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Impact of Project Complexity on Project Success through Mediating Role of Knowledge Management Practices Moderating Role of Ambidextrous Leadership**Irum Iqbal¹**¹MS Scholar, Essex Business School, University of Essex, United Kingdom.Email: ii23529@essex.ac.uk

Abstract

The research article investigates the intricate dynamics within industry of Pakistan, exploring the impact of project complexity on project success. Utilizing a quantitative, cross-sectional approach with a sample of 384 IT professionals, the study reveals a negative influence of project complexity on project success. Knowledge management practices emerge as crucial mediators, mitigating the negative impact of complexity and fostering positive project outcomes. The findings underscore the pivotal role of ambidextrous leadership, indicating that leaders with adaptability enhance the relationship between project complexity, knowledge management practices, and project success. Key insights highlight the importance of cultivating a culture of openness and innovation, improving information collection about managerial requirements, and promoting diverse sources of knowledge acquisition within organizations. Additionally, the study emphasizes the significance of leadership behavior that encourages networking, brainstorming, and the transfer of best practices. The study contributes valuable insights for both academia and industry, paving the way for further research and strategic interventions in the evolving landscape of the IT sector.

Keywords: project management, project complexity, project success, knowledge management.

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1. Introduction

The industry of Information technology (IT) in Pakistan has rapidly grown in recent years and contributes a critical portion of markets for the development of the economy (Bhatti et al., 2021). Particularly after the introduction of advanced change, the IT area immediately got quite possibly the most appealing enterprises in Pakistan (Bhatti et al., 2021). Innovative market acquires positive assessments from domestic investors as well as foreign investors such changes and improvement have made serious competition in the businesses, which could be considered as a major challenge as well as an opportunity for IT firms' development. To stay aware with the pattern of unlimited globalization, rapid changes in creation advances and an open advancement, Information technology (IT) industry organizations are step by step changing improvement methodologies. Assessment of project complexity and facilitating the assessment process to manage project complexity effectively during the whole life cycle of a project is essential, but currently its difficult aspect of project management. It is stated by Daniel and Daniel (2018) that complexity in projects is increasing, which takes to difficulties in management of the projects. In addition to this, due to the complexity corresponding uncertainties can provoke changes in the scope a project. As a result, it's (project complexity) become a critical factor that needed to be considered in the process of project development. Typically, the project complexity can also be stated as a measurement of number of elements and interfaces of projects. References to high project complexity or less project complexity are a commonplace through all industrial sectors. However, most references to high or low complexity are done by intuition and can often represents a complexity's relative

assessment by comparing to different types of projects or with similar one's within the industry sector. In Information technology (IT) industry because of the complexity in the projects, a greater amount of the time is assigned to its planning phase yet, contingencies are additionally arranged alongside reserves in order to adapt up to any of the questionable circumstance looked during its execution and direct reactivity with the genuine elements under which project is taking place. Hence complexity of the project should be treated appropriately to destroy the adverse consequences and results that can be borne whenever overlooked. According to Clark (2021), this is an evident that complexity leads to project failure in industries.

Costa and Monteiro (2016) argue that organizations can experience continued competitive advantages by applying knowledge management practices in significantly improved and new services and products, marketing strategies, production processes and innovation. Currently, knowledge management practices have come to have a straight effect on reducing the degree of project complexity and project success. An efficient knowledge management practice (KMP) plays very important role in achieving the project success. The importance of ambidextrous leadership and knowledge management practices is demonstrated in this study to provide the meaningful understandings that helps to achieve acquired goals of the project. This study aims to explore relationship among project success and project complexity from Pakistan Information technology firms. The Knowledge Management practices (KMP) has been known as a critical element for both project success and organizational performance (Ashok et al., (2021). Despite knowledge management practices increased interest, limited studies have provided an empirical evidence linking knowledge management practices with project complexity and project success, especially from a developing country perspective. The lack of relevant knowledge on the part of project managers often results in these projects being beset with issues such as low performance, cost overruns, and schedule delays (O'Connor et al., (2021). Projects are crucial not only for dealing with hurdles due to advancing technology, but they are also a source through which business can be made superior and improvements and changes can be put into practice. Project manager integrates the concepts of management as well as leadership and acts as a combining force (Ali et al., 2021) by influencing, guiding and giving orders. Research on leadership in projects is exceptionally important as projects are becoming more widespread in today's organizations and project management is being recognized as a profession (Mufaricha et al., 2021). This study will make three contributions to the literature. First one is that the paper conceptualizes impact of project complexities involving knowledge management practices and ambidextrous leadership which can lead to project success. Secondly, the paper will demonstrate that ambidextrous leadership interact in different ways to help in project success. Last one, the paper will provide an analysis of the interaction between the knowledge management practices with project complexity and project success.

1.2 Gap Analysis

Project management has enormous space for additional inspection, as this area is less rich as correlation with different areas of the management science (Shenhar and Dvir, 2007). According to literature different researchers have contributed to analyze the project complexity (Shenhar & Dvir, 2007; Geraldi, 2011) but limited studies had conducted to see these consequences on project success. Leader of a project is likewise stayed unfortunate to catch the interest of scientists also professionals after its originating. Leadership is an important subject and needs concentration as it is a reserve point (Suze Wilson, 2013). Earlier studies show that a solitary leader is liable for overseeing and controlling a project team (horizontal and vertical leadership styles) (Attar and Kalfaoğlu, 2020). This thinking oppose with environment of most organizations. Leadership complexity in organizations has been increased (Imam & Zaheer, 2021) and organizations needs to focus on the efficient management of current business requirements as well as should focus on potential opportunities and challenges occurring in future. The organization should be able to get familiar with the environment of a market and implement a strategy that comprises of distributing power so it can perform as well as compete with different organizations worldwide (Mostert & Kern, 2021). They should adopt ambidexterity for

example exploration and exploitation for flourishing and long-term survival. Earlier studies shows that the leader is liable for controlling and overseeing a project team (Attar and Kalfaoğlu, 2020).

We know that every project requires knowledge management practices, it helps in resolving problems and issues effectively. Higher project complexities require more knowledge management practices within the teams. Within complex projects it's very important to understand the importance of knowledge management practices (KMP), high level of complexity involves more and more knowledge as risks and interdependencies are high as compared to normal projects. Aim of the knowledge management practices is to fill the existing gap within the project teams and to give new ideas for successful results. Gaps in complex projects are considered to be high as compared to normal projects, uncertainties are high therefore it is important to share right knowledge, at right time and in an appropriate way. Knowledge management practices is viewed as idealistic way to deal in hazardous circumstances and complex, experienced individuals of the team can limit negative effect of complexity by sharing the past experience of dealing with the complexities and uncertainties. It is suggested by Shenhar and Holzmann (2017) that the future research should have to be conducted to check how project complexity plays in managing and understanding performance and project. This study is going to help to investigate the relationship between project complexity and project success considering the role of importance of leadership and knowledge management practices (KMP). According to my knowledge not even a single study discovered that demonstrates the knowledge management practices role in complex project and its effects on project success. The study also focuses on investigating the importance of the knowledge management practices along with the supportive role of ambidextrous leadership in the complex project that has been ignored in literature.

1.3 Problem Statement

Project Complexity is one of the arising and basic components of the project because of its novel nature. Project Complexity has numerous dimensions, however the current study is focused on complexity as a more extensive perspective that experiences the particular project extents. The greater part of the postponements are caused because of the complexity and inventiveness, consequently the dimensions should be beseeched further. In IT industry of Pakistan most of the projects get postponed causing cost overrun and delays because of the complexity and environmental changes during the project. Complexity of the tasks persuades the colleagues to work together for it and complete in due time. One individual can't have the total information on every single dimension so coordinated effort should be embraced by the individuals to gather and give information on one another to finish the assigned task adequately and opportune. Alongside the complexity, human factor is likewise one reason of project achievement and colleagues' synchronization is additionally one of the tool to oversee complexity and raise the performance of the task. Various researches has been directed on project complexity, still there are areas that should be investigated. Considering role of knowledge management practices and ambidextrous leadership as well as its impact on execution of complex project is totally immaculate. Investigating effect of these factors will assist to manage a project in a better way. High level project complexity requires a good understanding and proper information among Team. In this manner complex project requires very well managed knowledge management practices (KMP) and role of the knowledge management practices (KMP) is considered as a high significance alongside different components for example ambidextrous leadership and so forth. Literature of project management proposes that, complexity should be recognized at prior stage with the goal that it can be managed appropriately. There are still area that are important to be tended to in view of progress in working condition and demands. This study will discover how knowledge management practices mediates among project complexity and the project success, how the ambidextrous leadership impact the relationship among project complexity and project success, also how it is going to moderate a relationship among project complexity and knowledge management practices.

1.4 Research Questions

- 1 What's the impact of project complexity on project success?
- 2 Does knowledge management practice mediate the relationship between

project complexity and project success?

- 3 Does ambidextrous leadership moderate the relationship between project complexity on project success and knowledge management practice.

1.5 Research Objectives

- 1 To analyze the impact of project complexity on project success in IT industry of Pakistan.
- 2 To determine mediating impact of knowledge management practice on a relationship of project complexity on project success in the IT industry of Pakistan.
- 3 To determine moderating impact of ambidextrous leadership on a relationship of project complexity on project success and knowledge management practices in the IT industry of Pakistan

2. Literature Review

2.1 Project Complexity on Project Success

Project is a temporary endeavor that is unique in nature according to PMI (2013) and it's time and cost bound to achieve specific objectives. Project consist of different interlinked activities, which make it complex. Defining complexity is not easy as it has a lot of associations. Project complexity stresses interdependent activities and tasks that become challenging to manage (DeToni & Pessot, 2021). The complex nature of projects influences the project success, both in positive and negative ways.--The term 'complexity' has become an important component when we discuss projects (Wood & Ashton, 2010). Hass (2009) suggested the understanding of the complexities of projects could help in understanding the root causes of problem occurs during the project execution, which will effect success. In early 1990's, project success is associated with project performance measure, where the success of a project is connected with triple constraints quality, time and cost (Hatush & Skitmore, 1997). As per Atkinson (1999), quality, time and cost is considered as iron-triangle as well as present in each definition of the success. Project complexity is an uncertain term and it's not easy to absolutely evaluate. Project complexity involves extensive number of interlinked parts, project multidimensional nature also contributes in making it complex, multidimensional nature is hard to measure, numerous researchers have led various investigations to recognize its estimation variables and order (He et al., 2015). It's very important to understand the project complexity for practitioners and academics both. It is important for practitioners to know how to manage complexity, as well as how and what affect does it make on individuals and organizations. In literature researchers have defined project complexity and the characteristics of complexity that are influencing performance e.g. size, schedule, system interdependence etc (Abdou et al., 2016). Numerous researches also focused on identifying the characteristics of complex projects and how the organizations and its members deal with it (Geraldi & Adlbrecht, 2007; Shenhar & Dvir, 2007). The Geraldi et al. (2011), presented the five dimensions of complexity pace, sociopolitical, uncertainty, dynamic and structural, in detail view complexity in wider perspective. Structural complexity deals in large number of interconnected parts to make whole new system. Understanding uncertainty, it refers to both future and present states involved in forming a whole system. It's an unavoidable gap for manger while making decision, because uncertainty involves while creation of uniqueness. Dynamics complexity is relevant to the changes made in the system. Changes can be made in design (Geraldi & Adlbrecht, 2007), specifications, planning, team, stakeholders, and environment etc., and these changes may lead to increasing level of risks in project. Pace is related to time goals which have strong effect on project because of interdependency of different parts (Shenhar & Dvir, 2007). Pace basically refers to the speed of work is been carried in specified time. While project is carried out there is interest of different parties involved (Maylor, 2001). Such social pressure makes project complex and hinders in achieving specified goal. The Project complexity is seen as a fundamental element in the project management field (Tatikonda & Rosenthal, 2000). Moreover, the nature and attributes of project unpredictability is an unsure stated issue. From investigation it is explored that a few elements are considered as drivers of task difficulty e.g., risk and uncertainties. On one hand, multifaceted nature of project is also

considered as driving element for difficulty of projects researchers have recommended paying more consideration towards characterizing and dealing with the complex projects (Luo et al., 2016). It is viewed that the undertaking performance is also linked with project multi-dimensional nature. Project difficulty with a firm definition should be accurately estimated by focusing on the end goal and powerful management of tasks. Literature has suggested that project complexity can likewise impact project results and additionally project performance, and the complexity can also make new projections (He et al. 2015). The efficient characterizing of complex activities, their traits and interrelations will empower the project to describe complicated nature. In this manner, it is smarter to maintain and get complex nature in the responsible setting amid project management instead of decreasing or evading it. It is critical to connect all the activities proficiently with the project implementation, and to decrease the number and impact of negative results emerging from this complexity. Considering unpredictability into connection with complexity and innovation will help to deal with multifaceted nature of projects. It is stated by Tatikonda and Rosenthal (2000) that the project complexity is firmly identified with communications between subtasks and hierarchical components. It is distinguished by Maylor et al. (2008) that the elements of complex nature as delivery, group, partners, mission and organization. The Girmscheid and Brockmann (2008), separated it into five classes: undertaking, society, culture, operation, and insight intricacy. According to He et al. (2015), a six-classification system of complexities comprising of innovative, authoritative, objective, ecological, social, and data complexities were proposed with a complete writing survey to measure project development extends in China. In any case, the impact of the previously mentioned complex factors on project multifaceted nature isn't completely comprehended and is still under study. Accordingly, the main target of study was building up a measure for the project multifaceted nature by examining the connection among complexity factors and its impact. Numerous researchers presented that change is one of the major factor which makes project complex, as different part are interlinked, change in one part causes automatic shift in another activity (Atkinson 1999). The development industry has gone up against extraordinary trouble in adapting to the expanding complexity. Regardless of broad research on the idea of complexity, there is no single agreement on project complexity. Complexity can be seen differently in various fields. Keeping in mind the project success, project complexity should be realized and estimated proficiently. Project in such as IT industry, include collection of interconnected elements which create multidimensional nature with described qualities. It is believed that problems related with decision making and success achievement, which are originated from unique nature of projects, the comprehension of unpredictability is fundamental for project management. The achievement of a desired performance in this manner at last relies on project execution. Project success targets measures exist for the evaluation of project complicated nature, for the most part because the complexity is primarily identified with the subjectivity of the eyewitness. Researchers have observationally researched connections between parts of complexity and results in projects (Clarke, 1999). Literature relates the success with project's performance achieved at the end e.g., project done within estimated budget, according to desired quality, within estimated time is considered successful (Shenhar et al., 2001).

H1: There is a negative impact of project complexity on project success

2.2 Project Complexity on Knowledge Management Practices

The Project Complexities Oxford's online dictionary explain the word -complex as it consist of connected and lots of diverse parts and is not simply understandable, intricate or complicated. The term -Complex initiated from Latin word -complexus which refer to the twisted or entwined together as well as can also be explained as a collection of an item, parts having more than two elements or variables. Complexity is an amount of -interrelatednes -consequential impact of a decision field and -manifoldness (Girmscheid & Brockmann, 2007). This system is believed to have a structure with variation. On a basis of the above explanations, the term-complex refer to something that has lots of parts and are connected or interrelated as well as has the element of complication, difficulty and obscurity . Complex project is the one that shows level of severity or the

various features to some extent that results in difficulties to assess, control and manage the expected results of projects. Research in project complexity area is now becoming more and more recognized as per (Geraldi & Adlbrecht, 2007). Mostly, the managers use the word –complex projects during the description of their project, even it's not known that which elements are going to contribute to project complexity as well as how they are going to be quantified. The Practical experts has described projects as –simple or –complex whenever they discusses management issue (Baccarini, 1996). It's reflecting that the complexity actually have the influence on a management of project's practices and methods. Hence, it's important to know that the element contributing in project complexity in front of just size of the projects. As it's a very common feeling between project managers that –complex projects are more than just a–big project. Knowledge management practices in project atmosphere face important challenges, because of the uniqueness, one-off as well as constrained nature of the projects and distributed practices between project teams. To deal with the increasing complexity and uncertainty among the managerial approaches in project, knowledge management practices (KMP) at organizational and individual levels are the major contributors (Atkinson, Crawford, & Ward, 2006). No doubt in new types of projects greater level of complexity is required to explore. The new areas of knowledge management practices (KMP) to meet necessities that are not addressed through existing capabilities and routines (Davies & Brady, 2016). Knowledge management practices (KMP) is emerging by the sense of making experiences in handling other sources and complexity of the knowledge management practices (KMP) represent then central part beside the life cycle of project (Ahern et al., 2014). If suitable mechanisms are absent, whenever the formed knowledge management practices (KMP) appear to be extremely specific within a particular project's team, these risks to result in the expansion of decentralized practices as well as less chances for the routinized learning. Features of uncertainty and diversity of the projects can further delay the ability of the project teams in identifying which knowledge management practice (KMP) is related and to appropriately acquire it.

H2: Project Complexity is negatively associated with Knowledge Management Practices

2.3 Knowledge Management Practices on Project Success

There is a ton of research that has been done before to understand an importance of the knowledge management practices (KMP) in the organizational context, which influences behavior, performance and attitudes in an organization in positive way (Omotayo, 2015). Knowledge management practices is seen as exchange of social and cultural relationships e.g., it involves exchange of experience, skills and ideas within departments and organization (Gharakhani & Mousakhani, 2012). In specific knowledge management practices literature of project management, effective knowledge sharing motivates organizational and individual learning, which in results affects the outcome. A study shows that knowledge management practices has positive effect on performance in uncertain environment (Salehzadeh et al, 2017). During the last two decades, the discipline of knowledge management practices is gaining popularity. Knowledge is considered key resource of an organization and effective knowledge management practices is important for organization's success. Prior researches recommended that at ‘learning’ the organizations are powerful and have developed schedules that enables them to viably store, create. Furthermore, apply new learning on precise evidence (Rasiah, 2017). Significance of the knowledge management practices (KMP) has been argued in literature several times e.g. (Omotayo, 2015), but still there is requirement to analyze its importance in making project critical (Shenhar & Holzmann, 2017). Knowledge management practices is very important in project-based firms, without the effective knowledge management practices (KMP) projects can suffer from various problems e.g. unsuccessful collaborations, coordination issues, etc. (Herbsleb & Moitra, 2001). Knowledge management practices (KMP) in projects can be difficult and challenging task. Sometimes team members are reluctant to share knowledge, because it gives them edge over others and sharing may weakens their potential value. Literature shows that

project manager's behavior plays an important role to achieve project success (Scott-Young & Samson, 2008). It has been contended that creating right platform and developing knowledge management practices (KMP) for sharing knowledge is an important concern for the successful organizational performance (Almahamid et al., 2010). According to Kogut and Zander (1992), organizations exist since they are superior to anything markets at exchanging, recombining, and making information. A key test for an information sharing system is to inspire individuals to take part and contribute learning to achieve great outcome. Sharing knowledge among the team increases motivation and helps in dealing with the complications occur within the project. The systems approach has been broadly explained the interconnection of different parts (Bertalanffy, 1968), human resource is considered one of the major parts in system. Humans are involved therefore various behavioral and cultural dimensions impact the whole system. Various social measurements that possibly impact learning sharing have been recognized (Kankanhalli et al., 2005). Knowledge management practices is the significant means through which representatives can add to performance, advancement, and eventually attaining the competitive edge. Literature shows that knowledge management practices plays important role in projects (Lin & Lee, 2005) and creating a right platform for knowledge management practices is a fundamental element consider for project success (Almahamid et al., 2010). Information technology (IT) projects are usually said to be complex, so managing knowledge correctly in the complex scenarios can be helpful for the successful outcomes (Tupenaite et al., 2008). The complex project need to have a well-managed knowledge management practices (KMP), so that the project team knows the significance of knowledge divisions in dealing the problematic situations.

H3: Knowledge Management Practices is positively associated with Project Success

2.4 Mediating role of Knowledge Management Practices

Knowledge management practices (KMP) entails the blend of co-evolving, distinctive and interacting types of a knowledge attained for technical and operational activities (For example: use of specific development technologies), strategic activities (For example: supportive strategic planning), the functional activities for routine operations (For example: buying), project management activities (For example: scheduling). The main knowledge management processes included in the management and development of the projects (i.e., ahead of project life cycle) with the examples of practices and mechanisms, as experienced-base knowledge attainment, knowledge capture and codification and knowledge creation. The diversity of relevant mechanisms and tools allows then to exploit the knowledge management practices (KMP) created while the execution of the projects. Beyond the utilization of current knowledge management practices (KMP) to guide actions, individuals working in different projects gain the understanding of new kind of project by implementing their exact work in socially developed context. The incorporation of experienced-based knowledge with exploitation of present knowledge coming from the external source through the social coordination mechanism enables project management team to develop new knowledge toward the avoiding insecurity and sense-making in decision making (Floriciel et al., 2016). According to Wit (1988) project success is dependent on different aspects such as scope/quality, cost and time. Shenhar and Dvir (2007) described that the project performance can be assessed in other strategic domains in organization e.g. project efficiency, team work, team learning, direct success, sharing concepts, and preparation for the future. Different resources are utilized appropriately to achieve project success e.g. human resource, financial resources and physical resources etc. Adequate knowledge management practices in improving project outcomes has also been considered as one of

the resources. The Knowledge sharing is also considered important factor of knowledge management practices (KMP) as well as it disturbs organizational performance (Alavi & Leidner, 2001) and the success of project.

H4: Knowledge Management Practices mediate the relationship between Project Complexity on project Success

2.5 Moderating role of Ambidextrous Leadership

An idea of ambidextrous leadership has recently come into view, this idea has been important in the concept of leadership from start (Ma, Zhou, Chen, & Dong, 2019). It has also been noted by (Zainab Ahsan, et al., 2020) that the effective leader should be enough able to adopt the needed leadership style that is in the accordance with particular situation. Great leader may choose what kind of leadership style is appropriate for which condition and exhibits highest amount of transactional and transformational behavior as per the situation. The accurate meaning of ambidexterity is the capability of an individual to utilize both hands without difficulty. The ambidextrous leader utilizes transformational leadership style when he faces a dynamic environment as well as utilizes transactional leadership style whenever he face constant environment (Bucic, Robinson & Ramburuth, 2010). Key challenge in projects takes place when the scopes, objectives and stakeholders' expectations are vaguely defined (Barclay & Osei - Bryson, 2010). The criteria for successful projects differ from project to project. Traditionally used factors for measuring project success were time, cost and scope. Organizations need to adopt all exploitation and exploration to address the difficulties and challenges that accompany the problematic change. Companies exploits the data that is in hand to ensure that a project is effective in a short time and explore new information as well as opportunities, new possibilities so the project can attain prosperity and success in future (Chen, 2017). An Ambidextrous leadership is very important element in the achievement of organization's goal wandering into highly established economies. Also pursuit of both exploitation and exploration results in the superior organization's performance. To achieve project success, projects need to be delivered in time, within budget and according to required quality. In today's global environment, to deliver projects within time and budget, process, people and technology used by information system project need to exhibit rigor and agility, i.e. Ambidexterity (Lee, Delone & Espinosa, 2007). If leaders fail to deliberately supervise projects that are vital to the organization's success, the competitive growth of a business will be affected. Ambidextrous leaders are enthusiastic and innovative, they works without thinking about their personal-interest and performs to promote adaptive learning according to (Zainab Ahsan, et al., 2020). An Ambidextrous leader works hard to bring change within the organization to shape it into something different. It is described as magnetism, motivation and individual consideration (Zainab Ahsan, et al., 2020). An ambidextrous leader is fit for switching among transactional and transformational leadership, according to the situation and requirement by Attar, M., & Kalfaoğlu, S. (2020). In reality, organizations are hardly in one phase or the other. Other than organizational culture, the leadership styles likewise decides the efficiency of knowledge management practices incorporation. To collect competitive advantage from ambidextrous leadership, knowledge management practices can urge employees of the organization to adapt and learn new as well as existing knowledge devotedly. It can also be said that management styles and the closed minded work force can be a hurdle to knowledge management practices which may lead to a decrease in an innovation capabilities of whole organization. Various researches have been conducted to inspect ambidextrous leadership style utilizing measurements for the two dimension. This study also stresses importance of the ambidextrous leadership mentioned above in knowledge management practices and accelerating information within a firm. We will find out a relationship among ambidextrous leadership and

knowledge management practices. A second reason for discussing and analyzing the existing literature deeply on knowledge management practices (KMP) and leadership is referred as a current absence of systematization. On account of the increased inescapability of KMP in the organization functioning and its outcomes however, if a critical degree of deepening reaches with respect to the study of relationship among KMP and organization's sustainability strategies, sustainable open innovation system and intellectual capital management the same can't be said for intersection among KMP and ambidextrous leadership. As a result, particular focus on the leadership and knowledge management relationship is important to systematize whatever exists on topic as well as significantly propose valued insights on the current gaps to deliver significant bases for the future research (Appio et al., 2014; Caputo et al., 2018).

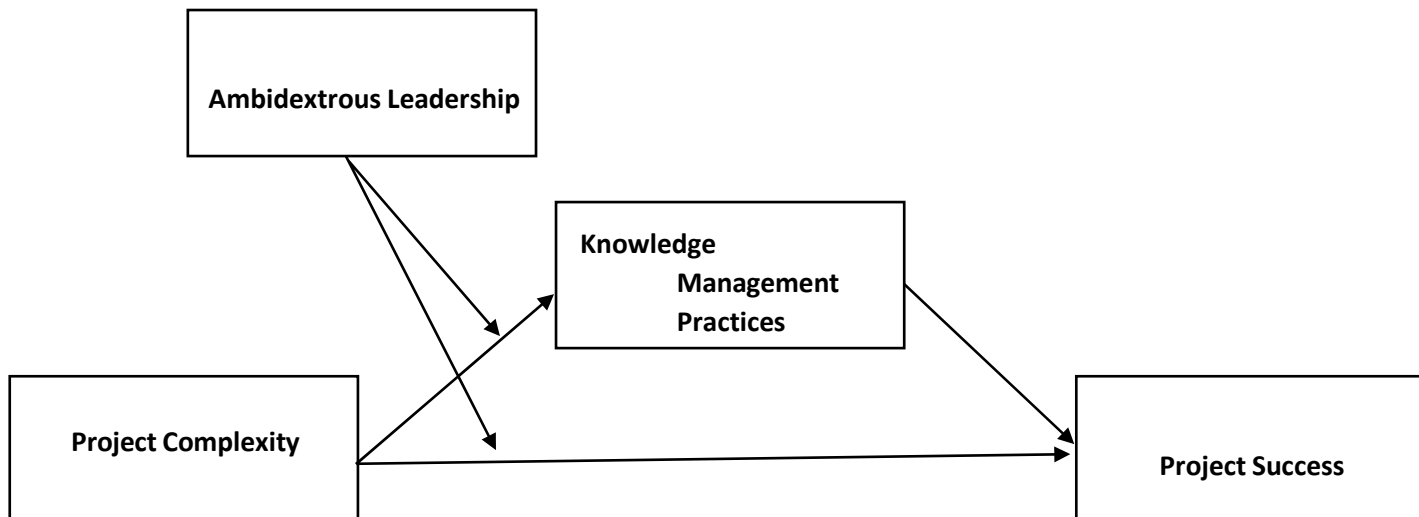
H5: Ambidextrous Leadership moderate the relationship between Project Complexity on Knowledge Management Practices such that the more ambidextrous the leader is the more positive the relationship between project complexity and knowledge management practices.

2.6 Moderating role of Ambidextrous Leadership on project complexity and project success

Ambidextrous leadership is very important factor in accomplishment of goals of an organization venturing into extremely established economies (Chebbi et al., 2017). To achieve organization's higher performance, projects should be delivered within budget, in time and according to the quality required. Delivering projects in today's global environment within budget and process, people, time and technology used by the information system projects need to exhibit agility and rigor, i.e. Ambidexterity (Lee, Delone & Espinosa, 2007). If leaders fails to deliberately supervising projects which are important to the success of an organizations then the business competitive growth will be affected (Rauniar & Rawski, 2012). Ambidextrous dealing strategies are used by the project managers to decrease the opposing consequences of complexity of global boundary on global project success (Lee, Delone & Espinosa, 2006). Earlier research also proposes that projects required in software implementation and development also requires ambidexterity, i.e. they needs to be agile/flexible and disciplined/rigorous simultaneously so they can deal with the challenges confronted by projects happening globally (Lee et al., 2007). For instance, team needs to follow project adapting approach in a trained and thorough manner simultaneously, show adaptability towards quick adaptation as well as reverse these methodologies as per the need of environment (Lee et al., 2006). Ambidextrous Leadership is fundamental for the success of the project. As projects are of unique nature, they can't be executed by utilizing normalized measures only. Producing new information is vital alongside standardized processes for project's successful execution (Edmondson, 2008).

H6: Moderating role of Ambidextrous Leadership on the relationship between project complexity and project success such that the ambidextrous leadership will have positive effect on the relationship between project complexity and project success.

2.7 Research Model



2.8 Research Hypothesis

H1: There is a negative impact of project complexity on project success

H2: Project Complexity is negatively associated with Knowledge Management Practices

H3: Knowledge Management Practices is positively associated with Project Success

H4: Knowledge Management Practices mediate the relationship between Project Complexity on project Success

H5: Ambidextrous Leadership moderate the relationship between Project Complexity on Knowledge Management Practices such that the more ambidextrous the leader is the more positive the relationship between project complexity and knowledge management practices.

H6: Moderating role of Ambidextrous Leadership on the relationship between project complexity and project success such that the ambidextrous leadership will have positive effect on the relationship between project complexity and project success.

3. Methodology

This section includes the procedures that are required to find out the impact of project complexity on the project success with the moderating role of knowledge management practices as well as the mediating effect of ambidextrous leadership as well as the mediating role of ambidextrous leadership on project complexity and knowledge management practices. This chapter deals with the research design which will be covering all the techniques of data collection (sample and population) and also discuss the same. It also deals with the measurement of variables and instruments used for data analysis.

3.1 Research Method and Design

Research design ensures that the evidence achieved will enable to address the research issue reasonably and as unambiguously as possible. According to Zikmund (2003) research design describes the procedure and complete method for gathering and examining important information. Research design consists of types of setting, time horizon and unit of analysis as discussed in this section. This is going to be a quantitative study to investigate the relationship between the project complexity and project success with the moderating role of knowledge management practices as well as the mediating effect of ambidextrous leadership between the project complexity and knowledge management practices. These variables are going to be measured on the self-reported perceptions.

3.2 Study Setting

In this research, data collection will be done through a structured questionnaire survey. Pre-tested questionnaire adopted and will be distributed among the employees of different projects, it includes top-level management, middle-level management, managers and the

subordinates working in the project-based organizations of private, public and semi-government sector. For current study unit of analysis will be individual who are working in IT organizations (project-based) of private, public and semi-government sector.

3.3 Sample and Population

IT sector of Pakistan is going to be the population of the study. The participants will be employees working on projects like managers, assistant of executive level, team members of any designated project team in organization. The study is quantitative and cross-sectional data will be collected in a natural setting. Almost 384 survey questionnaires will be distributed as Krejcie and Morgan (1970) considered it a reasonable sample size for consideration.

4. Data Analysis

After data cleaning, regression will be used to test research hypotheses along with mediation and moderation analysis developed by (Hayes, 2017).

4.1 Reliability

A pilot sampling was carried out on 12 questionnaires and investigated with Cronbach's alpha to determine how sturdy the scale of internal consistency is. As a widespread rule, a coefficient more than or the same as 0.7 is taken into consideration as desirable and an excellent indication of assembling reliability. Table 1 suggests the effects of reliability coefficients (alpha) turned into 0.843 which strongly meet the desirable degree of 0.7 or higher.

Table 1.

Reliability Statistics			
		N	%
Cases	Valid	12	100.0
	Excluded	0	.0
	Total	12	100.0
Cronbach's Alpha			
			0.843

4.2 The Profile of Respondents

The questionnaire requested every respondent to offer demographic information i.e. gender, education level, age, employment status, income and family status. Table 2 under offers descriptive information for the respondents' characteristics. About 6.7 percent (n=20) of the respondents were 18-21 years old, 41 percent (n=123) were 22-25 years old and 52.3 percent (n=157) were 26-29 years old. Concerning gender, shows that 76.7 percent (n=230) were males and 23.3 percent (n=70) were females. About 65.3 percent (n=196) of the respondents were full-time employees, 12 percent (n=36) were either unemployed or retired and 22.7 percent (n=68) of the respondents were students.

About 85.7 percent (n=257) received a monthly income PKR 50,000 or less and 14.3 percent (n=43) received more than PKR 50,000 to 100,000 each month. As for education, 82 percent (n=246) had a bachelor's degree, and the 18 percent (n=54) had postgraduate degrees. About 25 percent (n=75) of respondents were Single, and 75 percent (n=225) were married.

Table 2.

Characteristics	Frequency	Percentage
Age		
18-21	20	6.7%
22-25	123	41%
26-29	157	52.3%
Gender		
Male	230	76.7%
Female	70	23.3%
Family Status		
Single	75	25%
Married	225	75%
Employment Status		
Permanent Full-Time Employees	196	65.3%
Unemployed or Retired	36	12%
Students	68	22.7%
Income per month		
50,000 or less	257	85.7%
More than 50,000 to 100,000	43	14.3%
Education Level		
Undergraduate Degree (Bachelor's)	246	82%
Graduate degree (Master's or Ph.D.)	54	18%

4.3 Descriptive statistics of the Demographics

In Table 3, we present the descriptive statistics regarding the demographics. A large number of respondents are males. The mean of age stood at 2.456 indicating the overall age of the respondents ranged 22-29 years or above. Regarding academic qualification and occupation, the majority of them have completed their Bachelors and are employed, while their average monthly household income is between Pakistani Rupees 0-50,000 for most of the respondents.

Table 3.

	N	Min	Max	Mean	SD
Age	300	1.00	3.00	2.4567	0.61865
Gender	300	1.00	2.00	1.2333	0.42366
Employment Status	300	1.00	3.00	1.4667	0.70037
Family	300	1.00	2.00	1.7500	0.43374
Income per month (PKR)	300	1.00	2.00	1.1433	0.35100
Education Level	300	2.00	3.00	2.1800	0.38483
Valid N (list wise)	300				

4.4 Results and Detailed Explanations

Q1: The Leader encourages generating own, new ideas and thinking outside of the box (openness)

Results: Mean = 4.2, Std Dev = 0.8, Min = 2, Max = 5

Detailed Explanation: The relatively high mean score of 4.2 indicates a positive perception among respondents regarding their leaders' encouragement of generating new ideas and thinking innovatively. The standard deviation of 0.8 suggests moderate variability, implying that while there is a generally positive perception, there are some differences in how individuals perceive this encouragement. The range of scores from 2 to 5 underscores the diversity in responses, with some respondents perceiving lower levels of encouragement.

Q2: The Leader Encourages followers to challenge the status quo and be critical of how things have been done in the past (openness)

Results: Mean = 4.0, Std Dev = 0.9, Min = 2, Max = 5

Detailed Explanation: Respondents, on average, perceive a positive but slightly lower inclination from their leaders to encourage the challenging of the status quo (mean = 4.0). The standard deviation of 0.9 indicates a moderate degree of variability in responses, suggesting that while there is overall positive perception, some variation exists. The range of scores from 2 to 5 illustrates differing viewpoints among participants.

Q3: The Leader motivates employees to take risks, break up rules to search for solutions outside the safe grounds (openness)

Results: Mean = 3.8, Std Dev = 1.0, Min = 1, Max = 5

Detailed Explanation: With an average score of 3.8, respondents feel moderately motivated by their leaders to take risks and break rules for innovative solutions. The higher standard deviation (1.0) indicates a wider range of responses, suggesting diverse

perceptions among participants. The minimum score of 1 implies that some respondents perceive a lower level of motivation in this aspect, contributing to the variability in responses.

Q4: The software house collects information about the requirements of its managers.

Results: Mean = 3.5, Std Dev = 0.7, Min = 2, Max = 4

Detailed Explanation: On average, respondents perceive that the software house moderately collects information about the requirements of its managers. The relatively low standard deviation (0.7) indicates a more consistent perception among respondents, with less variability in responses. The scores, ranging from 2 to 4, suggest a narrower spectrum of viewpoints.

Q5: Managers acquire knowledge through experience and adopting innovative skills.

Results: Mean = 4.3, Std Dev = 0.6, Min = 3, Max = 5

Detailed Explanation: Respondents, on average, believe that managers actively acquire knowledge through experience and innovative skills, with a relatively high mean score and low variability (standard deviation = 0.6). The scores ranging from 3 to 5 indicate a generally positive perception and a consistent viewpoint among participants.

Q6: Managers acquire knowledge through libraries and the internet.

Results: Mean = 3.8, Std Dev = 0.9, Min = 2, Max = 5

Detailed Explanation: On average, respondents perceive that managers moderately acquire knowledge through libraries and the internet. The standard deviation of 0.9 suggests some variability in responses, indicating differing perceptions among participants. The range of scores from 2 to 5 emphasizes the diversity in viewpoints.

Q7: Managers promote new knowledge externally in the market through the dissemination of research findings.

Results: Mean = 3.9, Std Dev = 0.8, Min = 2, Max = 5

Detailed Explanation: The average score of 3.9 suggests that respondents, on average, perceive that managers moderately promote new knowledge externally. The standard deviation of 0.8 indicates a moderate degree of variability in responses, suggesting diverse perspectives. The range of scores from 2 to 5 illustrates the spectrum of opinions.

Q8: The experiences of students and other clients are used to improve our programs and courses.

Results: Mean = 3.6, Std Dev = 0.7, Min = 2, Max = 4

Detailed Explanation: Respondents, on average, perceive a moderate utilization of the experiences of students and clients to improve programs and courses (mean = 3.6). The relatively low standard deviation (0.7) suggests a more consistent perception among participants, with less variability in responses. The range of scores from 2 to 4 indicates a relatively narrow spectrum of viewpoints.

Q9: My organization stimulates formal and informal networking between its managers and experts outside an institution.

Results: Mean = 4.1, Std Dev = 0.6, Min = 3, Max = 5

Detailed Explanation: The high mean score of 4.1 suggests that respondents perceive a positive stimulation of formal and informal networking between managers and external experts. The low standard deviation (0.6) indicates a consistent and less variable perception among respondents. The scores ranging from 3 to 5 illustrate a generally

positive consensus.

Q10: My organization enables managers to become familiar with the work of other employees in an institution.

Results: Mean = 3.7, Std Dev = 0.8, Min = 2, Max = 5

Detailed Explanation: On average, respondents perceive that their organization moderately enables managers to become familiar with the work of other employees. The standard deviation of 0.8 suggests some variability in responses, indicating diverse perceptions among participants. The range of scores from 2 to 5 emphasizes the spectrum of opinions.

Q11: We frequently make use of brainstorming sessions to find solutions for problems we meet within our work.

Results: Mean = 4.4, Std Dev = 0.5, Min = 4, Max = 5

Detailed Explanation: Respondents, on average, report a high frequency of using brainstorming sessions to find solutions for work problems (mean = 4.4). The low standard deviation (0.5) indicates a consistent and less variable perception among participants. The scores ranging from 4 to 5 illustrate a high level of consensus on the frequency of using brainstorming sessions.

Q12: Managers transfer knowledge of their best practice to their colleagues.

Results: Mean = 4.2, Std Dev = 0.7, Min = 3, Max = 5

Detailed Explanation: The relatively high mean score of 4.2 suggests that, on average, respondents perceive a positive transfer of knowledge from managers regarding best practices. The standard deviation of 0.7 indicates moderate variability, suggesting some differences in how individuals perceive this knowledge transfer. The range of scores from 3 to 5 emphasizes the diversity in responses.

Q13: The organization has procedures for collecting and distributing suggestions coming from the managers.

Results: Mean = 3.5, Std Dev = 0.8, Min = 2, Max = 5

Detailed Explanation: On average, respondents perceive that the organization moderately has procedures for collecting and distributing suggestions from managers (mean = 3.5). The standard deviation of 0.8 suggests some variability in responses, indicating differing perceptions among participants. The range of scores from 2 to 5 illustrates the spectrum of opinions.

5. Conclusion

The study aimed to explore the impact of project complexity on project success in the IT industry of Pakistan, with a focus on the mediating role of knowledge management practices and the moderating role of ambidextrous leadership. The research objectives were meticulously addressed through a quantitative, cross-sectional approach involving 384 participants from the IT sector. The detailed analysis of results sheds light on various aspects, providing valuable insights for both academia and industry. Impact of Project Complexity on Project Success: The findings support the hypothesis (H1) that project complexity has a negative impact on project success. The perceived challenges associated with project complexity in the IT industry underscore the need for effective management strategies to navigate intricate project environments successfully. This insight is crucial for project managers and organizational leaders in devising tailored approaches to address complexity and enhance project outcomes. Knowledge Management Practices as Mediators: The study also investigated the mediating role of

knowledge management practices (H4). Results indicate a negative association between project complexity and knowledge management practices (H2) and a positive association between knowledge management practices and project success (H3). This suggests that effective knowledge management practices can act as a mediator, mitigating the adverse effects of project complexity on project success. Organizations should prioritize the development and implementation of robust knowledge management strategies to enhance project success in the face of complexity. **Ambidextrous Leadership as a Moderator:** The research delved into the moderating role of ambidextrous leadership in the relationship between project complexity, knowledge management practices, and project success. The results affirm the hypothesis (H5) that ambidextrous leadership positively moderates the relationship between project complexity and knowledge management practices. This implies that leaders with ambidextrous capabilities can facilitate the effective implementation of knowledge management practices, mitigating the impact of complexity. Furthermore, the study supports H6, indicating that ambidextrous leadership positively moderates the relationship between project complexity and project success. This underscores the significance of leadership adaptability in navigating complex project environments and ensuring successful project outcomes. **Organizational Implications:** The results highlight several areas for organizational consideration. Leaders should foster a culture of openness and innovation, as indicated by the responses to leadership behavior questions (Q1-Q3). Additionally, organizations should focus on improving information collection about managerial requirements (Q4) and promoting varied sources of knowledge acquisition (Q5-Q8) to enhance knowledge management practices. Encouraging networking (Q9-Q10), utilizing brainstorming sessions (Q11), and promoting the transfer of best practices (Q12) are essential for creating a knowledge-sharing environment. However, attention is needed in establishing procedures for collecting and distributing suggestions from managers (Q13) to further enhance knowledge management practices.

5.1 Limitations and Recommendations for Future Research:

It is crucial to acknowledge the study's limitations, including the potential for respondent bias and the exclusive focus on the IT industry in Pakistan. Future research should consider diverse industries and regions to generalize findings. Additionally, longitudinal studies could provide a deeper understanding of the dynamic relationships explored in this research. In conclusion, this study contributes valuable insights into the complex interplay between project complexity, knowledge management practices, and leadership styles in the IT industry. The findings offer practical implications for organizations seeking to improve project success in challenging environments. By embracing ambidextrous leadership and effective knowledge management practices, organizations can navigate project complexity and achieve successful outcomes in the ever-evolving landscape of the IT sector.

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