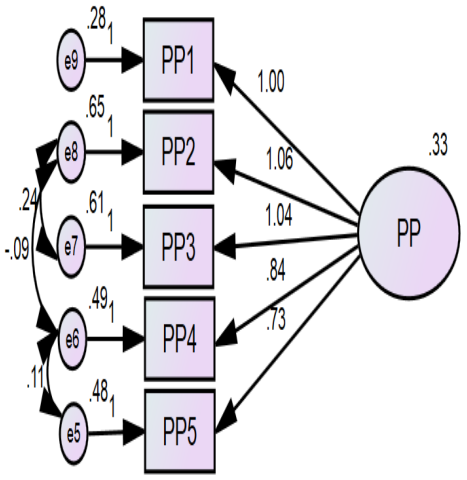

FIGURE 4.2: CFA for Project Performance (PP)

4.2.3 Mediating Variable:

Agility coded as (A) and the scale contain 8-items. This scale loading factor was A1 =0.51, A2=0.57, A3=0.62, A4=0.53, A5=0.67, A6=0.59, A=0.63, A=0.37. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indicates the value to be on acceptable criteria, such as, RMSEA = 0.47, AGFI = 0.94, and GFI = 0.97.

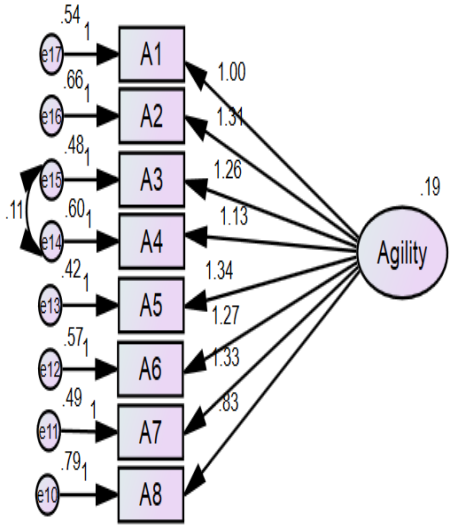

FIGURE 4.3: CFA for Agility (A)

4.2.4 Moderating Variable:

The moderating variable of the study was Team skills coded as TS and the scale contain 4-items. This scale loading factor was TS1 = 1.00, TS2 = 1.06, TS3 = 1.04, and TS4= 0.8. This variable showed favorable results and there was no need to delete any item in this variable. Statistic fit indicates the value to be on acceptable criteria, such as, RMSEA = 0.00, AGFI = 0.99, and GFI = 0.99.

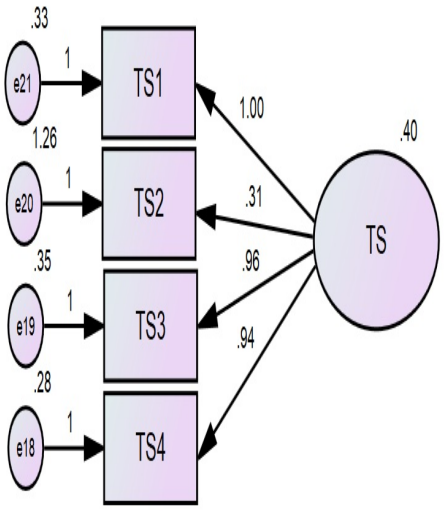

FIGURE 4.4: CFA for Team Skills (TS)

4.3 Confirmatory Factor Analysis for all Latent Variables:

To perform CFA, AMOS is used. The measurement model proved to be a good fit to the data(/df=1.76, GFI=0.91, IFI=0.936; TLI=0.924; CFI=0.93; RMSEA=0.05) shown in table 4.1. The aforementioned results of CFA confirmed by showing satisfactory discriminate power. The satisfactory level of testing recommended by MacCallum, Browne, and Sugawara (1996); Thompson (2000) is 0.05 to 0.10 (ideal) for RMSEA however in this research case 0.05 (ideal). CFA for complete model is shown in figure 4.5.

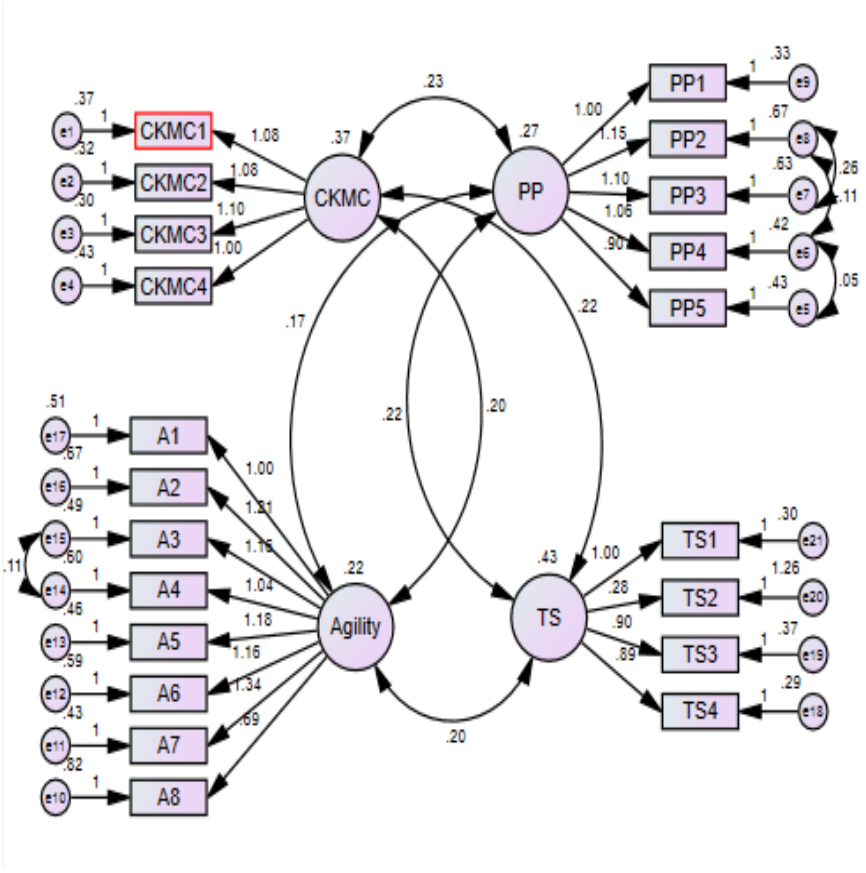

FIGURE 4.5: CFA, Full measurement model diagram

After conducting the CFA, study perform single linear regression to carry out the correlation among the independent variable that is CKMC and dependent variable that is project performance. Regression analysis is commonly used when we want to study the impact of various factors on the dependent variable under the study. To make it assure that the earlier research with respect to the variables is still supporting and accepted or rejected the proposed hypothesis or not.

TABLE 4.1: Confirmatory Factor Analysis

Model	**Factors**	**CMIN**	**CMIN/DF**	**RMSEA**	**GFI**	**TLI**	**CFI**
Base Line Model	Four Factors	315.35	1.76	0.05	0.91	0.92	0.93

At that point, for further analysis three steps of Preacher and Hayes (2004) were used. Firstly, we have to set our dependent variable Project performance in the outcome column, then our independent variable CKMC in the IV column and after that we have to set the demographic organization (control variable) in covariant

column. Lastly, we have to choose our model number to perform both model 4 for mediation and model 1 moderation through the Preacher and Hayes method.We perform the analysis separately for both mediation and moderation.

4.4 Pilot Study

In order to perform the research on a larger scale, pilot testing is always preferred and is considered as a very positive and effective approach, so as to avoid many risks related to wastage of resources and time. Hence, it could be assured that the questionnaire was valid. The pilot study was conducted on the sample size of 50. After collecting all 50 questionnaires, variables reliability was valuated which indicated adequate alpha coefficient values and there was no significant problems with the variables and the scale were absolutely reliable.

4.5 Reliability Analysis of Scales

Reliability analysis describes as a process and represent the competence of the scale for giving consistent results over and over again when the specific item is being tested over a number of times (Sekaran, and Bougie, 2013). This study, conducted reliability test through Cronbach alpha, it tells about the internal consistency reliability of the variables and tells about if those variables have a link between them (Gliem and Gliem, 2003). A Significant range of Cronbach alpha is 0 to 1. Aforementioned researcher further explained that the scale is measured reliably when the value of alpha above 0.6 is acceptable, although the alpha value above 0.8 should be considered as excellent value (Xatignon and Xuereb, 1997) to be used in this study according the context of Pakistan. Cronbach alpha was developed by Cronbach (1951) is an indicator to measure the reliability of the instrument that will indicate a researcher about designed instrument is accurately measuring the latent variable according to the acceptance criteria given by above scholars.

TABLE 4.2: Scale Reliability Analysis

Variables Name	Cronbachs Alpha()	No. of Items
CKMC	0.82	4
Project Performance	0.76	5
Agility	0.79	8
Team Skill	0.61	4

4.6 Descriptive Analysis

The descriptive analysis is performed to summarize the data for diverse and computes their uniform values shown in the Table 4.3. Descriptive statistics present the summarized result of standard deviation, Maximum value, Minimum value, mean and sample size. Table 4.3 below presents those details about the data gathered in this research study. The detail of variables is shown in the first column of the table, the information about sample size, maximum value, minimum value and mean and standard deviation is show in second, third, fourth, fifth and sixth columns respectively.

Table 4.3 shows that sample size is 307. All variables CKMC, project performance, agility and team skills. Data was collected in the form of questionnaires and have been measured on a 5-point Likert scale ranges from 1 to 5. All the variables have been measured on a scale 1 to 5 except gender, age, education, experience, organization and CIMS which is measured on 1 to 2, 1 to 4, 1 to 3,1 to 4, 1 to 2, and 1 to 2 respectively. Among demographics, the gender values (mean = 1.71, SD = 0.45), age value (mean = 1.55, S.D = 0.59). The values of other four demographic variables education level, experience, organization, and CIMS are shown (mean = 1.97, S.D = 0.86), (mean = 1.77, S.D = 0.899), (mean = 1.38, S.D = 0.48), and (mean = 1.32, S.D = 0.46) respectively the CIMS shows minimum values and education level shows the highest values.

CKMC which is independent variable is reported the mean value 3.7951 and standard deviation of 0.71560 which illustrate that respondent were agreed to have CKMC. Whereas, the mediator agility represents the mean values 3.6975 and standard deviation of 0.58677 that show respondents were agreed that they have

agility in the organization. Similarly, team skill the moderator, reflects the mean 3.7628 and standard deviation of 0.62716. And finally, project performance that is the dependent variable is with the values of mean 3.8008 and the standard deviation of 0.63740 that show respondents were agreed that their performance of projects increases.

Table 4.3: Descriptive Analysis

Variable	**Sample**	**Size**	**Min**	**Mean**	**SD.**
Gender	307	1.00	2	1.71	0.456
Age	307	1.00	4.00	1.5537	0.59919
Education Level	307	1.00	4	1.97	0.866
Experience	307	1.00	4.00	1.7785	0.99498
Organization	307	1.00	2	1.38	0.487
CIMS	307	1.00	2	1.32	0.466
CKMC	307	1.00	5.00	3.7951	0.71560
PP	307	1.00	5.00	3.8008	0.63740
Agility	307	1.00	5.00	3.6975	0.58677
TS	307	1.00	5.00	3.7628	0.62716

4.7 Covariates

We perform One-Way ANOVA test using SPSS in order to recognize the control variables for the current study that may affect the outcome variable along with the effect of the predictor, because more than one understudy variable developing a considerable association, so the understudy variables should to be controlled (Becker, 2005). Previous research shows that Gender, Age, Education Level, Experience and Organization type, have a significant relationship with project performance (see, e.g., Barrick et al., 2007). We considered all these demographic variables in the study in addition to some more, the analysis showed that Gender, Age, Education level and Experience were found non-significant while Organization type found significant in the results of ANOVA shown in Table 4.4 therefore in this study only one control variable is organization type. In earlier research

Rogiest, Segers, and van Witteloostuijn (2018) also used the organization type as a control variable in their study.

TABLE 4.4: One-Way ANOVA Test

Covariates	**Mean Square**	**F value**	**P**
Gender	0.020	0.049	>0.825
Age	0.235	0.576	>0.631
Education Level	0.335	1.392	>0.245
Experience	0.335	0.822	>0.482
Organization	2.201	5.498	<0.020
CIMS	0.512	1.261	>0.262

Sig. level p<0.05

4.8 Correlation Analysis

Usually the purpose correlation analysis is carried out in order to define the association among variables selected for the study. In this research work, correlation analysis was used to validate the proposed hypothesis by discovering the relationship between CKMC and project performance, also the agility role as mediator and team skills role as moderator to make the proposed hypotheses valid. Correlation analysis does not entail a relationship between two or more than two variables because it is different from the regression analysis. According to Grimm and Yarnold (2000) one of the most important method or level among many given alternatives is Pearson (bivariate) correlation to measure the effect of association among variables through a Pearson correlation range. In correlation analysis the values of any two variable lies between +1 and -1 (Lomax and Vaughn, 2007).

Barnard (1992) proposed that with the help of the extracted magnitude we can examine a relationship between two variables on the basis of two major aspects magnitude and direction. Impact of association among two variables is examined through magnitude and direction will provide positive and negative relationship for researchers. An absolute value of 1 proposes that two variables have a strong relationship. But if the values are zero that straightly means that the two variables

do not have any association. If the correlation coefficient value is ≥0.4 shows the moderate relationship. In case, having correlation value ≥0.5 show a strong relationship in any research study. For examining probability values both 0.05 and 0.01 are used to standardize the actual level of correlation between two variables make the proposed hypotheses valid (Delucchi, 2006).

To validate the gap of this research study correlation was measured at both variable and dimensional levels to prove the strong relationship between the selected constructs. The outcomes at dimensional level give a productive result of positive and critical association with each dimension of the chosen independent variable with dependent and mediating variable, therefore bringing the established constructs acceptable.

Literature has suggested a positive correlation among dimensions of CKMC and project success which is successfully calculated through Pearson correlation at significance level of 0.01 P value which successfully justify the gap of this research study. Detailed results of this correlation are shown in the table mentioned below.

Table 4.5: Correlation Analyses

Sr.No.	**Variables**	**1**	**2**	**3**	**4**
1	**CKMC**	1			
2	**Agility**	.547**	1		
3	**Team Skills**	.376**	.471**	1	
4	**Project Performance**	.565**	.527**	.403**	1

*N = 307,*correlation is significant at the .05 level,** correlation is significant at the 0.01 level, *** correlation is significant at the 0.001level (2-tailed), p <.001***, p <0.05**, p <.01.*

Correlation analysis, among the study variables, i.e., Organization, CKMC, Agility, Team skills, and Project performance have been demonstrated in Table 4.5. Correlation table shows that organization is significantly and negatively correlated to CKMC (r = -.162, p<.01), agility (r= -.133, p<.05), team skills (r = -.036, p<.01) and project performance (r = -.062, p<.01). While the independent variable CKMC shows positive and significant relationship with mediating variable

agility (r=.547**p<.01), moderating team skills (r=.376**, p<.01), and also with dependent variable project performance (r=.565**, p<.01). Similarly agility is having a relatively strong positive relationship of (r=.471**, p<.01) with moderating variable team skills, and (r=.527**, p<.01) with project performance. And positive relationship of team skills with project performance (r=.403**, p<.01).

4.9 Regression Analysis

To validate the existence of the relationship between the variables, co-relation analysis has been conceded out which shows that variables are interrelated to each other, but only co-relation analysis is not enough because it shows only the existence of the relationship between the studied variables and does not provide passable support to clarify the underlying relationship between the variables. Therefore, regression analysis is a used which determines the statistical relationship (association) among two or more variables. According to the Amstrong and Scott (2012) regression analysis shows the unit to which a result variable is dependent upon the predictor variable, it gives an understanding of the way that how the estimation of measuring variable changes when a diversity occurs in one or more independent variables. So it explains the pivotal association between the variables. Regression process is carried on by various tools (for example, Baron and Kenny, 1986) but here for the ease and suitability of the study, Hayes (2017) methods have been used for both mediation and moderation analysis.

As shown by Baron and Kenny (1986) and Hayes (2008) method is obsolete in light of the fact that it influences a condition of complete impact of relationship for intercession while in a couple of experts' points of view, it isn't important and even a obstruction in the technique for checking valid effect (Preacher, Rucker and Hayes, 2007; Preacher and Hayes, 2008;). According to these experts, the indirect impact through mediation is also possible paying little heed to whether no signs of direct impact between predictor and result components are found. Hayes (2017) method constructs the congeniality of sensible results in light of the fact that the model is divided into various little miscellaneous items and analysis is continued

running on those more diminutive estimated models. Mediation regression analysis is (Model 4) conducted to study the mediating role of the agility on the relationship between CKMC and project performance. Similarly, Moderation regression analysis was conducted (Model 1) conducted to study the moderating role of team skills on the relationship between CKMC and agility. Thorough results of this regression analysis are displayed in the table 4.6 mentioned below.

TABLE 4.6: Regression Analysis

Predictor	**Agility**			**Project**	**Performance**	
	β	**R2**	**ΔR2**	β	**R2**	**ΔR2**
IV:CKMC						
Step1						
Organization						
Step2						
CKMC	0.456***	0.55	0.302	0.341***	0.625	0.390***
Med:Agility						
Step1						
Organization						
Step2						
CKMC				0.497**	0.566	0.321***

*Regression coefficient reported. N=307, *p <.05, **p <.01, ***p <.001, CKMC (Independent variable), Project performance (Dependent variable),Agility (Mediation variable), Control variable is Organization.*

4.9.1 CKMC and Project Performance

Table 4.6 indicates the result of hypothesis testing. First, H1 was tested that "CKMC is positively related to project performance". Outcomes illustrate that there is a positive and significant relationship existing among CKMC and project performance (β=0.341, R2 = 0.625, p <.001). The value of R2 shows the coefficient of determination, whereas the value of β shows the percentage change demonstrating that a 1 unit change in CKMC leads to 0.341 unit change in project performance. The results indicate that almost 34% of change is observed on the dependent variable, and p value of 0.000 indicates a higher level of significance which provides strong grounds to accept the hypothesis H1.

In Hypothesis H2 we assumed that "CKMC is positively related to project performance". The regression results of this hypothesis are given in above Table 4.6. The results show that the mean indirect effect of CKMC on project performance through the mediation of agility is significant (β =0.456, R2 = 0.550, p <.001). The value of R2 shows the coefficient of determination, whereas the value of β shows the percentage change demonstrating that a 1 unit change in CKMC leads to 0.45 unit change in agility. The results indicate that almost 45% of change is observed on dependent variable,and p value of 0.000 indicates that the relationship is highly significant. Hence, the hypothesis H2 is accepted.

4.9.2 Agility and Project Performance

In Hypothesis H3 we assumed that "Agility is positively related to project performance". The regression results of this hypothesis are given in above Table 4.6. Results of regression analysis revealed that there is a positive and significant relationship existing between agility and project performance (β =0.497, R2 = 0.566, p <.001). The value of R2 shows the coefficient of determination, whereas the value of β shows the percentage change demonstrating that a 1 unit change in agility leads to 0.49 unit change in project performance. The results indicate that almost 49 % of change is observed on dependent variable, and p value of 0.000 indicates that the relationship is highly significant. Hence, it provides strong grounds to accept the hypothesis H3.

4.10 Mediation Analysis

Table 4.7 exhibits Mediation Analysis. Hypothesis H4 proposed that "Agility mediates the relationship between CKMC and project performance". To test the mediation of H4 we used model 4 of PROCESS macros through SPSS version 25 (Hayes, 2017). In which we checked different paths a, b, c and c'respectively. According to Preacher and Hayes direct, total and indirect effects needs to be substantiated when a, b, c and c'paths were tested.

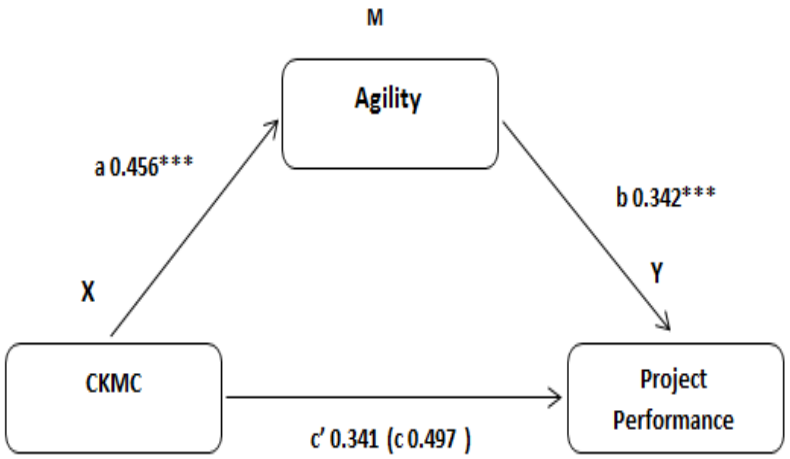

FIGURE 4.6: Mediation Graph

4.10.1 Total Effect

Total effect demonstrates the effect of IV (CKMC) and DV (project performance). The total effect of CKMC on project performance is .497 with the significant p-value of 0.000. It indicates that approximately 49% variance occur in project performance due to 1 unit change in CKMC. The lower limit value is 0.4136 while the upper limit value is 0.5184 without having any zero between both limits. Hence, H1 is accepted that CKMC has a significant positive impact on project performance.

4.10.2 Direct Effect

Direct effect identifies the effect of IV (CKMC) on DV (project performance) in the presence of the mediator which is agility. In the presence of a mediator the direct effect is 0.341 with the significant p-value of 0.000. It demonstrates that CKMC covers 34% variation of project performance in the presence of agility. The lower limit value is 0.2460 while the upper limit value is 0.4366, without having any zero between both limits, which clarifies the results are significant.

TABLE 4.7: Mediation Analysis

DV	Effect of IV on M (a path)		Effect of M on DV (b path)		Total Effect of IV on DV (c path)		Direct Effect of IV on DV (c'path)		Bootstrap results for indirect effects	
	β	t	β	t	β	t	β	t	LL95% CL	UL95% CL
PP	0.456	11.45	0.342	5.87	0.497	11.66	0.341	7.04	0.0841	0.2474

N = 307, Un-standardized regression coefficient reported. Bootstrap sample size was 5000. Confidence Interval = 95%. p<.05; p <.01; p<.001 LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.

4.10.3 Indirect Effect

Indirect effect recognizes that the mediation exists among IV (CKMC) on DV (project performance), agility mediates the relationship between CKMC and project performance. The lower limit value is 0.0841 while the upper limit value is 0.2474, without having any zero between both limits, which clarifies that the results are significant. Hence, H4 is accepted that agility positively mediates relationship CKMC and project performance.

TABLE 4.8: Moderation Analysis

DV	Effect of CKMC on Agility		Effect of TS on Agility		Total Effect of CKMCxTS on Agility		Bootstrap results for indirect effects	
	β	t	β	t	β	t	LL95% CL	UL95% CL
Agility	0.311	7.53	0.238	5.14	-0.143	-3.95	-0.215	-0.072

*N = 307, Un-standardized regression coefficient reported. Bootstrap sample size was 5000. Confidence Interval = 95%. * p<.05; p<.01; p<.001; LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval; CKMC (Independent), Agility (Mediator), TS (Moderator), Control variables (Organization).*

4.11 Moderation Analysis

So as to test the Hypothesis H5 states that "Team skills moderates the relationship between CKMC and agility". We used model 1 of PROCESS macros through SPSS version 25 through (Hayes, 2017). The above Table 4.8 exhibits Moderation

Analysis. The result show regression coefficients of Interaction Term (CKMC x TS) and team skills as (β = -0.143, ΔR2 = 0.030, p = 0.0001). The finding show that team skills negatively moderates between CKMC and agility and the relationship is significant because the lower limit of value is -0.2153 and upper limit value is -0.0722, due to the same negative sign among both limits, hence Hypothesis H5 is rejected. The results are shown in the table 4.8 and also explain the conditional effect.

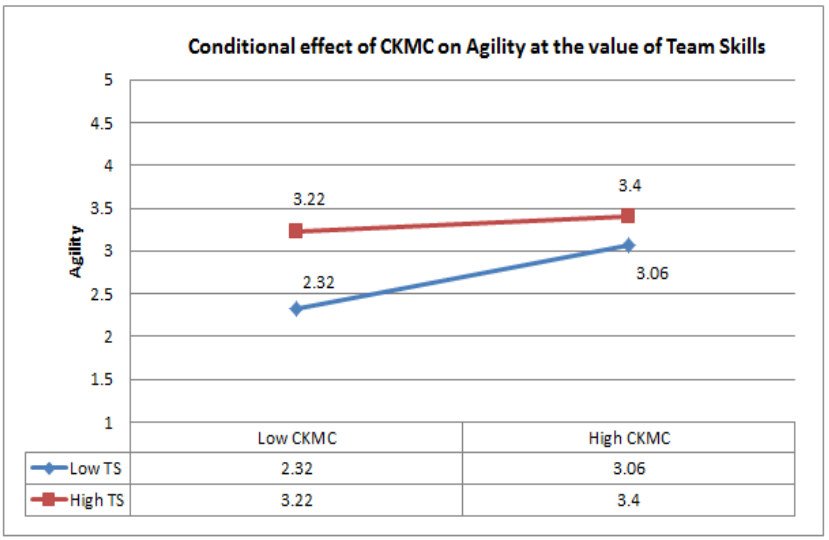

FIGURE 4.7: Moderation Graph

Figure 4.7 represents the graphical explanation of rejection of Hypothesis H5. The team skills negatively moderates the relationship between CKMC and agility.

4.12 Summary of Hypothesis

Table 4.9 illustrates the precise summary of results for the proposed hypotheses under this study.

TABLE 4.9: Hypotheses Summarized Results

Hypothesis	**Statements**	**Results**
H1	CKMC has a significant positive impact on project performance.	**Accepted**
H2	CKMC has a significant positive impact on agility. related with employee creativity.	**Accepted**
H3	Agility has a significant positive impact. on project performance.	**Accepted**
H4	Agility mediates the relationship between . CKMC and project performance	**Accepted**
H5	Team skills moderate the relationship between CKMC and agility.	**Rejected**

Chapter 5

Discussion and Conclusion

5.1 Introduction

This chapter discusses the relationship between the all variables, justification of acceptance and rejection of established hypothesis, also discuss theoretical and practical implementation. Finally, the research limitations and future research directions and conclusion on the basis of current study.

5.2 Discussion

The main purpose of this study was to examine the relationship between the CKMC on project performance by having agility as a mediator and team skills as a moderator in the IT sector within the context of Pakistans project based firms. The analyzed results successfully justified the gap of this research study by showing the significant relationship between CKMC and project performance, hence the hypothesis H1, H2, H3, H4 are accepted developing positive relationship between customer knowledge enhancing their capability to understand the customer needs and want which lead to decrease project delay, over consumption of the budget and directly lead to increase the project performance. Likewise, agility, plays mediating role between CKMC and project performance, therefore the fourth hypothesis H4 has also been accepted.

Furthermore, in the present study introduced team skills as a moderator. Hypothesis H5 has been found that team skills turn out to be the significant, but negatively moderates. Therefore, team skills negatively impact on the relationship between CKMC and agility. i.e. increase in the effect of team skills decreases the effect of agility, subsequently, inclines to reject the H5 proposed hypothesis. The comprehensive discussion on each of the hypotheses is as follows:

5.3 H1: CKMC has a significant positive impact on Project Performance.

The hypothesis H1 results shows the existence of a significant positive relation ($\beta = 0.341$, R2 = 0.625, p <.001) between CKMC and project performance. The t value 7.04 of the outcome demonstrates the significant level, as the t value is greater than 2 implies the outcomes are statistically significant. The co-efficient is 0.341 which clarify that if there is a 1 unit change in the CKMC there will be practically 34% of increase in the performance of the project. Empirical studies in the field of project management generally consider CKMC as a significant variable positively enhance towards project performance as association having high levels of CKMC and have a high level performance of the project (Campbell, 2003; Singh Sandhawalia and Dalcher, 2011). The study also supports the findings reported by Adam (2017) showing that an association and its project team are involved and playing their roles in multiple CKMC contribute to the project performance. A study conducted by Wei and Miraglia (2017) also indicates that customer knowledge significantly contributes to the improvement in project performance. The outcomes of this research are likewise in accordance with the results of the study by Lopez-Nicolas and Molina-Castillo (2008) which states that in the modern era of globalization CKMC is the key factor contributing positively towards project performance within the contextual settings of Pakistan.

5.4 H2: CKMC has a significant positive impact on Agility.

The hypothesis H2 results, indications the existence of a significant positive relation (β =0.456, R2 = 0.550, p <.001) between CKMC and agility. The t value 11.45 of the outcome demonstrates the significant level, as the t value is greater than 2 implies the outcomes are statistically significant. The co-efficient is 0.45 which clarify that if there is a 1 unit change in the CKMC there will be nearly 45% of increase in the agility. Therefore, it is evident that CKMC be viewed as an essential for achieving agility (Esterhuizen, Schutte, and Du Toit, 2012). Moreover, Tan et al. (2017) demonstrated that utilizing CKMC expands the possibility to constantly innovate, but also arrange a supportive atmosphere to accomplish agility within the organization. As proposed by past research, agility has a momentous association with organizations performance and as a critical source of high indicator for the organization's performance (Ofoegbu and Akanbi, 2012; Yang and Liu, 2012). Hence, the CKMC supports the organizations agility for reliable new regulatory procedures (Arnold et al., 2012). The hypotheses further enhanced with knowledge management theory, where CKMC execution has been hypothesized as a resource and agility as an ability to adjust the unpredictable condition to the project performance.

5.5 H3: Agility has a significant positive impact on Project Performance.

The hypothesis H3 results, shows the existence of a significant positive ($\beta = 0.497$, R2 = 0.566, p <.001) between CKMC and agility. The t value 11.66 of the outcome demonstrates the significant level, as the t value is greater than 2 implies the outcomes are statistically significant. The co-efficient is 0.49 which clarify that if there is a 1 unit change in the CKMC there will be nearly 49% of increases in the agility.Hence, the study supports the findings of the past studies that agility

is considered to be playing a critical role in improving the performance of project based organizations. Lindner and Wald (2011) and Ravichandran (2018) described agility have a positive impact on the performance of project that measured by collect commitment, resource flexibility and strategic sensitivity.

5.6 H4: Agility mediates the relationship between CKMC and Project Performance

Hypothesis H4 show the significant result, agility mediates the relationship between CKMC and project performance because the indirect effect of IV on DV lower limit 0.0841 while the upper limit is 0.2474 respectively indicated by the un-standardized regression coefficient both are positive and doesnt contain zero. Bootstrapped 95% confidence intervals around the indirect effect on CKMC and project performance through agility. Likewise the agility has been found significant, to mediate the relationship between CKMC and project performance. Hence, the hypothesis H4 has been accepted. Kidd, (1994) highlighted that many organizations are established, each has a diverse basic abilities and technology in a way to respond the client need and wants the basic component that give them supremacy is agility, in order to achieve agility each component should be integrated such as people, organization, and technology. Queiroz et al. (2018) also suggested that the agility improves the project performance. Furthermore, team skills, plays a significant moderating role between CKMC and project performance the hypothesis H4 has also been accepted.

The results also indicate that CKMC has a positive effect on project performance and the effect of CKMC through agility on project performance is more than its direct effect on project performance. The result of this study related to the prior studies (Teoh, Lee, and Muthuveloo, 2017; Pollanen, Abdel-Maksoud, Elbanna, and Mahama, (2017). Previous studies Sarhadi (2013) examined the relationship between CKM with organizational performance improvement in the banking sector. In this research model 4 used to determine the relationship between the variables.

The result shows that the agility is the key strength for a project based organization or a simple organization, to achieve the improved project performance. Agility enhances the use of project knowledge by adopting best practices of CKMC, and agility leading to improved project performance. Therefore, it is also evident from the results, in the context of Pakistan, CKMC increase the project performance through agility.

5.7 H5: Team skills moderates the relationship between CKMC and Agility

Hypothesis H5 assume that team skills moderates the relationship between CKMC and agility.The results of Hypothesis 5 showed significant results, but in the opposite direction of the proposed statement. The analysis indicates that there is a insignificant impact of team skills between CKMC and agility (β = -0.143, p = 0.0001, ΔR2 = 0.030). The β value -0.143 show negative sign, which clarify that if there is a 1 unit change in the team skills, there will be almost 14% change in agility but in the negative direction. The lower limit value is -0.2153 and upper limit value is -0.0722, respectively indicated by un-standardized regression is having same signs and zero does not exist in the bootstrapped 95% intervals, which means the results are negatively significant. Hence, the results are suggesting that in contrast to strengthening, the team skill is weakening the relationship between CKMC and agility.

After getting these result interviews were contacted from respondents without telling them the results, to identify the reason of rejection include: The communication barrier between team members, such as highly skill team member only focuses on their task completion and did not help low skill team member, who do not have enough knowledge or skill to do their task, hence whole team will struggle and not able to complete their task on time.

5.8 Theoretical Implication

This research has contributed to the literature where the investigation of variables like customer knowledge management capability, agility, team skills and project performance. Literature in several important ways. First, presenting the customer knowledge management capability framework, that explained how the CKMC antecedent components lead to the project performance. This framework has supports that CKMC is a significant and rare asset for organizations, which will enable them to react rapidly to the client needs, create, acquire and transform knowledge into the competitive advantage (Shi and Yip, 2007). Secondly, the indirect effect of agility on CKMC and project performance. However, the indirect effect of agility on the CKMC and project performance is the new contribution to the project management domain of customer knowledge management capability, since there is no past research has been conducted in the context of a project based organization in Pakistan.

Moreover, another theoretical contribution of this study that assists the researchers for further research is the team skills. We are using the moderation of team skills on the relationship between CKMC and agility which is the new contribution of this study to better understand the condition for having customer knowledge management capabilities and integrating with agility, and team skills to improve the project performance.

5.9 Practical Implications

CKMC is turning into a progressively essential strategic benefit for the organizations. Though, the CKMC has been frequently difficult to manage in practice. This study provides the several practical implications for project based organizations: Firstly, for successfully implementing and deployment the CKMC, organizations emphasis should be on the high priority customer knowledge management antecedent factors group in order to initiate and implement the CKMC effectively. Considering the fact that the most software companies in Pakistan are

small medium enterprises, the employee resources and the investment in these enterprises are limited. In this manner, dedicating the investment and employee resources for CKMC is extremely challenging. Thus, utilizing the result of this examination helps them to concentrate on the high priority CKMC achievement factors that can reduce the risk of CKMC implementation failures. This study has motivation for the organizations, it offers a suitable model for the successful implementation of the CKMC. The results of the empirical investigation of the model demonstrated that agility has positively significant factors, while team skills have negatively significant impact on the agility in the context of software development enterprises in Pakistan. Therefore, the result of the study shows that agility is important for the successful implementation of CKMC in the software enterprises, In this way customer participation give a valuable and practical knowledge for the enterprises.

Therefore, this study has proposed that organizations need to give the trustworthy relationship with customers so as to assimilate and utilize more customer knowledge and produce high quality and creative products that accomplish the customer desires. It is strongly suggested that software enterprises give sufficient resources and strategies for involving the primary customers while developing the software products. The finding of this exploration demonstrates that creating and keeping up a framework that can encourage a reliable situation in which both customer and project team could communicate appropriately and transfer their relative knowledge in an effective manner for advancement the CKMC. Having an agility organization gets the ability to meet the unexpected changes and take competitive advantage and attract the customers. The study provides information and suggest recommendation to the software enterprises, that while selecting the team member for particular project must insure the team member have relevant knowledge or skills, because if some team member did not complete their task on time whole team will struggle. Therefore, enterprises need to select a skillful team or give them training before selecting them for projects.

5.10 Strengths, limitations, and future directions

The present analysis has a solid methodological methodology. In the first place, so as to diminish the potential impacts of regular techniques and single source inclination, information ought to be gathered from related CKMC, agility, team skills and project performance from project managers and colleague working in different IT-oriented and non IT-oriented project based associations.

There are a few impediments, which future researchers ought to know about; first, the sample size may create barriers to generalize the findings of this study. Secondly, the information just gathered from IT-oriented and non IT-oriented project based organization future research can test the model in different fields. Because of time limitation only one mediator and moderator was tried, future research can enhance the model and furthermore check alternate mediators and moderators such as strategic agility, organization agility and team performance. Thirdly, the information was cross-sectional the researcher can have utilized time lag. Lastly, the information just gathered from the Pakistan and restricted city the exploration can enhance the information accumulation strategy and gather information from various nations.

5.11 Conclusion

The present study empirically clarifies the relationship between customer knowledge management capability and project performance in IT-oriented and non IT-oriented project based organization of Pakistan, through a questionnaire analysis to measure the extent to which customer knowledge management capability impacts project performance with a mediating role of agility and moderating role of team skills. We distribute 450 self-administered questionnaires and collected 330 and selected 307 questionnaires for analysis, the result of the study H1, H2, H3.H4 are accepted and H5 is rejected. CKMC means to enhance organizational knowledge to understand the customer needs and wants which leads to decrease

in project delay, over consumption of budget and directly lead to project performance. Agility was found significant and positively mediate the relationship between CKMC and project performance, and team skills also significantly moderate between CKMC and agility, but in the negative direction. IT-oriented organization is more aware with the customer knowledge and agility, have ability to understand customer requirements, which allows them to build trustworthy relationships with their customer as compared to non IT-oriented organization which struggles in understanding the customer demands.

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Appendix-A

List of Organizations Included

- Enabling System Private Limited
- Emumba Private Limited
- MMI Software house
- xFlow Research Inc.
- Aims and ideas Private Limited
- Bentley Systems Pakistan (Pvt.) Ltd.
- MFSYS Software and Systems (Pvt.) Ltd.
- Vizteck Solutions
- iGate Technologies
- Discretelogix (Private) Limited
- Seven Technology
- Askari bank
- BankIslami pakistan
- MCB Bank Limited
- Bank Alfalah

- Bank AL Habib Limited
- Zigron pakistan (Pvt) Ltd.
- Whinstone (Pvt.) Ltd.
- Longhorn Innovations
- Evamp and Saanga
- Alfoze Technologies
- SecureTech Consultancy
- Bitsol Technologies
- Arcana Info
- Mercurial Minds
- DatumSquare IT Services Pvt.
- OpenWare Business, OWB Pvt.

Appendix-B

Questionnaire

Dear respondent,

I am a student of MS (Project Management) at Capital University of Science and Technology, wishing to conduct research on "Customer knowledge management capability and its positive and negative outcomes in project based organization of Pakistan" for the completion of my research thesis. In this regard, I have prepared following questionnaire, please note down that your identity as respondent is concealed. You can freely express whatever the ground realities you see and face. It will take your 10-15 minutes to answer the questions; any information obtained for this research will only be used for academic purpose. For more queries please email Haidershah24@gmail.com. I really appreciate your time for filling up this questionnaire.

Regards

Syed Arslan Haider

Section: 1	**Demographics**
Your gender:	1- Female 2- Male
Your age:	1 (Less than 25 years), 2 (26-40), 3 (41-50), 4 (more than 50 years)
Your qualification:	1(Bachelor.), 2 (Masters), 3 (MS/MPhil),4 (Masters), 5(PhD)
Your Experience:	1 (Less than 3 years), 2 (3 to 5 years) 3 (6 to 10 years) 4 (11 to 15 years)
Your Organization:	1 (IT-Oriented Organization) 2 (Non IT-Oriented Organization)
Your Customer Information Management System:	1 (YES), 2 (NO)

Section-2: Customer Knowledge Management Capabilities

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

1	CREATE: Creating marketing skills and knowledge that are applicable across multiple business units.	1	2	3	4	5
2	TRANSFER: Transferring relevant customer knowledge among business units.	1	2	3	4	5
3	INTEGRATE: Integrating relevant customer knowledge of multiple business units to gain new customer insights.	1	2	3	4	5
4	LEVERAGE: Changing marketing & product policies of business units based on relevant customer discovered in other business units.	1	2	3	4	5

Section-2: Project Performance

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

1	The project results, or deliverables, are in line with client objectives.	1	2	3	4	5

2	This project is operating within the preestimated budget.	1	2	3	4	5
3	This project is operating within the predefined schedule.	1	2	3	4	5
4	Overall, our stakeholders are satisfied with the project outcomes.	1	2	3	4	5
5	The product quality and the deliverables quality accord with the standard.	1	2	3	4	5

Section-2: Agility

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

1	Respond to changes in aggregate customer demand.	1	2	3	4	5
2	Customize a product/service to suit an individual customer.	1	2	3	4	5
3	React to new product/service launches in the market.	1	2	3	4	5
4	Introduce new pricing schedules in response to changes in competitors prices.	1	2	3	4	5
5	Expand into new regional and/or international markets.	1	2	3	4	5
6	Expand or reduce the variety of products/services available for sale.	1	2	3	4	5
7	Adopt new technologies to increase the throughput of products/services.	1	2	3	4	5
8	Switch suppliers or partners.	1	2	3	4	5

Section-2: Team Skills

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

1	Members of our design team have example expertise for doing the work.	1	2	3	4	5
2	Some people in our design team do not have enough or skill to do their part of the teams task well.	1	2	3	4	5
3	Behavior in our design team is very orderlyit is clear what members are expected to do, and they do it.	1	2	3	4	5

4	Our design team has the right mix of people needed to do its work well.	1	2	3	4	5

Thank you for your time and cooperation