CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Impact of Entrepreneurial Orientation on Project Success: Mediating Role of Technological Orientation and Moderating Role of Top Management Support

by

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I want to dedicate this thesis to my parents, respected teachers, siblings and my wife for their love, support and care.

CERTIFICATE OF APPROVAL

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

(Surah Ar-Rahman)

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Abstract

This study examined the impact of Entrepreneurial Orientation on Project Success with mediating role of Technological Orientation and moderating role of Top Management Support. A research framework was developed to formulate and analyze the hypotheses to investigate the connection between all four factors. Data was collected from software development companies of twin cities of Pakistan i.e. Islamabad and Rawalpindi. Convenience sampling was utilized to collect data from 350 respondents. 258 respondents responded to the questionnaires developed for the aforesaid research. The results of the study revealed that Entrepreneurial Orientation is positively associated with Project Success. Moreover, Technological Orientation also proved to have a mediating role in the relationship between Entrepreneurial Orientation and Project Success. Surprisingly, moderating role of Top Management Support was found insignificant. The study contributed not only to the existing body of knowledge of project management but also tried to bridge the gap between the entrepreneurship and project management literature. Furthermore, the current study is expected to enable the project managers to explore new methods to understand project success. They should exhibit a mix of different dimensions of entrepreneurial orientation in their decision making and methodology for improving project success.

Keywords: Entrepreneurial Orientation, Project Success, Technological Orientation, Top Management Support

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Abbreviations

AUT	Autonomy
AVE	Average Variance Extracted
CA	Competitive Aggressiveness
CR	Composite Reliability
EO	Entrepreneurial Orientation
HTMT	Heterotrait-Monotrait
ICT	Information and Communication Technology
IT	Information Technology
INN	Innovativeness
LLCI	Lower Limit Confidence Interval
PS	Project Success
PMI	Project Management Institute
PSEB	Pakistan Software Export Board
PLS-SEM	Partial Least Squares Structural Equation Modeling
PRO	Proactiveness
RBT	Resource Based Theory
RT	Risk Taking
TO	Technological Orientation
TMS	Top Management Support
ULCI	Upper Limit Confidence Interval
VRIN	Valuable, Reliable, Inimitable, Non-substitutable
VRIO	Valuable, Reliable, Inimitable, Organized
VIF	Variance Inflation Factor

Chapter 1

Introduction

1.1 Background of the Study

Project management has been defined by (PMI, 2013) as, "the application of knowledge, skills, tools and techniques to project activities to meet the project requirements". It includes requirements of the project that are to be met, explicitly stated objectives that are to be achieved, and managing the project within pre-defined schedule, budget and quality to meet its specifications (Golubović, Golubović, Stojiljković, Glišović, & Živković, 2018). Research within the sphere of project management has highlighted that projects are medium to institutionalize the change within an organization (Hornstein, 2015). According to (Turner & Müller, 2003, p. 7), "a project is a temporary organization to which resources are assigned to undertake a unique, novel and transient endeavor managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change".

Lister, (2014) contends that "projects are vehicles to help organizations learn, change, adapt, improve, and adopt new processes, products or technology". They are undertaken to generate value for the business and providing competitive edge to the organizations over their rivals (Shenhar 2001). According to (PMI, 2017), it has been forecasted that US $20.2 trillion will be contributed to GDP by project-oriented industries in coming years. Howsawi et al (2014) enunciated that success

is one of the eventual objectives of any project endeavor besides others. Over the decades, project success has been researched widely within the field of project management (He et al., 2019). Success in projects lead to achievement of strategic objectives of an organization and high success rate ensures superior organizational performance (Iqbal et al., 2017). Although project success has been extensively researched within project management literature (McLeod et al., 2012), yet no common success criteria exist in the literature. The success criteria change according to the nature of project (Mir, & Pinnington, 2014).

Various factors like project methodology (Joslin and Müller, 2016), planning (Dvir & Lechler, 2004), coordination (Jha & Iyer, 2006), leadership styles (Jiang, 2014), goal clarity (Raziq et al., 2018) etc. have been attributed to project success. However, projects still fail bringing huge financial loss to the organizations as well as loss of time, reputation and decreasing morale of project team. According to (Pulse of the Profession, 2019), organizations wasted 12% of their investment due to poor project performance. Similarly, (The Standish Group, 2018) reported that percentage of projects that are successfully executed is 29%, 52% are challenged (over time, over budget or not meeting the desired specifications of users) while 19% are completely failed. Nevertheless, the failure rate of projects has prompted researchers to identify further in detail the antecedents of project success.

Recently, (Martens et al., 2018) has attempted to link entrepreneurial orientation with project success. Although, entrepreneurship and project management disciplines have been researched separately in the academic literature, but in practice, there exists a strong connection between them (Kuura et al., 2014). Fonrouge, Bredillet, & Fouché (2019) argued that performance is perceived differently in both disciplines that makes them apart. In entrepreneurship literature, Entrepreneurial Orientation (EO) is conceptualized as an established construct (Bojica et al., 2011) that has attracted reasonable attention in hypothetical and experimental studies (Rauch et al., 2009). It reflects "the processes, practices, and decision-making activities that lead to new entry" (Lumpkin & Dess, 1996, p. 136) and is represented by five dimensions which are innovativeness, proactiveness, risk-taking, autonomy and competitive aggressiveness.

Entrepreneurial orientation can provide new information which can be used by an organization to revitalize the existing capabilities to achieve its goals (Choi and Williams, 2016). It varies industry to industry and depends upon the frame of reference of an organization (Lomberg et al., 2017). With the advent of new technologies and growth in innovation, the landscape of doing business has changed (Markovic, 2008). This scenario has made it inevitable for organizations to react to requirements of customers in an economical way (Martens et al., 2018). Entrepreneurially oriented organizations are in a better position to adjust themselves according to the changing environment which can affect performance positively (Hakala and Kohtamaki, 2011).

Recent advancements in technology have also affected projects (Makui et al., 2018) and the use of technology in projects has grown considerably (Anantatmula, 2008). The technology is conceptualized as potentially useful knowledge and medium for innovation (Amoako-Gyampah et al., 2018). The use of technological knowledge to fulfill client's needs reflects technology orientation of an organization (Gatignon and Xuereb, 1997). The technologically-oriented firms acquire technology to upgrade their existing technology base, invest substantially in R&D projects for new product development or services and are inclined to new ideas, methods and practices that can benefit organization (Chen et al., 2014). Hence, technological orientation facilitates innovation in an organization to remain competitive (Yu et al., 2013). Foregoing in view, it is important for the organizations to keep them up-to-date with latest technologies or else they will be out of competition (Peslak, 2012).

In an organization, it is the prime responsibility of top management, to provide required support and resources for the project and their involvement can enhance project success (Berssaneti and Carvalho, 2015). Top management's decision making and support is considered to be the main driving force in facilitating entrepreneurial culture within the organization (Mahrous and Genedy, 2019). Hence, entrepreneurial orientation in combination with technological orientation may enable organizations to create unique products, processes or services to create first-mover advantage (Hakala & Kohtamaki, 2010).

1.2 Research Gap

Research has shown that Entrepreneurship and Project Management disciplines have been explored separately in the academic literature but the reality is that they are strongly inter-connected (Kuura et al., 2014). Performance is perceived differently in both disciplines that has segregated them from each other from past few decades (Fonrouge et al., 2019). Within Project Management, performance generally means project success when the objectives are achieved within the iron triangle of time, cost and scope. Whereas in Entrepreneurship, performance relates to growth, profit or any other goals to be achieved in future by the entrepreneur. According to the extant literature, performance in organizations has been explored through Entrepreneurial Orientation (Pittino et al., 2016). It is widely acknowledged and extensively researched variable within Strategic Management and Entrepreneurship literature for past few decades (Jeong et al., 2019). Studies have concluded a siginificant relationship between entrepreneurial orientation and performance (Rosenbusch, Rauch, & Bausch, 2013; Rauch et al., 2009). Generally, entrepreneurial orientation has mostly been researched in manufacturing and SMEs sectors but limited studies are available that have investigated entrepreneurial orientation within the domain of project management (Kock, & Gemünden, 2016; Martes, Carneiro, Martens, & Silva, 2015.

Foregoing in view, (Martens et al., 2018) attempted to link entrepreneurial orientation with project success by deducing that if entrepreneurial orientation has relationship with organizational performance, then it can also lead to project success. The same authors also proposed that the study should be carried out in different contexts and other business sectors to validate their proposed model. Therefore, this study will utilize this gap to determine the impact of entrepreneurial orientation on project success in Asian setting especially in project-based organizations of Pakistan, making it one of the fewer studies that interrelate entrepreneurship and project management literature.

While investigating the relationship of entrepreneurial orientation and project success, researchers have also suggested the inclusion of mediating and/or moderating variables to further explore this relationship (Martens et al., 2018). Therefore,

this study suggests technological orientation to be studied as mediator between entrepreneurial orientation and project success because technology has a significant contribution in the successful accomplishment of a project (Anantatmula, 2008). According to our limited knowledge, no previous literature is available that has theoretically and empirically investigated technological orientation within the domain of project management. Therefore, it would be an important addition to project management literature because technological orientation has previously been explored within literature of new product development (Hsu et al., 2014; Yang, Wang, Zhu, & Wu, 2012). It has also been observed that top management support has significant contribution in project success (Ahmed & Azmi bin Mohamed, 2017) because it provides tangible, intangible and financial resources for successful execution of any activities related to projects. Thus, this drives the motivation to study the top management support as a moderator between technological orientation and project success.

The present study will, therefore, determine the impact of entrepreneurial orientation on project success in software development companies of Pakistan. The study will contribute significantly to the existing literature of project management and will empirically test the proposed research framework; hence bridging the gap between entrepreneurship and project management disciplines.

1.3 Problem Statement

Research in the sphere of project management has highlighted that projects are medium to institutionalize the change within an organization (Hornstein, 2015). They are undertaken to generate value for the business and providing competitive edge to the organizations over their rivals; hence, they have been cited as crucial in the success of the organizations (Davis, 2016).

In developing countries like Pakistan, it has been observed that successful execution of projects is a challenging task especially in the software development firms (Jehan, Ghani, & Shafi, 2014). Though different projects have been initiated by

the Government of Pakistan to promote IT industry at global level. However, despite all the efforts, most of the projects fail resulting in huge financial loss to the organizations (Butt, 2013). The ratio of successful projects in Pakistan is small as compared to developed countries. According to Standish Group's Chaos Report 2015, only 29% of the projects are considered successful.

Moreover, the newly emerging and existing software companies of Pakistan are not progressing the way companies of the developed countries are progressing. Hence, Pakistan ranks 110 among 139 countries on "Networked Readiness Index (NRI)" (Monitor, 2018). The failure rate of software development projects has prompted researchers to identify further in detail other factors that can impact project success. Study conducted by (Martens et al., 2018) attempted to link entrepreneurial orientation with project success by deducing that if entrepreneurial orientation has relationship with organizational performance, then it can also lead to project success. Therefore, it has become imperative to understand the phenomenon of entrepreneurial orientation in the context of Pakistan.

The goal of this quantitative research is to determine whether entrepreneurial orientation impacts project success in the software development firms of Pakistan or not. Since entrepreneurial orientation requires resources which is in the possession of top management support, it is therefore necessary to measure the effect of this variable in determining project success. Moreover, inclusion of technological orientation in the proposed model will determine whether it acts as an antecedent of project success or not.

1.4 Research Questions

A research question is an inquiry into a specific issue or problem. The research questions used in this study to address the aforementioned problems are listed below:

Research Question: 1

Does Entrepreneurial Orientation impact Project Success?

Research Question: 2

Does Entrepreneurial Orientation impact Technological Orientation?

Research Question: 3

Does Technological Orientation impact Project Success?

Research Question: 4

Does Technological Orientation mediate the relationship of Entrepreneurial Orientation and Project Success?

Research Question: 5

Does Top Management Support moderate the relationship of Technological Orientation and Project Success?

1.5 Research Objectives

Research objective of the study is to formulate a research framework that will integrate all variables into one coherent model. The proposed model will be examined for its effectiveness in the software sector of Pakistan. The specific objectives that this study intends to explore are given below:

Research Objective: 1

To examine the relationship of Entrepreneurial Orientation and Project Success.

Research Objective: 2

To examine the relationship of Entrepreneurial Orientation and Technological Orientation.

Research Objective: 3

To examine the relationship of Technological Orientation and Project Success.

Research Objective: 4

To examine the mediating role of Technological Orientation between Entrepreneurial Orientation and Project Success.

Research Objective: 5

To examine the moderating role of Top Management Support in the relationship of Technological Orientation and Project Success.

1.6 Significance of the Study

Due to globalization, robust growth in technology and innovation has led to the existence of project-based organizations where projects are considered as means to achieve goals and objectives of an organization and to enhance its performance. Success is one of the ultimate goals for any project (Howsawi et al., 2014). When talking about organizational performance, entrepreneurial orientation is widely cited as established construct in measuring organizational performance (Khanagha et al., 2018). Plethora of studies are available that have identified variables that affect project's success. However, entrepreneurial orientation and project success relationship has not been explored much. The study intends to examine the effect of entrepreneurial orientation on project success by identifying other factors that have the potential to determine project success.

This research study has theoretical, empirical and practical significance. Due to paucity of studies that link entrepreneurship and project management disciplines (Fonrouge et al., 2019), the current study fulfills this research gap by examining the influence of entrepreneurial orientation on the project success in the contextual settings of Pakistan. The study will be an addition to the existing literature of project management and will also theoretically bridge the gap between entrepreneurship and project management disciplines. Furthermore, this study has identified the antecedents of project success as suggested by (Martens et al., 2018) and developed a research framework by including technological orientation as a mediator and top management support as moderator in the relationship of entrepreneurial orientation and project success. Moreover, analyzing the relationship between all variables through the lens of resource-based theory (RBV) will assist the researchers/ scholars to further stimulate this research by including other variables that have the potential to act as an antecedent of project success.

From managerial point of view, the study provides insight into how to increase project success rate. The project managers working in IT sector should develop a different approach for managing IT projects as compared to that of construction and engineering projects. This understanding will enable them to adopt entrepreneurial actions that are necessary for the success of the projects. They

should exhibit a mix of different dimensions of entrepreneurial orientation in their decision making and methodology for improving project success. Management of the organization should formulate policies, adopt best business practices and make strategies on the basis of best available tangible and intangible resources to exploit opportunities available in the market and to incorporate state-of-the-art technology for successful execution of the projects; thereby increasing success rate of IT projects and to gain competitive advantage. It has become imperative for IT professionals to explore news methods to understand project success and to improve project performance (Guo, 2019).

Through this research, the top management will be able to understand that its support for implementation of technology in projects can result in completion of a project successfully; thereby augmenting the rate of the project success. It will also help them to recognize which resources are more important to exploit opportunities that can ultimately enhance the organizational performance. Additionally, policy makers, government strategists and ICT specialists will be in a position to establish standards and formulate policies to administer the ICT investments and its innovative use for the well-being of the organization.

This study will be the first of its kind to be conducted in the contextual settings of project-based organizations of Pakistan that will direct the researchers to investigate the success factors in other business sectors or industries as well to further validate the current research model. Moreover, project managers will also come to know about entrepreneurial orientation and its effectiveness in software sectors of Pakistan.

1.7 Supporting Theory

Several theories have been proposed by different researchers around the globe to understand the phenomenon of entrepreneurial orientation like Opportunity Identification Theory, Entrepreneurial Dominant Logic Theory, Upper Echelon Theory,

Institutional Theory, Organizational Change Theory, Resource-Based View Theory etc. Among these theories, Resource Based Theory (RBT) best suits to this research study and cover all variables of the study in a coherent model.

1.7.1 Resource-Based View (RBV)

The current study relies on Resource-based View (RBV) theory. The work of (Barney, 1991) has been considered seminal in the emergence of resource-based theory and is widely cited as one of the renowned theoretical frameworks for understanding and predicting organizational relationships in the strategic management literature (Barney et al., 2011). RBV states that the possession of strategic resources within the firm provides an organization the opportunity to achieve sustained competitive advantage. In analyzing competitive advantage of the firm, this theory is based on two assumptions; (1) firms should be heterogeneous in terms of possession of strategic resources and (2) resources should be immobile for sustained competitive advantage (Barney et al., 2012; Madhani, 2010). Its implications in other fields like human resource management, economics, entrepreneurship and marketing have also been analyzed by different researchers.

Resources of a firm have been categorized as "tangible resources, human resources and organization's resources" (Barney, 1991). Land, plant, equipment, raw materials, technology etc. are included in tangible resources. Experience, judgment, intelligence, knowledge, creativity, risk-taking ability comes under category of human resources. Firm's reporting structure, planning, control and coordinate system, relationship between people inside and outside the firm, reputation of company, brand image and quality of product represent organization's sources (Ghapanchi et al., 2014; Barney, 1995).

Barney (1991) proposed a VRIN framework which states that strategic resources should be valuable (allowing the firm to grab external opportunities and reduce threats), rare in nature (controlled by lower number of firms or not available to others), inimitable (not easily duplicated or implemented by others) and non-substitutable (cannot be easily replaced) to attain competitive advantage. Another key concept in RBV is the capability of an organization to do something on the

basis of the resources it possesses. Capability enables an organization to exploit the resources in a manner that provides value to the customers. VRIN framework was further improved to VRIO framework by (Barney, 1995) that questions the capability of an organization whether it is organized enough to gain competitive advantage through valuable, rare and inimitable resources or not.

Human resource has been considered as the source for competitive advantage because they are heterogeneous and cannot be easily substituted or imitated (Jeong et al., 2012). Taking into account our current research study, the projects in software sectors are more human capital intensive because multitude of people works as project managers and in different teams and require coordination and establishment of relationships in the successful execution of projects. The capabilities of project managers to utilize the available resources in an efficient and effective manner along with the utilization of their existing knowledge, skills and experience can enhance project's success rate and provide value to the organization.

These resources, when appropriately deployed, can provide foundation for developing strategies to enhance entrepreneurial culture in an organization (Grande et al., 2011). These strategies have been termed as entrepreneurial orientation and categorized as intangible resource by (Ferreira et al., 2011). While exploiting the already existing resources, project managers can explore new resources to create a bundle of resources (Kollmann & Stockmann, 2014) that should be valuable and rare and cannot be easily imitated or substituted by other firms. These strategies together with the implementation of new technologies can create new process, procedures or products for sustained competitive advantage (Ferreira et al., 2011). The project-based organizations implement the aforementioned strategies in the form of projects that deliver its customers with the desired output, achieving project success and ultimately enhancing performance of the organization.

According to RBV, technological orientation is a valuable asset (Mahrous & Genedy, 2019) that is beneficial in enhancing entrepreneurial performance of a firm. (Kocak et al., 2017) stated that technological orientation enables a firm to refine its existing technologies according to dynamic environment and reconfigure its resources

to exploit the potential opportunities. To successfully execute the projects requires the organization's physical and human resources that are under the control of top management. From the RBV's perspective, top management represents the human resource whose skills, expertise and decision-making abilities can provide value to the firm. Top management should provide support to project managers in the provision of these physical and human capital resources. A firm's organizational structure should be flexible enough to allow acquisition and bundling of those resources that provide value to organization, are not easily available, difficult to copy and cannot be replaced for smooth execution of entrepreneurial activities within organization and to gain competitive advantage.

1.8 Definition of the Variables

1.8.1 Entrepreneurial Orientation

It has been defined as "the processes, practices, and decision-making activities that lead to new entry" or "methods, practices and decision-making styles managers uses to act entrepreneurially" (Lumpkin & Dess, 1996). It has been categorized into five dimensions as "Innovativeness, Risk-taking, Proactiveness, Autonomy and Competitive Aggressiveness". According to (Anderson et al., 2009), EO characterizes "firm's decision-making practices, management philosophies, and firm level behaviors that are entrepreneurial in nature".

1.8.2 Technological Orientation

(Gatignon & Xuereb, 1997) defined Technological Orientation as "the ability and will of a firm to acquire substantial technological background and use it in the development of new products". According to (Zhou et al., 2005), when an organization invests substantially in Research & Development to acquire latest technologies with an idea to develop value creating products, it is considered as technologically oriented.

1.8.3 Top Management Support

It means "when a senior management project sponsor/ champion, the CEO and other senior managers devote time to review plans, follow up on results and facilitate management problems" (Young & Jordan, 2008).

1.8.4 Project Success

According to (Baker et al., 1997), "if the project meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the client organization, key people on the project team, and key users or clientele of the project effort, the project is considered an overall success".

Chapter 2

Literature Review

2.1 Entrepreneurial Orientation

Entrepreneurial rientation (EO), is widely acknowledged as predicting performance at organizational level (Khanagha et al., 2018; Pittino et al., 2017; Pratono et al., 2013). It has been explored extensively in literature related to Strategic Management and Entrepreneurship for past few decades (Jeong et al., 2019). It is also evident from the fact that some domain-specific journals like Entrepreneurship Theory and Practice publish scholarly work largely related to EO to enhance body of knowledge in this regard (Wales et al., 2013) and has gained considerable attention in both theoretical and empirical studies (Shan et al., 2016; Parkman et al., 2012; Covin & Wales, 2012;). Other terminologies associated with the concept of entrepreneurship at organizational level are 'Entrepreneurial Mode', Entrepreneurial Style', 'Corporate Entrepreneurship', 'Intrapreneurship' etc. (Covin & Lumpkin, 2011; Zahra, Jennings, & Kuratko, 1999).

As per the available literature, the concept of EO was first presented by (Miller, 1983), though he did not use the word EO explicitly in his study but characterized it as an 'entrepreneurial activity' of a firm. According to him, "an entrepreneurial firm is the one that engages in product-market innovation, undertakes risky ventures by coming up with "proactive" innovations and beating the competitors completely" (p. 771). He also proposed three significant dimensions

namely 'proactiveness, innovativeness and risk taking' that collectively reflect entrepreneurship at firm-level by developing a scale to measure their contributions in a firm's success.

Covin & Slevin (1989) expanded the study of Miller by validating and further refining the scale developed by him to further investigate the effect of organizational structure and strategic posture on the firm's performance with respect to favorable and unfavorable environments. Their devised scale consisted of nine items; three items each for proactiveness, innovativeness and risk taking. Till now, most of the empirical research on EO has been done either by using this aforementioned scale as it is originally designed or with some minor modifications according to the contextual requirements.

With the rapid expansion of entrepreneurial concept at organizational level, a framework was proposed by (Covin & Slevin, 1991) in order to identify the preceding variables and their effect on entrepreneurial posture along with the moderating variables explaining the relationship of entrepreneurial posture and firm performance. The model proved to be very beneficial for other scholars in exploring various moderating variables explaining EO and performance relationship (Adomako, 2018; Hong et al., 2018).

But (Zahra, 1993) criticized the model and stated that although the model has incorporated latest research findings, interrelated significant constructs in a clear model, explained the role of entrepreneurship to organization's performance theoretically and highlighted several research questions related to the model but the model needs to be revised and extended to better understand the firm's entrepreneurial behavior. He suggested that the model should (1) specify the nature of entrepreneurship undertaken by firm; (2) consider various level of analysis (corporate, strategic business unit, functional); (3) identify redundant variables in the model and; (4) to find out the connection between entrepreneurial posture and organizational performance.

Lumpkin & Dess (1996) incorporated the suggestions of (Zahra, 1993). Furthermore, the term 'Entrepreneurial Orientation' was first coined by (Lumpkin & Dess, 1996). According to them, EO reflects "methods, practices and decision-making

styles managers uses to act entrepreneurially" (p. 136) or "the processes, practices, and decision-making activities that lead to new entry" (p. 136). Two more dimensions, 'Autonomy and Competitive Aggressiveness', were proposed by (Lumpkin et al., 1996). Hence, EO is comprised of five dimensions which are 'innovativeness, proactiveness, risk taking, autonomy and competitive aggressiveness' and are independent of each other.

In addition to the above, the literature also shows that EO has been conceptualized on the basis of different approaches; uni-dimensional and multi-dimensional. Uni-dimensional approach means that innovativeness, risk taking and proactiveness should contribute equally at a time such that increase in one has impact on other. In other words, they must co-vary with each other. On the other hand, multi-dimensional approach by (Lumpkin et al., 1996) explains that all five dimensions of EO are independent from each other and need not to co-vary with each other.

Anderson et al., (2015) classified EO as behaviors of entrepreneurs and attitude of managers towards risk. The review of EO by (Rauch et al., 2009) has shown that it has been researched in different contextual settings. Researchers have also investigated several antecedents of EO performance relationship like financial resource availability (Filser et al., 2014), motivational and personality attributes (Pittino et al., 2017), organizational culture (Brettel et al., 2015) etc.

Since EO has been widely acknowledged as an established construct, it has been empirically tested in different countries like Austria and Hungary (Filser et al., 2014), Germany, Austria, Switzerland, and Liechtenstein (Rigtering et al., 2014), USA (Mcgee et al., 2017), Canada (Miller, 1983), South Korea (Jeong et al., 2019), Iran (Khanagha et al., 2018), United Kingdom (Hughes & Morgan., 2007), Brazil (Martens et al., 2018), Pakistan (Ahmed et al., 2014) etc.

A research has concluded that the effect on performance of the firm by EO varies industry to industry and the context in which it operates (Lomberg et al., 2017; Lechner & Gudmundsson, 2014). In this regard, industries like tourism, hospitality, services, manufacturing, health, software, architecture along with different SMEs and business incubators have been researched by many intellectuals to study

EO performance relationship. In recent years, the research on EO at international level has also grown exponentially (Covin, & Miller, 2014).

The EO-model of (Covin, & Slevin, 1991) laid the foundation to explore different moderators. Moderators like CEO Entrenchment (Keil et al., 2017), Organizational Structure (Lumpkin et al., 1996), Organizational Size (Real et al., 2014), National Culture (Saeed et al., 2014), Collectivism (Hong et al., 2018), Resource capability (Adomako, 2018), Knowledge Acquisition (Bojica et al., 2011), Strategic Alliances (Brouthers et al., 2015), Absorptive capacity and slack resources (Kohtamaki et al., 2019), Top Management Support (van Doorn et al., 2017), Environmental Turbulence (Kraus et al., 2012) etc. have been explored so far.

Similarly, different mediating variables like Adaptive Organizational Culture and People-centered Management (Jeong et al., 2019), Exploratory and Exploitative Innovation (Kollmann et al., 2014), Integration of Activities (Lumpkin et al., 1996), Innovation Capacity (Parkman et al., 2012), Organizational Learning (Real et al., 2014), Structural Organicity, Strategy Formation Mode & Market Responsiveness (Anderson et al., 2009), Technology and Marketing Action (Choi, & Williams, 2016) have also been investigated since long.

2.1.1 Dimensions of an Entrepreneurial Orientation

2.1.1.1 Innovativeness

It is the ability of a firm to support newness and promote creativity by implementing new practices and technologies (Saeed et al., 2014). Innovativeness enables a firm to survive in a competitive environment as it leads to generation of novel ideas and a source of growth for firms (Piirala, 2012). The generation of new ideas through experimentation results in the creation of new process, product or service (Lumpkin et al., 1996; Kraus, 2013).

In high-tech industries, innovation has shown strong effect on performance as compared to other dimensions (Kollmann & Stockmann, 2014). Hence, it is considered as fundamental concept of EO (Lomberg et al., 2017; Filser et al., 2014). Innovation can either be incremental (i.e. to exploit prevailing information and skills to

make process, product or service more efficient) or radical (i.e. departing from established practices and technologies to acquire new skills for making new products or formulating new processes) (Adomako, 2018; Hong et al. 2018).

2.1.1.2 Proactiveness

Proactiveness refers to 'acting' rather than 'reacting' (Kraus, 2013) by seizing opportunities, monitor trends in the market and anticipating future demands of customers. It gives an advantage of being the first-mover in the market in the short run and to establish position as a market leader in the long run (Lomberg et al., 2017; Hughes & Morgan, 2007) by creating novel products or services. A proactive firm can become a pioneer in the market by identifying a problem and providing solution for it before a competitor does this (Filser et al., 2014).
It does not mean to develop plans only but to implement them as well. Hence, it is considered as a best strategy to grab market opportunity (Lumpkin et al., 1996). It has been found that performance of an organization is positively associated with proactiveness in dynamic environment than in stable environment (Kreiser & Davis, 2010).

2.1.1.3 Risk-Taking

It is the willingness of a firm to seize an opportunity by investing ample amount of resources into projects and activities which have uncertain outcomes or high costs of failure (Parkman et al., 2012). Therefore, it is imperative for entrepreneurs/ managers to select the right projects for their enterprises to remove uncertainty (Filser et al., 2014). The focus should be on calculated risk-taking rather than uncontrolled risky activities (Kraus, 2013). Calculated risk taking involves finding ways to mitigate, transfer or share risk. Absence of risk-taking results in delay to introduce innovative products and activities that would weaken the performance of a firm as compared to its rivals (Hughes & Morgan, 2007).

An organization can face either business risk, financial risk or personal risk. Extant literature has revealed that risk taking is positively associated with organizational performance in dynamic environment that leads to increase in market share (Kreiser & Davis, 2010) due to availability of ample resources.

2.1.1.4 Competitive Aggressiveness

It is the efforts of the firm to beat its competitors through exploitation of their weaknesses or react to its competitor's threats in the market (Hughes & Morgan, 2007). It also refers to willingness of a firm to use unorthodox methods rather than conventional methods of competition (Lumpkin et al., 1996). Aggressiveness can be manifested through low pricing strategy, quality of a product or enhancing capacity to produce more, expanding their marketing channels in new and existing markets, strategic alliances and partnerships with suppliers (Adomako, 2018).

2.1.1.5 Autonomy

It is the decision-making power or authority given to a personnel or teams within an organization to propose an idea (Wales et al., 2013) and carry it to the completion. It also represents pursuing an opportunity for new venture without any interference or organizational constraints (Lumpkin et al., 1996), access to information and openness to communication. In projects, it represents decentralization of authority provided to project managers, project teams or individuals to decide on their own which methods, tools or procedures are more appropriate to deliver a project successfully.

2.2 Project Success

Project is a temporary activity which is carried out to create a product, service or process that is unique in nature (PMI, 2013). According to (Turner & Müller, 2003, p. 7), "a project is a temporary organization to which resources are assigned to undertake a unique, novel and transient endeavor managing the inherent

uncertainty and need for integration in order to deliver beneficial objectives of change". Projects are "powerful strategic weapons, initiated to create economic value and competitive advantage" (Shenhar et al., 2001, p. 699) and have become modus operandi of almost every organization (Jugdev & Müller, 2005). According to (PMI, 2017), it has been forecasted that US $ 20.2 trillion will be contributed to GDP by project-oriented industries.

Research has shown that projects act as a catalyst to bring about change in the business processes (Berssaneti & Carvalho, 2015; Beleiu et al., 2015). Hence, project-based organizations have come into existence where projects are considered as means to achieve organizational goals and strategic objectives i.e. profitability, market share or advancements in technology (Anantatmula, 2010; Baccarini, 1999). Project success depends upon whether the results of the project are in line with the strategic objectives of the organization or not (Serrador et l., 2015; Shenhar et l., 2001; Shenhar et l., 1997). The strategic objectives can be achieved with the selection of right projects (Jonas et l., 2012).

Over the decades, project success has been researched widely within the field of project management (He et al., 2019; Cserhati & Szabo, 2014; McLeod et al., 2012). However, there is lack of unanimity among researchers upon common definition of project success (Howsawi et al., 2014; Jugdev & Müller, 2005) and existence of common success criteria (Jha & Iyer, 2006). Howsawi et al. (2014) states that success is one of the eventual objectives of any project endeavor besides others. According to (Baker et al., 1997, p. 903), a project is considered successful "if it meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people in the parent organization, key people in the client organization, key people on the project team, and key users or clientele of the project effort, the project is considered an overall success".

According to (Baccarini, 1999), 'project management success' and 'product success' are the two prominent factors related to project success. De Wit (1988) mentioned that a successful project is the one that fulfills the requirements and if everyone involved within project (i.e. organization, project team and client) is

satisfied with the outcome of the project. The same author further states that project objectives are the most befitting criteria for project success. Project success lies "in the eyes of beholder" (Müller & Jugdev, 2012, p. 768).

The extant literature has classified project success into 'success factors' and 'success criteria' (Müller & Jugdev, 2012, p. 758). Rockhart (1982, p. 4) first introduced the term 'Critical Success Fctors' (CSFs) which are "the few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his or her goals". In every project, CSFs are considered as a measure for project's success (Geoghegan & Dulewicz, 2008) and are also used to evaluate approaches in the implementation of a project to increase the odds of success through proper allocation of scarce resources (Kheyroddin, 2018; Hwang & Lim, 2012).

Project success has been conceptualized as either uni-dimensional or multidimensional construct (Carvalho & Rabechini Jr, 2017; Mir & Pinnington, 2014). Measurement of project's success criteria is done in several ways (Serrador & Turner, 2015). The criteria for project success varies from one project to another because of difference in its size, complexity and uniqueness (Mir & Pinnington, 2014) and depend upon in which context the projects are carried out. In other words, "one size does not fit all" (Shenhar et al., 2001, p. 704).

Conventionally, project's success has been gauged in respect of triple constraint of cost, time & scope but other factors have also been categorized as contributing factors related to project's success (Pinto & Slevin, 1987). Hence, different success factors were identified to gauge the project's success. Pinto & Slevin (1987) developed ten CSFs that were determined empirically to understand the successful execution of a project.

From these ten factors, (Pinto & Slevin, 1987) developed an instrument called 'Project Implementation Profile' which helped project managers to determine the success of a project. Similarly, research conducted by (Hwang et al., 2012) identified 32 success factors which were categorized into four factors as 'project characteristics', 'contractual agreements', 'project participants' and 'interactive processes'. (Shenhar et al., 2001) highlighted four dimensions of success that were

categorized into 'project efficiency', 'impact on the customer', 'business and direct success', and 'preparing for the future'.

Besides identifying critical success factors, different models and frameworks have also been proposed by many researchers to evaluate project success. (Shenher & Dvir, 2007) proposed a model to determine project's success that includes efficiency (timely completion of project in allocated budget), impact of project on customer (meeting customer requirements that ultimately leads to customer's satisfaction), impact on project's team (regarding motivation, loyalty etc.), results of project on business (i.e. profit, achieving growth & share in the market etc.) and future preparation (for increasing the capability of organization in terms of obtaining new technology, penetration in new markets etc.).

Westerveld (2003) proposed 'The Project Excellence Model' to integrate project's success criteria and CSFs into single model. It is comprised of twelve areas that are fundamental in managing a project which can be applied in any situation and to various phases of the project. Similarly, (Turner, 1999) has proposed seven forces model for project success.

The Pentagon Model' was devised by (Rolstadas et al., 2014) to analyze the performance of project organization carrying out mega projects. It can be used as a tool to share lessons learned among different projects. (Turner & Zolin, 2012) also suggested a model related to project success based on the perception of several stakeholders of project over multiple time frame.

A four-level model was proposed by (Howsawi et al., 2014) for evaluation of success in project. Similarly, Todorovic et al. (2015) examined the framework for analysis of project's success and found that the documentation of previous completed projects, if appropriately maintained, can lead to a success in future projects. Likewise, (Baccarini, 1999) proposed a four level 'Logical Framework Method' for defining and understanding project success.

Research has shown that an organization's selection of methodology of project management impacts the quality of a project and therefore failure or success of project is dependent on it (Joslin & Müller, 2015; Rolstadas et al., 2014).

Similarly, (Carvalho et al., 2017) examined the influence of sustainability management of project on success and concluded a positive association between them. (Serrador et al., 2015) used the terminology project efficiency instead of project management success in their study and empirically determined the relationship between the two. (Berssaneti & Carvalho, 2015) investigated the relation of project management maturity with success and found a significant relation with 'triple constraints' but not with customer satisfaction.

McLeod et al., (2012) investigated project success from subjective perspective and concluded that stakeholders evaluate project's success on the basis of their perception about the end results of the project. Time frame and criteria of project success also matters. According to (Lim & Mohamed, 1999), as everyone involved in a project has different expectations, therefore the success criteria also differs accordingly. Furthermore, the same authors categorized project success into 'macro' and 'micro'. From micro point of view, a project is successful if it has achieved its objectives (time, cost, quality). From macro point of view, success in project is judged by its completion along with the satisfaction of client.

Project manager's style of leadership is also a determinant for a successful project (Aga et al., 2016; Prabhakar, 2008) because it motivates the team members towards the successful accomplishment of a project. Other factors that determine success are planning (Dvir & Lechler, 2004), coordination (Jha & Iyer, 2006), clearly defined project mission, support of top management, dedication of project manager (Bersanetti & Carvalho, 2015; Anantatmula, 2010), trust (Jiang et al., 2016), project management performance (Mir & Pinnington, 2014), goal clarity (Raziq et al., 2018), project governance (Joslin & Müller, 2016), communication skills (Day, 2000), cost management (Varajao et al., 2014) and stakeholder's perception (Davis, 2016; Baccarani, 1999).

2.3 Entrepreneurial Orientation and Project Success

Entrepreneurship and project management disciplines have been researched

separately in the academic literature, though in practice, there exists a strong connection between them (Kuura et al., 2014). Fonrouge et al., (2019) argued that the notion 'performance' is perceived differently in both disciplines that makes them apart. Within Project Management, performance generally means project success achieved when the stated goals are met within the prescribed time, cost and scope. Whereas in Entrepreneurship, performance relates to growth, profit or any other predefined goals of an entrepreneur to be achieved in future.

According to (Al-Dhaafri et al., 2016), change in landscape of doing business today has increased the significance of entrepreneurship due to its positive effect on performance of organization and helping to sustain competitive edge. Consequently, organizations which favor risks and adopt changes accordingly are gaining popularity for being entrepreneurial in nature (Kantur, 2016). Hence, performance of a business is linked to the strategy of an organization to exploit opportunities in a highly competitive environment (Hilman & Kaliappen, 2014; Obeidat, 2016). These entrepreneurial strategies may be a panacea to achieve higher standards of performance (Yunis et al., 2017) and enable them to sustain competitive advantage over their rivals (Certo et al., 2009).

Since project-oriented organizations are growing largely, most of the organizations are now achieving their strategic objectives with the help of projects (Davis, 2011; Anantatmula, 2010). Projects are deemed as the preferred method of taking initiatives and conducting business now-a-days (Kock et al., 2016). These project-oriented organizations depend upon the success of the projects undertaken by them which in turn determines organizational performance.

Loong Lee & Chong (2019) stated that EO dimensions have different effect on organizational performance depending upon the circumstances in which organization operates. Innovation, either product or process innovation, is fundamental for firms to achieve sustained competitive edge (Garcia-Granero et al., 2015). In the context of projects, organizational innovativeness represents the willingness of an organization to develop novel products, processes, services or technologies; thereby augmenting organizational performance (Creasy & Anantatmula, 2013). Proactiveness can also lead to project success by anticipating customer's latent needs

and developing quality products accordingly to satisfy their needs (Filser et al., 2014). This is similar to project success dimension 'preparation for future' which was proposed by (Shenhar et al., 2001). The successful execution of the projects can develop strong relations with the customers and enable the organization to develop its infrastructure for future projects; hence enhancing the performance of the organization.

Vezzoni et al. (2013), while studying the relationship of CSFs and project performance, found that two of the success factors namely, empowerment and risk management, has close resemblance with autonomy and risk-taking. A project manager must have to analyze and take calculated risks before and during the execution of the project so that appropriate methodology can be adopted (De Bakker et al., 2010) for the successful execution of project. Consequently, performance level of those organizations will be higher that favor risk taking (Garcia-Granero et al., 2015). Similarly, having autonomy in a project can help project managers to reduce conflicts regarding resource allocation, coordination, and decision making (Gemunden et al., 2005).

Since EO is about how to implement new ideas, take risks, and to gain competitive advantage, many researchers have found positive relationship of EO with project success that leads to the performance of an organization (Khedhaouria et al., 2015; Alegre & Chiva, 2013). Hence, it can be inferred that if EO can increase performance of an organization, then there is a prospect of establishing a connection of EO with project success (Martens et al., 2018). Foregoing in view, the following hypothesis has been developed:

Hypothesis 1: There is positive association between entrepreneurial orientation and project success.

2.4 Entrepreneurial Orientation and Technological Orientation

Due to globalization, technology has been recognized as a vital factor for firms

to remain competitive in the market (Haro-Dominguez et al., 2010). The advancements in technology have reduced the product life cycle and enable the firms to imitate anything with ease (Aljanabi, 2018). Hence, the intense competition has made it imperative for the organizations to upgrade their existing technological base to develop new products or else they will be outperformed by their competitors at global level (Fitzgerald et al., 2014). According to Khin, & Ho (2019), firms that have necessary skills to manage new technologies will be able to develop products or processes superior to the competitors. Foregoing in view, a strategy must be adopted by a firm to manage its resources to achieve competitive edge over its rivals (Bucktowar, Kocak, & Padachi, 2015).

To become a market leader, a firm must be a keen observer of robust changes in technologies and be able to identify opportunities where it can deploy the latest technologies (Chaudhary, & Batra, 2018). These characteristics of firms drive them to integrate the latest technologies in their processes and to explore the new business opportunities (Hakala, & Kohtamaki, 2011). Lumpkin & Dess (1996) labelled these characteristics as Entrepreneurial Orientation. According to Oliveira Junior, Borini, Bernardes, & Oliveira (2016), Entrepreneurial Orientation has been recognized as central element in today's dynamic environment. It not only helps to transform the status of a firm from static to dynamic but also aids in establishing novel businesses (Li, 2012). It also helps a firm to explore advanced technology and to take risks in its implementation to generate new ideas or make new product, service or process (Choi, & Williams, 2016).

According to the extant literature, firms exhibiting stronger entrepreneurial orientation can achieve competitive edge by a mix of innovativeness, proactiveness and risk-taking ability (Li, Guo, Liu, & Li, 2008). Innovativeness strongly advocates the use of latest technology in R&D to develop novel products and processes to target niche markets (Hussain, Rahman, & Shah, 2016). It can also help to expand business internationally (Urban, 2010). Similarly, firms that proactively monitors the trends in the markets, acquire cutting-edge technologies and integrating them in their processes are more likely to be market leaders (Al-Ansari et al., 2013). It is because new technologies can help in the reduction of production costs, make

the supply-chain more effective that enable a firm to enter new markets and building good relationships with its customers (Voola, Casimir, Carlson, & Agnihotri, 2012). Risk taking enables a firm to make decision regarding investment of resources to acquire latest technologies for new projects and other activities related to technologies within the firm (Zhai, Sun, Tsai, Wang, Zhao, & Chen, 2018).

Aljanabi (2018) examined the relationship of entrepreneurial orientation and technological innovation capability with absorptive capacity as an intervening variable and found a positive relationship between them. This shows that a firm having the entrepreneurial attitude can acquire technology to enhance its innovative capability on the basis of opportunities available in the market. Similarly, a study conducted by Zhang (2017) established a positive relationship between entrepreneurial orientation and technological innovation in the pharmaceutical firms of China. Likewise, (Chaudhary, & Batra, 2018) examined the relationship of absorptive capacity and firm performance via the mediating role of technological orientation in their study and found a significant relationship. Moreover, (Choi, & Williams, 2016) conducted a study to determine the relationship of entrepreneurial orientation and firm performance in the presence of technology action and marketing action and concluded that technology action has a strong mediating effect in enhancing the performance of firm.

Li, Su, Zhang, & Mao (2018) investigated how owners/ entrepreneurs of different companies, who were facing resource constraints and had limited capabilities, integrated latest technology within their companies and changed their status to digital businesses. Furthermore, Li et al. (2008) studied the relationship of entrepreneurial orientation and technology commercialization in the contextual settings of China and found a positive relationship between them. However, a negative relationship between entrepreneurial orientation and technological orientation was reported by (Urban, 2010) but when other environmental factors were studied with them, they showed positive relationship. Nonetheless, it is a common belief that novel technologies are easily integrated within the organizations when they are considered practical (Gupta, Niranjan, Goktan, & Eriskon, 2016). Based on the above discussion, following hypothesis has been developed;

Hypothesis 2: There is positive association between entrepreneurial orientation and technological orientation.

2.5 Technological Orientation and Project Success

The influx of technology in every facet of business has called for formulation of different strategies by the organization to manage work properly (Pinheiro, 2010). The implementation of strategies by the organization to direct its activities in order to achieve success in business is termed as Strategic Orientation within the literature (Deshpandé, Grinstein, Kim, & Ofek, 2013). It not only escalates capabilities of an organization to adapt to dynamic environment but also provides competitive advantage to survive in the market (Song, & Jing, 2017). Strategic Orientation encompasses entrepreneurial orientation, technological orientation, market orientation and learning orientation (Obeidat, 2016; Jantunen, Nummela, Puumalainen, & Saarenketo, 2008).

Among these different orientations, Technological Orientation represent management's attitude to implement cutting-edge technologies within an organization in order to develop new products, processes or services (Ibrahim, Keat, & Abd Rani, 2017). A firm can acquire technology either externally or it can develop it internally. When a firm develops technology internally, it can protect its technical knowledge by not sharing it with others externally and its competitors will find it difficult to act promptly and to imitate it. On the contrary, if the firm acquires technology externally, it will enable the firm to adjust itself according to the external environment via partnering with other firms in the industry, leading to sharing of knowledge, resources and gaining market share by penetration into new markets (Haro-Dominguez et al., 2010).

The technologies have the prospect of creating more value for organizations when they are introduced into the market for the sake of creating new products, processes, benefits to the society etc. (Petti, & Zhang, 2011). Hence, most of the

organizations have acquired and implemented technologies to enhance the efficiency of their production process (Yang, Chen, & Wang, 2012). It can enhance customer satisfaction as well because customers prefer those products that are technically superior (Lekovic, & Bobera, 2018). According to (Vargo et al., 2015, p. 65), technology can be considered as "potentially useful knowledge that may provide solutions for new or existing problems". The adaptation to new technology according to the context was termed as "technology-use mediation" or "metastructuring" (Orlikowski et al., 1995, p. 424).

Markovic (2008) stated that new technologies have renewed the working environment of organizations. Consequently, organizations are now investing in technologies to achieve competitive advantage (Anantatmula and Kanungo, 2005) and are developing a cost-effective system for better performance (Martin Rojas et al., 2014). As the businesses are becoming projectized, the exponential growth of technology usage in projects has been witnessed (Anantatmula, 2008). According to (PMI, 2017), it has been forecasted that project-oriented industries will contribute US $ 20.2 trillion to GDP in coming years. Projects are now considered as a medium to achieve strategic objectives of the organizations (Sheykh, Azizi, & Sobhiyah, 2013).

The intense competition and globalization have accentuated the significance of project success to firm's performance (Raz et al., 2002). Technology is considered as an important factor in the successful execution of a project and also helps a project team to coordinate and communicate with each other (Yang, & Huang, 2016). It can also help in the transfer of useful knowledge within the context of projects (Santos, Barriga, Jugend, & Cauchick-Miguel, 2019). According to (Baker et al., 1997), when all the desired requirements are fulfilled, it represents project success Since, the output of a project is a unique product, process or service; hence technological orientation has been stated as enhancing performance of a new product (Hakala, 2011). Based on the above discussion, following hypothesis has been developed;

Hypothesis 3: There is positive association between technological orientation and project success.

2.6 Mediating Role of Technological Orientation

Technological Orientation (TO) has been defined as the willingness of an organization to gain technical knowledge and utilize it to develop new products (Khin & Ho, 2019). Technological Orientation has been mostly researched under the umbrella term of 'Strtegic Orientation' which enables an organization to implement strategies that contribute significantly in determining whether a product succeeds or fails (Gatignon & Xuereb, 1997). TO has been stated as a valuable factor in the development of new products (Hsu et al., 2014). (Kocak et al., 2017), citing other study, stated that TO enables a firm to refine its existing technology according to changes in market and reconfigure its resources to exploit the potential opportunities. The technological change results in enhanced competition that can help in eradication of monopolies and creation of entirely new markets or industries (Srinivasan et al., 2002).

Technological Orientation represents the idea of "technological-push" (Srivastava et al., 2013, p. 432) which means that customers will those products or services that are technically superior. A firm, if it has to be technically oriented, needs to collect technical information from the industry in which operates, including its suppliers and customers (Yang et al., 2012). Hence, when a firm invests substantially in R&D to acquire new technologies with an idea to develop value creating products, it is considered as technologically oriented (Zhou et al., 2005).

Technology is recognized as a vital factor for firms to remain competitive in the market (Haro-Dominguez et al., 2010). Due to globalization, the intense competition has made it imperative for the organizations to acquire emerging technologies for development of new products or else they will be out of the competition at global level (Fitzgerald et al., 2014). The robust growth in technology has abridged the product life cycle that has forced the firms to upgrade their technology base to gain competitive advantage over their rivals (Salojarvi et al., 2015; Zhou & Li, 2010). Foregoing in view, a firm must adopt a strategy to direct its activities towards achievement of superior performance (Gao et al., 2007).

The early acquisition of new technology by a firm may strengthen its position relative to its competitors (Kapoor & Lee, 2013). It can also provide benefits to the

firms in the form of "valuable resources, increasing market power and initiating strategic renewal" (Graebner et al., 2010, p. 73). However, if the market turbulence is low, a firm has to decide whether the acquisition of new technology can benefit them or not as it can expose the firm to financial risk due to uncertainty prevailing in the market (Gao et al., 2007). According to Halac (2015, p. 1058), "a technology-oriented firm is needed to be in line with the mission and vision of the firm" and it is at the discretion of management of the firm either to develop technology within the firm or to acquire it from others. It is an important strategic decision that has to be made by top management (Martin Rojas et al., 2014).

If a firm opts to develop technology internally, it can protect its technical knowledge from being shared to others and competitors will find it difficult to respond quickly and to imitate it. On the contrary, external acquisition of technology enables the firm to adapt to vibrant external environment by forming alliance with other firms in the industry, leading to sharing of knowledge, resources and penetration into new markets (Haro-Dominguez et al., 2010).

From view point of RBV, TO can be considered as a valuable asset/ specific internal resource (Mahrous & Genedy, 2019) that is beneficial in enhancing entrepreneurial activities of a firm (Chen et al., 2014). EO helps a firm to explore advanced technology and to take risks in its implementation to generate new ideas or make new product, service or process (Choi & Williams, 2016). According to (Khin & Ho, 2019), firms that have necessary skills to manage new technologies effectively and efficiently will be able to make products superior to the competitors.

The entrepreneurial characteristics of firms drive them to integrate the latest technologies in their processes and to explore the new business opportunities (Hakala & Kohtamaki, 2011). It has been examined that innovativeness leads to novelty through the use of technology and R&D (Iqbal & Malik, 2019). Similarly, firms that are proactive in the acquisition of cutting-edge technologies and integrating them in their processes are more likely to enhance their capabilities and to become market leaders (Al-Ansari et al., 2013). Hence, TO represents a major element in the growth of firm and innovation in different industries (Lee et al., 2015; Yu et

al., 2013).

As stated by Markovic (2008), novel technologies have transformed the working environment of organizations. Consequently, organizations invest in technologies with the aim to achieve competitive advantage (Anantatmula & Kanungo, 2005) by developing a system that can minimize cost (Martin Rojas et al., 2014). As the businesses are becoming projectized, the use of technology in projects has grown substantially (Anantatmula, 2008) because technology makes a significant contribution in the successful accomplishment of the project. The intense competition and globalization have accentuated the significance of project success to firm's performance (Raz et al., 2002). According to (Baker et al., 1997), success in project comes when it fulfills the desired requirements. The end result of a project is also a unique product, process or service; hence technological orientation has been stated as enhancing performance of a new product (Hakala, 2011).

The extant literature has shown the impact of TO on product innovation and performance of the organizations (Lee et al., 2015; Urban & Heydenrych, 2015). Research by (Chen et al., 2014) verified the moderating role of TO in the relationship of leadership and corporate entrepreneurship; thus increasing the performance of the organization. However, negligible relationship of TO as a moderator in innovativeness and SME performance relationship has also been observed by (Saqib et al., 2018). A framework developed by (Hakala, 2011, p. 210) considers multiple orientations either as sequences, alternatives or complementary to each other and further stated that multiple orientations support each other and that "one is required to transmit the effects of the other (mediation)". Hence, the following hypothesis has been developed;

Hypothesis 4: Technological Orientation plays a mediating role between entrepreneurial orientation and project success.

2.7 Moderating Role of Top Management Support

The role of top management has a paramount importance in the literature

because they define the project and build team (Boonstra, 2013). Top Management Support (TMS) is the fundamental determinant of project success that has been explored widely for past three decades (Ahmed & Azmi bin Mohamed, 2017; Young & Poon, 2013). It is among the ten CSFs that were highlighted by (Pinto & Slevin, 1987) to achieve objectives of the project. Moreover, management provides financial, physical and human resources for successful execution of any tasks or activities related to projects, providing directions in an explicit manner to remove any uncertainty along with clarity of objectives (Hsu et al., 2019). Projects having top management support are termed as sacred cows and are less prone to failure (Iqbal et al., 2015; Meredith & Mantel, 2009).

Mahrous & Genedy (2019) delineate that top management support or organizational support represents the encouragement of subordinates by the top management to enable entrepreneurial actions within the firm. (Young & Jordan, 2008, p. 8) explains TMS as "when a senior management project sponsor/ champion, the CEO and other senior managers devote time to review plans, follow up on results and facilitate management problems". (Felekoglu & Moultrie, 2014, p. 159) highlighted that the words "involvement" and "support" with respect to top management can be used synonymously either as "top management support" or "top management involvement".

Organizational support enhances culture of innovation within a firm through resource allocation (Jeong et al., 2006). If a firm wants to enrich its technological base to develop innovative products and to gain competitive edge over its competitors, organizational support is mandatory. Without the appropriate support and resource commitment, a firm will be unable to develop innovative products and to compete in the market.

Top management is considered as key decision maker in the firm and has a major role in determining the entrepreneurial culture of the firm (van Doorn et al., 2017) which has been empirically proved; hence helping the organization to adopt entrepreneurial orientation successfully. (Van Doorn, 2013) stated that senior teams have the ability to evaluate potential opportunities and formulate strategies to align these opportunities with the strategic objectives of firm in order to enhance

EO. Management support encourages the employees to come up with innovative ideas; hence facilitating the entrepreneurial initiatives within firm (Johanna de Villiers-Scheepers, 2012).

Top management possess the worthy knowledge and relevant expertise to create and facilitate an environment conducive for doing new businesses (Garrett Jr & Neubaum, 2013). A research conducted by (van Doorn et al., 2017) showed that in a rapidly changing environment, top management's information gathering from its external environment and its capability to filter out the relevant information encourages them to be proactive, risk taking and innovative and to grab opportunities available in the market. According to (Hornsby et al., 2009), entrepreneurial initiatives are the outcome of scanning internal and external surroundings of an organization.

Top management is instrumental in the development of technology infrastructure that supports technology (Martin Rojas et al., 2014) and provides assistance in the transfer of technology throughout the firm (Byrd & Davidson, 2003). Research conducted by (Jeong et al., 2006) showed that organizational support facilitates technological orientation. According to (Vargo et al., 2015, p. 65), technology can be considered as "potentially useful knowledge that may provide solutions for new or existing problems". The adaptation to new technology according to the context was termed as "technology-use mediation" or "metastructuring" (Orlikowski et al., 1995, p. 424). Similarly, (Martin Rojas et al., 2011) posited that top management promotes competencies in terms of technology and organizational learning for achieving performance.

Boonstra (2013) developed a framework to evaluate the behavioral dimensions of top management support regarding the projects that are strategic in nature. According to him, top management must accommodate the implementation process for the project, acclimatize the organization to adapt to the new technology with the introduction of new work processes or structures, using the power to resolve conflicts and to persuade and negotiate with the stakeholders to provide resources on time for successful execution of projects. Similarly, (Dong et al., 2009) also

studied behaviors of top management in the execution of IT projects and concluded that different support behaviors influence outcomes in different manner and top management needs to adjust their behaviors according to the context. Generally, top managers view projects from operational point of view and show little or no concern to projects (Young & Poon, 2013). In order to achieve objectives of project, top management should formulate procedures, processes and appropriate structures according to the project (Ahmed & Azmi bin Mohamed, 2017).

According to the extant literature, only uni-dimensional top management support related to project success has been studied. (Ahmed & Azmi bin Mohamad, 2016) explored the construct of TMS having five dimensions and concluded that TMS is positively associated with project success. By employing the social capital theory as a lens, (Amoako-Gyampah et al., 2018) investigated the mechanism through which top management commitment impact project's success. Similarly, (Iqbal et al., 2015) proved that TMS strengthens the relation of project manager's transformational leadership and project success.

Zwikael (2008) conducted research in software sector of three different countries and identified six processes that have higher impact on project success than other processes. Those six processes are competent project manager, ability of project manager to communicate with organization by developing a communication plan, defining parameters to measure project success, existence of cross functional project groups, resource planning for the project and use of project management software for managing projects.

Foregoing in view, it has been observed from the above literature that top management not only formulate strategy for the firm and provides direction but also allocate resources for projects that provide value for the firm (Talke et al., 2011). Hence, the following hypothesis has been postulated:

Hypothesis 5: Top Management Support moderates the relationship of technological orientation and project success; such that when top management support is high, the relationship of technological orientation and project success would be strengthened.

2.8 Research Model

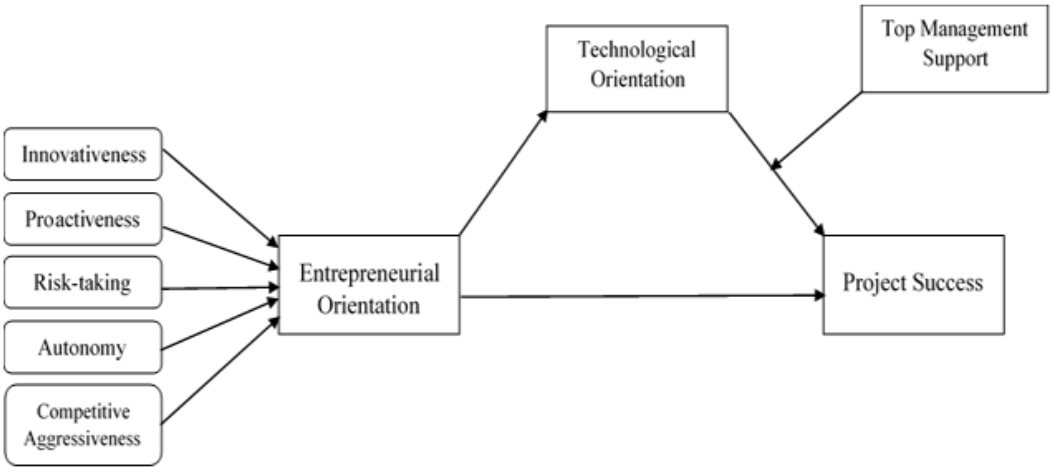

FIGURE 2.1: Research Model of Impact of Entrepreneurial Orientation on Project Success through Technological Orientation: Moderation of Top Management Support

2.9 Research Hypothesis

H_1: There is positive association between entrepreneurial orientation and project success.

H_2: There is positive association between entrepreneurial orientation and technological orientation.

H_3: There is positive association between technological orientation and project success.

H_4: Technological Orientation plays a mediating role between entrepreneurial orientation and project success.

H_5: Top Management Support moderates the relationship of technological orientation and project success; such that when top management support is high, the relationship of technological orientation and project success would be strengthened.

Chapter 3

Research Methodology

Research methods and research methodology are two distinguished concepts. Research methods are used by the researchers to collect and analyze data. On the other hand, research methodology describes various steps undertaken to resolve the problem in a systematic and logical manner (Kothari, 2004).
This chapter encompasses details about research design, population, characteristic of sample, technique for sampling, research instrumentation, pilot testing and reliability analysis of all variables that are included in the research.

3.1 Research Design

3.1.1 Type of the Study

The current research is classified as quantitative study and is explanatory in nature. Explanatory research determines the "why" and "how" a relationship happens in a particular situation (Kumar, 2019). This causal/ relational study is conducted for determining the impact of entrepreneurial orientation on project success. For this purpose, public and private project-based organizations in the IT sector of Pakistan have been targeted to obtain the required data. Structured questionnaires were distributed through surveys to obtain the required data and

authentic results. The sample that has been selected for this research study represents the total population of project-based organizations and the results will be generalized on the entire population of project-based organizations of Pakistan.

3.1.2 Research Philosophy

It is "a system of beliefs and assumptions about the development of knowledge" (Saunders et al., 2016, p. 124). These assumptions will help the researcher in determining their research strategy, data collection techniques and procedures for analyzing the data. Research philosophy can be categorized as 'positivism', 'realism', 'interpretivism', 'postmodernism' and 'pragmatism' (Saunders et al., 2016). In this regard, positivism research philosophy had been adopted in this study and hypotheses were formulated on the basis of existing theory. Data was gathered and then analyzed to infer results for validating hypotheses. Moreover, the researchers have tried to remain neutral during the research study to avoid influencing the collected data.

3.1.3 Research Approach

Two research approaches use by researchers are deductive approach and inductive approach that depends upon the nature of the research (Soiferman, 2010). Deductive approach means formulating the hypotheses on the basis of available theory and to validate the hypotheses. Inductive approach means data is gathered first and then theory is developed on the basis of observed data. The current research study has followed the deductive approach where hypotheses are formulated on the basis of available theory and data is collected in a structured way. The collected data is then analyzed to find out the causal relationship of all variables.

3.1.4 Research Strategy

It allows the researchers to find answers of the research questions. According to (Saunders et al., 2016), different strategies for data collection are experiments,

case studies, surveys, records etc. The current study adopted the survey strategy using self-administered questionnaires as it allows collecting data from sample in an economical manner.

3.1.5 Study Setting

Research that is carried out in natural environment and with minimal interference from researcher is known as field study (Sekaran & Bougie, 2016). The current study was a field study because participants i.e. project managers of both public and private project-based organizations were approached during their working hours to make sure their availability in their respective organizations and to fill the questionnaires without any hesitation or fear. Hence, no artificial setting has been produced for this study and no variables included in this study were manipulated and controlled.

3.1.6 Unit of Analysis

It is the vital component of any research study (Khan, 2014). It can be individuals, groups, organizations, institutions, countries or culture from where the researcher collects the data. The present study is designed to examine the impact of entrepreneurial orientation on project success; therefore, the unit of analysis was individual working as project managers in software firms of both public and private sector located at Islamabad and Rawalpindi.

3.1.7 Time Horizon

Saunders and Lewis (2012) have mentioned different types of research studies according to time horizon; cross-sectional and longitudinal study. If the data is to be collected within a definite time, it is called cross-sectional study. Similarly, if the data needs to be collected without any time frame, it is called longitudinal study. The current study is cross-sectional as the data was gathered within four months i.e.

3.2 Population and Sample

3.2.1 Population

A collection of events or entities that create interest for the researcher to explore them is called population. In this research, we have targeted Information Technology sector. We have focused on public and private software development firms operating in twin cities of Pakistan i.e. Islamabad and Rawalpindi. The population of present study includes project managers working on different projects in the software development firms of Islamabad and Rawalpindi. The reason for selecting IT sector of Pakistan is the remarkable growth rate of this sector as compared to others. IT exports have crossed US $ 3.3 billion a year while annual domestic revenue surpasses $ 1 billion (Pakistan Economic Survey, 2018-19). According to Pakistan Software Export Board (PSEB), Pakistan is becoming one of the preferred destinations for IT outsourcing and investment. Due to the entrepreneurial attitude of IT organizations, this sector deems appropriate for studying the variables that have the potential to enable this sector to boost exports and to become competitive at global level.

3.2.2 Sample and Sampling Technique

When some members of population are selected by the researcher, it is called sample. Due to scarcity of time and resources, the researcher cannot collect information from entire population, that's why sampling is done to gather required information. A good sample must truly represent the entire population, contains small sampling error and the results drawn from the sample must be reliable enough to be generalized to the whole population.

A sample size represents a part of population that has been chosen for survey. In the current study, sample size has been determined by Cochran's sample size formula (Olowookere, Adepoju & Gbolahan, 2014; Cochran, 2007) which is:

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where n_0 is the sample size, Z is value of z at confidence interval 95%, p is estimated population proportion, q=1-p, and e is Margin of error.

According to PSEB, there are 4068 companies out of which 328 companies are located in Islamabad and Rawalpindi. Assuming that 16% individuals work as project managers in these companies, the value of p = 0.16 which represents estimated proportion of the population. The value of q = 1-p = 0.84. Margin of error, e = 0.05 and value of z = 1.96 at 95% confidence interval level. Putting these values in the formula stated above, the sample size is:

$$n_0 = \frac{(1.96)^2(0.16)(0.84)}{(0.05)^2}$$

$$n_0 = 207$$

Hence, the sample size evaluated for the current study was 207. In addition to that, convenience sampling was done by the researcher to gather data which is a non-probability sampling technique.

3.3 Data Collection Procedure

Most common methods for data collection are interviews, observations and questionnaires. For current study, collection of data was done via questionnaires. Self-administered questionnaires and digital questionnaires (prepared through Google doc) both were distributed among the public and private project-based organizations located at Rawalpindi and Islamabad to make sure that maximum respondents can participate in the survey. The covering letter was enclosed with every questionnaire so that participants would know why the study was being undertaken and that the information provided by them would be kept strictly confidential so that they should not hesitate to fill in the questionnaire. The questionnaires were segregated into two parts. The first part comprised items about the participant's demographics (gender, age, experience, education and type of organization). The second part contained questions about the independent variable (entrepreneurial

orientation), dependent variable (project success), mediating variable (technological orientation) and moderating variable (top management support). Both parts of the questionnaire were completed by the project managers.

Approximately, 350 questionnaires were circulated among the public and private software development firms of twin cities. However, only 262 questionnaires were received back. Out of these 262, four questionnaires were discarded because they were not completely filled by the participants. Hence, only 258 questionnaires were considered for further analysis.

3.4 Organizing Data

The observed data was first punched into software SPSS Statistics version 23. Items of all four variables were coded and numerical value was assigned to them for analysis of data. The questionnaires that were returned back by the participants were examined carefully to identify any missing data. Missing data means that the respondents did not answer a question in a survey.

It should be handled appropriately because it can result in serious problems for the researchers when generalizing the results of sample to whole population. The techniques to handle missing data are mean substitution, imputation and list wise deletion. In mean substitution, mean value of a variable is replaced with a missing value of that variable. In list wise deletion method, the case is completely deleted. Every method has its own pros and cons.

The current study identified some missing data during data entry. According to (Hair Jr et al., 2016), mean substitution method should be opted "when there are less than 5% values missing per indicator". Hence, mean substitution method was applied to handle missing data.

Therefore, four questionnaires were discarded because the missing data in these questionnaires was more than 10% (i.e. questions of two variables were left blank). Hence, the total remaining questionnaires were 258 that were utilized further in the analysis of data.

3.5 Sample Characteristics

In the present study, the demographics enquired from participants of this study were gender, age, experience, education and organization. The detailed characteristics of the sample are discussed as follows:

3.5.1 Gender

Gender is a significant element of the demographics as it distinguishes male from female in a given sample. It is taken into consideration to retain gender equality. In this study, full effort was made to maintain gender equality but it has been observed that male managers dominated female managers in the software sector.

Table 3.1: Gender Wise Distribution

Gender	**Frequency**	**Percent**
Male	222	86
Female	36	14
Total	258	100

Table: 3.1, portrays the statistics about gender. It can be observed that the sample is comprised of 86% male managers while 14% are female managers.

3.5.2 Age

Age is among the few demographic variables which the respondents of the survey hesitate to disclose. Therefore, different age brackets were mentioned in the questionnaire so that respondents feel comfortable to answer.

Table 3.2: Classification by Age

Age	**Frequency**	**Percentage**
20-30	189	73.3
31-40	62	24
41-50	6	2.3
Above 50	1	0.4
Total	258	100

Table: 3.2, describes the respondent's age according to which 73.3% of the participants were 20-30 years old while 24% were having age in the range of 31-40 years. 2.3% of the participants reported that they were aged 41-50 years. 0.4% of the respondents mentioned that they were more than 50 years of age.

3.5.3 Experience

Experience matters a lot in the projects. The knowledge, skills and experience of project managers enable them in the productive utilization of available resources to complete the projects successfully. Hence, year-wise categories were made to extract information from project managers about their work experience.

TABLE 3.3: Frequency Distribution By Experience

Experience	**Frequency**	**Percentage**
< 3	119	46.1
03-05	75	29.1
06-10	33	12.8
Above 10	31	12
Total	258	100

Table: 3.3, provides details about the work experience of project managers. It can be observed that 46.1% of the project managers have experience less than three years while 29.1% had experience in the range of 3-5 years. The percentage of respondents who had 6-10 years of experience was 12.8% and 12% had more than 10 years of experience.

3.5.4 Education

Education is vital to succeed in life. It has the utmost importance for personal grooming, social and economic development of a country. Through education, we can acquire essential knowledge, skills and decision-making abilities. Education

enables a project manager to bring uniqueness and creativity in a project. Having the required technical and managerial skills can enable a project manager to successfully execute the projects; thereby increasing the project success rate.

Table 3.4: Composition by Education

Education	**Frequency**	**Percentage**
Bachelors	137	53.1
Masters	83	32.2
MS/M.Phil.	28	10.9
Others	10	3.9
Total	258	100

Table: 3.4, gives a snapshot of educational level of respondents. The table exhibits that 53.1% of the respondents were Bachelors while 32.2% had done Masters. Those who had done MS/ M.Phil. were 10.9% of total respondents while 3.9% had other type of education (i.e. PhD).

3.5.5 Organization

Organization is also an important element of demographic as the type of organization delineates the availability of resources and infrastructure to carry out innovative activities. In the current study, three different categories were made to reflect the type of organization.

Table 3.5: Frequency Distribution by Organization

Organization	**Frequency**	**Percentage**
Public	32	12.40
Private	226	87.60
Total	258	100

Table: 3.5, depicts that 12% of respondents were working in the public sector organizations while 87.6% of the respondents were in private sector organizations.

3.6 Instrumentation

3.6.1 Measures

The questionnaire used in the collection of data was adopted from various reliable sources to measure four variables. Questionnaires were administered in English language and were distributed personally by visiting the respondent's work places after getting the approval from their higher authorities. Questionnaires were also distributed digitally that were prepared through Google Doc. Project Managers of public and private project-based organizations filled the questionnaires.
The questionnaire was categorized into two sections. In the first section, questions regarding demographics (gender, age, experience, education and type of organization) were enquired. The second section contained questions about all the variables (entrepreneurial orientation, project success, technological orientation and top management support). The questionnaires were developed using Likert scale that ranged from 1-5 where 1 represents "strongly disagree" while 5 represents "strongly agree". Details of measurement of each scale are described as follows:

3.6.2 Entrepreneurial Orientation

The scale used to measure Entrepreneurial Orientation was adopted from (Martens et al., 2018). It had 15 items in total which measured five dimensions of EO. Innovativeness, Risk-taking and Proactiveness was measured by 3 items each whereas 4 items were used to measure autonomy and 2 items measured competitive aggressiveness. Responses were evaluated on five-point Likert scale that ranged from 1-5 where 1 represents "strongly disagree" while 5 represents "strongly agree". Some items are; "In general, the top managers of my firm favor a strong emphasis on R&D, technological leadership and innovations", "In general, the top managers of my firm have a strong proclivity for high-risk projects (with chance of very high return)", "In dealing with its competitors, my firm typically initiates actions which competitors then respond to", "My firm supports the efforts of individuals

and/or teams that work autonomously", "My firm is very aggressive and intensely competitive" etc.

3.6.3 Project Success

Project success was assessed using a 14-items scale used by (Aga et al., 2016). Responses were evaluated on five-point Likert scale that ranged from 1-5 where 1 represents "strongly disagree" while 5 represents "strongly agree". Some items are; "The project was completed on time", "The project was completed according to the budget allocated", "The outcomes of the project are used by its intended end users", "The project has made a visible positive impact on the target beneficiaries" etc.

3.6.4 Technological Orientation

Technological Orientation was assessed using the scale of (Zhou et al., 2005) having four items. Responses were evaluated on five-point Likert scale that ranged from 1-5 where 1 represents "strongly disagree" while 5 represents "strongly agree". Some items included in this scale are; "We use sophisticated technologies in our new product development", "Technological innovation is readily accepted in our program/ project management" etc.

3.6.5 Top Management Support

The scale used to measure Top Management Support was adopted from (Carbonell & Rodriguez-Escuder, 2009). Four items were included in this scale. Responses were evaluated on five-point Likert scale that ranged from 1-5 where 1 represents "strongly disagree" while 5 represents "strongly agree". Some items of this scale are; "Top management supported the project", "Top management devoted a lot of time to the project", "Top management provided adequate resources" etc.

Table 3.6: Source of Instruments

Variables	**Source**	**Items**
Entrepreneurial Orientation	Martens et al., (2018)	15
Project Success	Aga et al., (2016)	14
Technological Orientation	Zhou et al., (2005)	4
Top Management Support	Carbonell & Rodriguez-Escuder, (2009)	4

3.7 Pilot Study

A pilot study is undertaken to assess the scale that is used to collect data to identify any potential problems in the instruments. It is one of the important steps in conducting a research study as it helps in avoiding wastage of resource and time. A pilot study enables a researcher to refine research questions, methods, tools and techniques and helps in identification of the target population. It can also help in making concise questionnaire or to change the wordings of questionnaire according to the context if the participants do not answer as expected. Therefore, before conducting a research on a large scale, it is essential to perform study at micro level (Van Teijlingen, & Hundley, 2002).

In the current study, pilot testing of 30 questionnaires was done to validate the reliability of each instrument. Reliability means that whenever we use the scale again and again, it should give us consistent results. Reliability is measured through Cronbach alpha which gives us reliability or internal consistency of a construct. Internal consistency means that all items in a construct measure the same concept. Its value lies between zero and one.

The general rule is that if Cronbach alpha's value is 0.70 or higher, it is considered good. **Table: 3.7**, portrays the Cronbach alpha value of each construct.

TABLE 3.7: Reliability of Pilot Testing

Constructs	**Cronbach Alpha**	**No. of Items**
Entrepreneurial Orientation	0.799	15
Project Success	0.908	14
Technological Orientation	0.870	4
Top Management Support	0.805	4

From **Table: 3.7**, it can be observed that Cronbach alpha value for all constructs is above 0.7 which depicts that instrument used to collect data for each variable is reliable and can be used in the contextual settings of Pakistan.

3.8 Research Ethics

While conducting this research study, certain ethical conducts were followed particularly in data collection. First of all, the aim of the research was elucidated to the participants. For gaining their confidence, a covering letter was enclosed with every questionnaire to reflect the association with the research institution. Secondly, after getting the consent of the respondents for participating in the study, it was ensured that their identity as well as responses would not be disclosed to anyone.

Moreover, the data collection was done in natural setting and the respondents were not coerced to provide prompt feedback. To make them feel easier, they were given proper time to fill the questionnaires. Regardless of problems faced during the collection of questionnaires (i.e. some respondents either lost the questionnaires or were not returned back), integrity of the subjects was not compromised by the researcher and did not harm any respondent either physically or by exchanging bad words.

Chapter 4

Results

The following chapter will elaborate the statistical methods that are employed for the analysis of collected data. To analyze the data, two different software have been used; IBM SPSS Statistic version 23 and latest version of Smart PLS 3. The chapter starts with the brief introduction of PLS-SEM and describes how the measurement and structural model are assessed through descriptive analysis, reliability analysis, validity analysis, mediation and moderation analysis. The results have been illustrated through tables and graphs.

4.1 Structural Equation Modeling (SEM)

SEM is known as "second-generation" technique that is used for analysis of multiple variables concurrently (Wong, 2013). It was developed by Herman Wold in 1970s who also coined the term "soft modeling" (Henseler and Sarstedt, 2013, p. 566) because of its soft assumptions. It has gained significant attention in many disciplines that include organizational management, human resource management, marketing etc. (Hair et al., 2019).

SEM is categorized into "Covariance based" and "Partial Least Squares" structural equation modeling. PLS is used in exploratory study to predict theories and to explain the variance in the criterion variables; hence it is considered as "components-based approach" to SEM (Hair et al., 2011). The salient features to

use PLS-SEM are;

a. Small sample size

b. Handling complex model efficiently

c. No assumption for normality of data

d. Handling of single-item constructs

e. Measuring formative constructs

PLS-SEM consists of two components. The first component is termed as Measurement Model (or Outer Model) that shows the relationship of constructs with their indicators. The second component is called Structural Model (or Inner Model) that exhibits the relation of one construct with another construct (Hair et al., 2016). Constructs are either exogenous or endogenous.

Exogenous constructs are independent variables and no arrow is pointing towards it. Endogenous constructs are those that are explained by other variables (i.e. arrows are pointing towards them). If endogenous construct is positioned in the middle of two variables, it becomes independent variable (F. Hair Jr et al., 2014). PLS results are evaluated in two stages. In the first stage, Measurement Model is examined and if the results are found satisfactory, evaluation of Structural Model is done in second stage. Measurement Model can be assessed by examining indicator loadings or weights (depending upon whether the construct is formative or reflective), composite reliability, multicollinearity, Convergent and Discriminant Validity. The assessment of Structural Model will be done by examining values of Coefficient of Determination (R^2), path coefficients and Predictive Relevance (Q^2) (Sarstedt et al., 2014).

4.2 Descriptive Statistics

Descriptive statistics enable us to organize and summarize the data to interpret them (Holcomb, 2016). Descriptive statistics are commonly represented through mean, median, mode, standard deviation, range etc. Descriptive statistics of all four variables i.e. entrepreneurial orientation, technological orientation, project success and top management support are shown in the table 4.1 below. The

descriptive statistics mentioned in the table below include the size of sample (N), mean, minimum and maximum value and standard deviation.

TABLE 4.1: Summary of Descriptive Statistics

Name of Variables	**Sample**	**Mean**	**Std.Deviation**	**Min.**	**Max.**
Entrepreneurial Orientation	258	3.4101	0.5571	1.33	5
Project Success	258	3.6411	0.5768	1.57	5
Technological Orientation	258	3.5879	0.8044	1	5
Top Management Support	258	3.7316	0.8549	1	5

Table: 4.1, illustrates summary of the variables that have been examined in the current study. First column on the left shows variables where entrepreneurial orientation is independent variable, project success is dependent variable, technological orientation is mediator and top management support is moderator. The column 'N' represents sample size which is 258. The mean value represents the average of responses.

The mean value of entrepreneurial orientation is 3.41 whereas of project success, mean value is 3.64. Similarly, mean value of technological orientation is 3.58 while that of top management support is 3.73.

The standard deviation is the dispersion of data across mean value. The standard deviation of entrepreneurial orientation, project success, technological orientation and top management support is 0.55, 0.57, 0.80 and 0.85 respectively. Minimum and maximum value represents the highest and lowest value in the dataset.

As shown in table 4.1, minimum value for entrepreneurial orientation, project success, technological orientation and top management support is 1.33, 1.57, 1.00 and 1.00 while the maximum value for all variables is equal to 5.0.

4.3 Control Variables

In order to control variables, we conducted one-way ANOVA test using SPSS Statistic version 23. The main purpose of this test is to check whether the demographic variables have any significant effect on dependent variable. The extant literature has shown the impact of demographic variables on the project success (Kloppenborg, Tesch, & Chinta, 2010). If any demographic variable is found to have a significant impact on dependent variable, it will be controlled for further analysis. Table 4.2 illustrates the results of one-way ANOVA.

Table 4.2: Results of One-way ANOVA

Control Variables	**F-value**	**p value**
Gender	0.542	0.462
Age	1.918	0.127
Experience	0.034	0.992
Education	1.825	0.143
Organization	0.242	0.623

From **Table 4.2**, it can be observed that values of all demographic variables with respect to dependent variable are insignificant (i.e. $p > 0.05$). Hence, there is no need to control any demographic variables as they have no impact on dependent variable.

4.4 Analysis of Measurement Model

Measurement model is analyzed through reliability (internal consistency reliability), convergent and discriminant validity of the constructs. Since entrepreneurial orientation construct is reflective-formative second order construct, two stage process was implemented. Initially, outer loadings of indicators of reflective construct (i.e. first order construct) were examined. Only those items were retained that met the required criteria.

Finally, scores of latent variables of all lower order constructs were derived to obtain single items to determine the validity of formative construct (i.e. second order construct). Figure 4.1 represents the initial path model estimation for outer loadings. Represented by table 4.3 are outer loadings for every item, Cronbach alpha, Composite Reliability and Average Variance Extracted of constructs prior to the removal of the items.

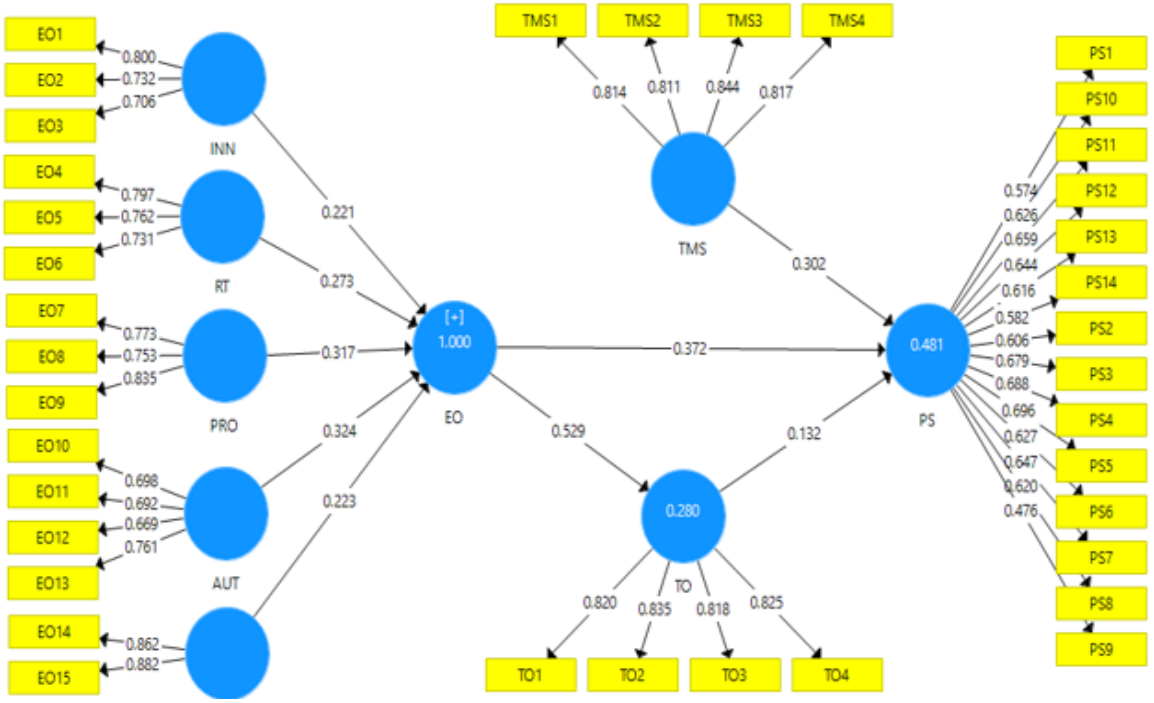

FIGURE 4.1: Initial path model estimation for outer loadings

TABLE 4.3: Initial Model Evaluation

Name of Constructs	**Items**	**Outer Loadings**	**Cronbach alpha**	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Innovativeness	EO 1	0.8			
	EO 2	0.732	0.608	0.791	0.558
	EO 3	0.706			
Risk Taking	EO 4	0.797			
	EO 5	0.762	0.643	0.807	0.583
	EO 6	0.731			
Proactiveness	EO 7	0.773			
	EO 8	0.753	0.694	0.83	0.620
	EO 9	0.835			
Autonomy	EO 10	0.698			
	EO 11	0.692	0.664	0.798	0.498
	EO 12	0.669			
	EO 13	0.761			
Competitive Aggressiveness	EO 14	0.862	0.685	0.864	0.760
	EO 15	0.882			
Project Success	PS 1	0.574			
	PS 2	0.606			
	PS 3	0.679			
	PS 4	0.688			
	PS 5	0.696			
	PS 6	0.627			
	PS 7	0.647	0.88	0.9	0.393
	PS 8	0.620			
	PS 9	0.476			
	PS 10	0.626			
	PS 11	0.659			
	PS 12	0.644			
	PS 13	0.616			
	PS 14	0.582			
Technological Orientation	TO1	0.82			
	TO2	0.835	0.843	0.895	0.680
	TO3	0.818			
	TO4	0.825			
Top Management Support	TMS 1	0.814			
	TMS 2	0.811	0.84	0.893	0.675
	TMS 3	0.844			
	TMS 4	0.817			

4.5 Assessment of First Order Construct

4.5.1 Convergent Validity

When an item of a construct is related with other items of the similar construct, it is known as convergent validity (Hair et al., 2016). It can be assessed by outer

loadings, Composite Reliability and Average Variance Extracted.

4.5.1.1 Outer Loadings

In general, value of outer loadings needs to be greater than 0.70 (F. Hair Jr et al., 2014). Those items whose outer loadings lie in the range of 0.40-0.70 should be removed only if deleting them increases composite reliability or AVE (Hair et al., 2016). Table 4.3 illustrates that outer loadings of all items of first order constructs of entrepreneurial orientation are above 0.70 except three items of autonomy; EO10, EO11 and EO12. Out of these three items, EO12 has the lowest loading. Deleting EO12 resulted in achieving AVE above the threshold level of 0.50 and also increased the outer loadings of other two constructs that can be seen in figure 4.2. All the items of technological orientation (TO) construct and top management support (TMS) construct have outer loadings above 0.70. However, outer loadings of few items of project success construct are below the threshold level of 0.70. To further analyze and to achieve threshold level, items PS1, PS2, PS7, PS8, PS9, PS12, PS13 and PS14 were removed.

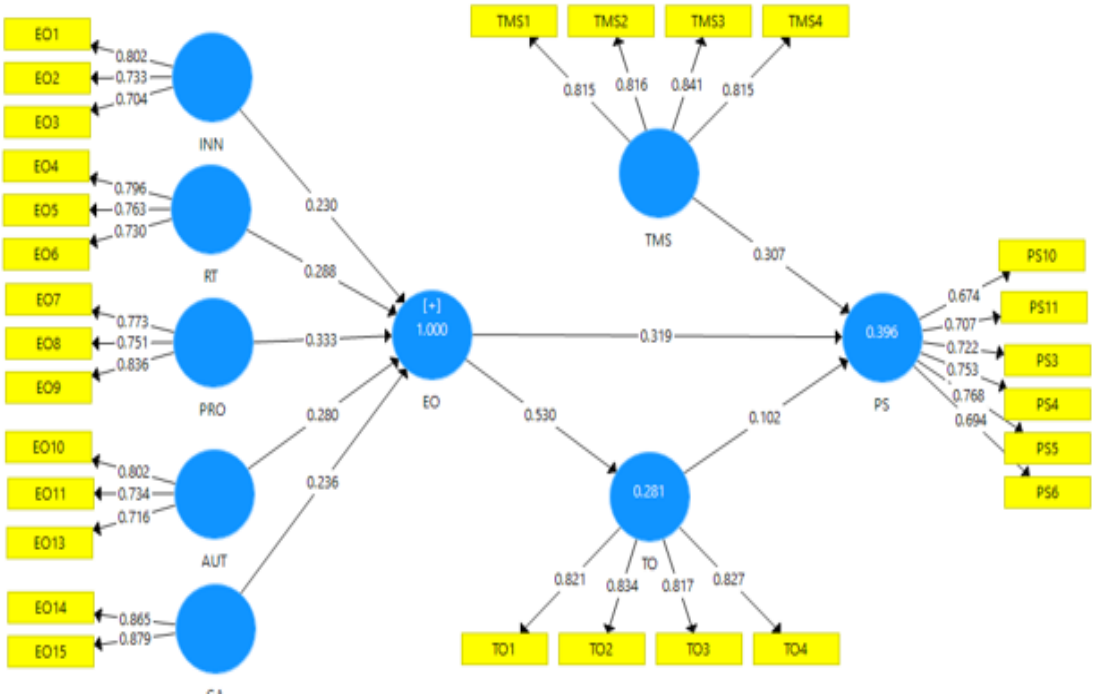

FIGURE 4.2: Assessment of Outer Loadings

4.5.1.2 Composite Reliability (CR)

Although Cronbach alpha is a frequent measure of "internal consistency reliability", but composite reliability is preferred to Cronbach alpha in PLS-SEM. Cronbach alpha presumes equality in outer loadings of all items in a construct while PLS-SEM prioritizes items on the basis of their individual reliabilities.
Moreover, Cronbach alpha depends upon the quantity of items in a scale which can decrease the credibility of the scale (F. Hair Jr et al., 2014). Hence, composite reliability is appropriate measure of reliability and varies from 0 to 1. Values above 0.70 are recommended as threshold (Hair et al., 2016).

4.5.1.3 Average Variance Extracted (AVE)

AVE is another method to determine convergent validity. It explains what the percentage of variation between items and its corresponding construct is (Hair et al., 2011). The threshold level of AVE is 0.50 or above according to criteria of (Fornell & Larcker, 1981). As depicted in table 4.4, AVE value of every construct is above 0.5.

Table 4.4: Assessment of Convergent Validity

Name of constructs	**CR**	**AVE**
Innovativeness	0.791	0.558
Risk Taking	0.807	0.583
Proactiveness	0.83	0.62
Autonomy	0.795	0.565
Competitive Aggressiveness	0.864	0.761
Project Success	0.866	0.519
Technological Orientation	0.895	0.68
Top Management Support	0.893	0.675

4.5.2 Discriminant Validity

A construct is said to have discriminant validity if it distinguishes itself from other constructs within a model (i.e. both constructs are not assessing the same phenomenon) (Hair et al., 2019). It can be gauged by three methods which are

listed below:

a. Fornell-Larcker criterion

b. Cross-loadings

c. Heterotrait-Monotrait (HTMT) ratio of the correlations

4.5.2.1 Fornell-Larcker Criterion

In Fornell-Larcker criteria, the comparison is done between square root value of AVE and the correlation coefficient of each construct. For a construct to have discriminant validity, square root value of AVE of a construct needs to be greater than the correlation coefficients of other constructs (Hair et al., 2016).

Table 4.5: Fornell-Larcker Criterion

Constructs	**INN**	**RT**	**PRO**	**AUT**	**CA**	**PS**	**TO**	**TMS**
INN	**0.747**							
RT	0.435	**0.763**						
PRO	0.391	0.485	**0.788**					
AUT	0.261	0.434	0.504	**0.752**				
CA	0.252	0.411	0.489	0.391	**0.872**			
PS	0.264	0.331	0.451	0.488	0.474	**0.72**		
TO	0.428	0.359	0.403	0.461	0.264	0.458	**0.825**	
TMS	0.367	0.424	0.46	0.576	0.321	0.559	0.607	**0.822**

Where INN = Innovativeness, PRO = Proactiveness, RT = Risk taking, AUT = Autonomy, CA = Competitive Aggressiveness, PS = Project Success, TO = Technological Orientation, TMS = Top Management Support.

The diagonal bold values represent the square root values of AVE of each construct while values below the diagonals are correlation coefficients of different constructs. From **Table: 4.5**, it can be seen that diagonal values are greater in every column and row. Hence, discriminant validity is established.

4.5.2.2 Cross-Loadings

Another technique to determine discriminant validity is the examination of cross loadings. The condition to establish discriminant validity is that an indicator's outer loading on its related construct ought to be higher than on different constructs (Hair et al., 2016). Table 4.6 represents cross loadings of each indicator. From table 4.6, it can be seen that every item load on its own construct and no item is loading on other constructs. Also, the values of loadings with its associated construct are higher than with other constructs. Hence, discriminant validity has been proved.

Table 4.6: Cross-Loadings of Indicators

Items	INN	RT	PRO	AUT	CA	PS	TO	TMS
EO 1	**0.802**	0.371	0.346	0.302	0.217	0.208	0.411	0.319
EO 2	**0.733**	0.274	0.238	0.146	0.152	0.212	0.313	0.302
EO 3	**0.704**	0.321	0.28	0.109	0.191	0.173	0.216	0.195
EO 4	0.387	**0.796**	0.407	0.386	0.362	0.261	0.304	0.366
EO 5	0.299	**0.763**	0.374	0.324	0.259	0.289	0.264	0.356
EO 6	0.304	**0.73**	0.326	0.277	0.315	0.206	0.251	0.242
EO 7	0.294	0.408	**0.773**	0.393	0.423	0.331	0.231	0.38
EO 8	0.236	0.324	**0.751**	0.342	0.337	0.387	0.358	0.321
EO 9	0.382	0.409	**0.836**	0.45	0.393	0.353	0.367	0.382
EO 10	0.235	0.42	0.445	**0.8**	0.286	0.399	0.419	0.48
EO 11	0.138	0.27	0.321	**0.73**	0.233	0.243	0.174	0.388
EO 13	0.205	0.271	0.358	**0.72**	0.359	0.443	0.419	0.422
EO 14	0.202	0.315	0.398	0.374	**0.865**	0.474	0.29	0.308
EO 15	0.237	0.4	0.454	0.309	**0.879**	0.356	0.174	0.253
PS3	0.184	0.209	0.255	0.269	0.308	**0.722**	0.37	0.398
PS4	0.189	0.242	0.377	0.387	0.291	**0.753**	0.351	0.463
PS5	0.156	0.303	0.317	0.394	0.378	**0.768**	0.323	0.442
PS6	0.226	0.292	0.28	0.305	0.361	**0.694**	0.299	0.387
PS10	0.125	0.172	0.304	0.38	0.357	**0.674**	0.303	0.315
PS11	0.257	0.204	0.406	0.372	0.36	**0.707**	0.33	0.398
TO 1	0.425	0.283	0.353	0.335	0.201	0.425	**0.821**	0.5
TO 2	0.349	0.344	0.321	0.353	0.303	0.355	**0.834**	0.482
TO 3	0.345	0.297	0.353	0.412	0.187	0.364	**0.817**	0.548
TO 4	0.286	0.259	0.3	0.426	0.179	0.362	**0.827**	0.471
TMS1	0.34	0.359	0.395	0.464	0.273	0.491	0.585	**0.815**
TMS2	0.31	0.345	0.353	0.434	0.291	0.436	0.539	**0.816**
TMS3	0.247	0.324	0.399	0.482	0.208	0.454	0.482	**0.841**
TMS4	0.307	0.366	0.363	0.511	0.283	0.455	0.385	**0.815**

4.5.2.3 Heterotrait-Monotrait Ratio (HTMT)

The concept of Heterotrait-Monotrait (HTMT) ratio was presented by (Henseler et al., 2015). It is the ratio of average of correlation of the indicators among different constructs and the average of the correlation of indicators of the related construct. According to (Henseler et al., 2015), models with constructs that are conceptually similar have threshold level of 0.90 while those constructs that are unrelated to each other have threshold value of 0.85 or below. From Table 4.7, it can be observed that not a single value is greater than 0.85. Hence, discriminant validity is established.

Table 4.7: Heterotrait Monotrait Ratio

Constructs	**INN**	**RT**	**PRO**	**AUT**	**CA**	**PS**	**TO**	**TMS**
INN								
RT	0.683							
PRO	0.586	0.719						
AUT	0.396	0.671	0.757					
CA	0.385	0.614	0.707	0.600				
PS	0.375	0.454	0.601	0.678	0.639			
TO	0.580	0.484	0.527	0.624	0.349	0.551		
TMS	0.507	0.572	0.600	0.794	0.424	0.671	0.719	

4.6 Assessment of Second Order Construct

After assessing and establishing the validity of the first order constructs, second order construct was assessed through multicollinearity of items and examination of the outer weights along with their significance (Wong, 2013). For the assessment of second order construct, (Hair et al., 2016) suggested two-stage method. First, the latent variable scores of lower order components were obtained. Next, these scores were copied in the SPSS data sheet which was saved in a comma delimited

format (*.csv) and was imported in PLS to draw a new model for assessment of second order construct, EO which is illustrated in figure 4.3.

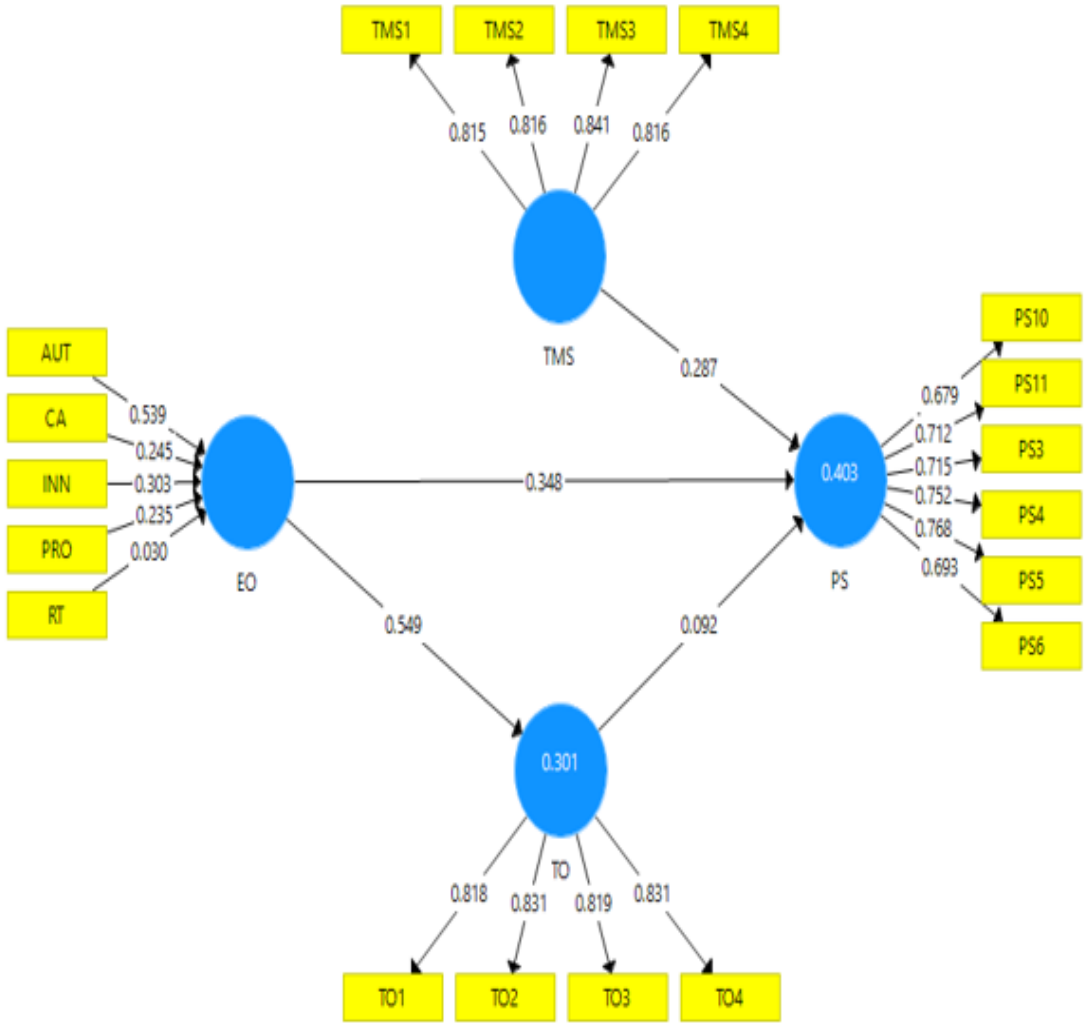

FIGURE 4.3: Model for Assessment of Second Order Construct

4.6.1 Multicollinearity of Indicators

Multicollinearity is when two or more items of a construct are highly correlated and is measured through "Variance Inflation Factor" (VIF) (Hair et al., 2016). The formative construct was examined with respect to multicollinearity. A value greater than 5 indicates multicollinearity issue. The VIF values of second order formative dimensions shown in Table 4.8 depicts that there is no issue of multicollinearity.

Table 4.8: Variance Inflation Factor Values

Formative indicators	**VIF Values**
AUT	1.461
CA	1.415
INN	1.302
RT	1.58
PRO	1.738

4.6.2 Outer Weights and their Significance

Formative indicators were evaluated by their outer weights. Moreover, the significance of the weights was tested through bootstrapping. Table 4.9 shows the weights of indicators along with their significance. It can be observed from table 4.9 that outer weights of AUT, CA, INN and RT are significant while weight of one item, PRO, is insignificant as its t-value is less than 1.96 and p-value is also above 0.05. According to (Hair et al., 2016), if the weight is insignificant but its outer loading is above 0.50, the item should be retained. If outer loading is also less than 0.5, the item should be removed. The outer loading of PRO was found to be significant (p = 0.000), therefore the item was retained. Moreover, confidence interval also gave evidence regarding significance of weights as zero did not come between upper and lower values of confidence interval except the PRO-EO relationship.

Table 4.9: Significance of Outer Weights

Relationships	**Original Sample**	**Sample Mean**	**Std. Deviation**	**t Values**	**p Values**	**95% BCa Confidence Interval**
AUT ⇒ EO	0.539	0.533	0.083	6.525	0.000	(0.380, 0.704)
CA ⇒ EO	0.245	0.235	0.086	2.864	0.004	(0.079, 0.411)
INN ⇒ EO	0.303	0.302	0.089	3.408	0.001	(0.137, 0.486)
PRO ⇒ EO	0.235	0.236	0.095	2.478	0.013	(0.043, 0.411)
RT ⇒ EO	0.030	0.029	0.100	0.304	0.761	(-0.172, 0.220)

4.7 Assessment of Structural Model

The evaluation of structural model, also known as inner model, takes place after gauging measurement model. The inner model illustrates how constructs are related to each other in a research framework (Hair et al., 2016). Structural model is assessed on the basis of significance of the path coefficients, Coefficient of determination (R^2), Effect size (f^2), Predictive relevance (Q^2) and Effect size(q^2) (Hair et al., 2018). However, prior to the assessment of structural model, it is important to check the multicollinearity of inner model as it can distort the results (F. Hair Jr et al., 2014).

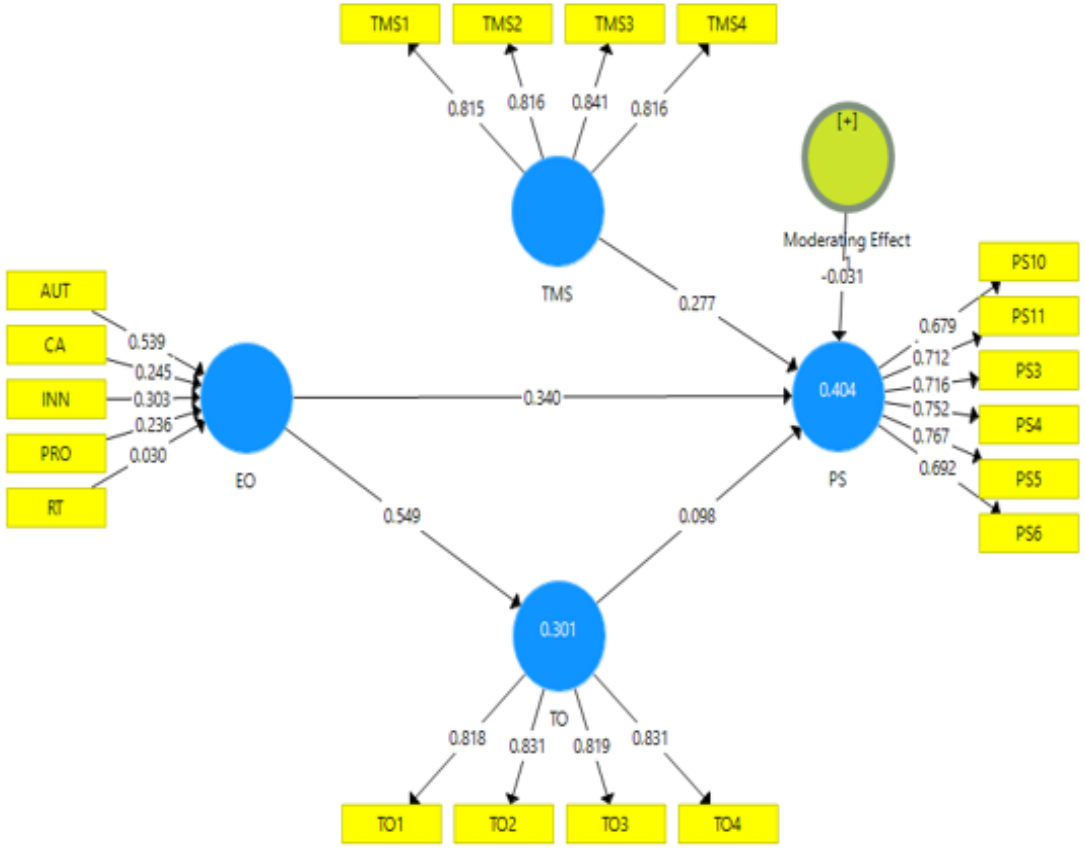

FIGURE 4.4: Complete Structural Model

4.7.1 Evaluation of Multicollinearity

The structural model was first assessed in terms of multicollinearity. It was done by attaining VIF values of exogenous constructs (i.e. predictors) with respect to each endogenous construct (Hair et al., 2016). The general rule is that VIF values should not be greater than 5 (Wong, 2013), otherwise there exists collinearity issue. As depicted in table 4.10, multicollinearity issue did not exist among the items of exogenous constructs as all VIF values are within the acceptable range.

TABLE 4.10: Inner Variance Inflation Factor

Exogenous Constructs	**VIF Values**
EO (with respect to PS)	1.807
EO (with respect to TO)	1
TO (with respect to PS)	1.748
TMS (with respect to PS)	2.047

4.7.2 Significance of Path Coefficients

Path coefficients are the hypothesized relationships that link the constructs and their values range from -1 to +1 (F. Hair Jr et al., 2014). Values near to +1 represent strong positive relationship while near to -1 represent strong negative relationship. Significance of path coefficients can be obtained through bootstrapping. Table 4.11 shows the path coefficients along with their significance and t-values.

Table 4.11: Significance of Path Coefficients

Relationships	**Path Coefficient**	**Standard error**	**t value**	**p value**	**95% CI**	
					LLCI	**ULCI**
EO ⇒ PS	0.340***	0.081	4.211	0.000	0.16	0.478
EO ⇒ TO	0.549***	0.05	10.879	0.000	0.426	0.629
Moderating Effect 1 ⇒ PS	-0.031	0.051	0.615	0.539	-0.087	0.311
TMS ⇒ PS	0.277***	0.081	3.423	0.001	0.125	0.445
TO ⇒ PS	0.098	0.067	1.476	0.14	-0.034	0.227

***p $<$ 0.001, **p $<$ 0.01, *p $<$ 0.05

Table: 4.11, shows that entrepreneurial orientation is positively associated with project success and their relationship is significant. The path coefficient (β = 0.340, t = 4.211) shows that one-unit change in entrepreneurial orientation leads to 0.340-unit change in project success. The path coefficient (β = 0.549, t = 10.879) between entrepreneurial orientation and technological orientation is also significant and shows that one-unit change in entrepreneurial orientation leads to 0.549-unit change in technological orientation.

Likewise, relationship between top management support and project success is also significant (β = 0.277, t = 3.423). However, the interaction term is showing insignificant effect (β = -0.031, t = 0.615) as there exists a zero between ULCI and LLCI.

Moreover, the relationship between technological orientation and project success is also insignificant (β = 0.101, t = 1.518) and it can also be reflected by a zero present between confidence intervals.

4.7.3 Coefficient of Determination (R^2)

Coefficient of Determination (R^2) is a measure of predictive accuracy of a model (F. Hair Jr et al., 2014). In other words, the value of R^2 exhibits the combined effect of exogenous latent variables on endogenous latent variables and its value ranges from 0 to 1 (Hair et al., 2016). The higher values indicate greater explanatory power. R^2 values of 0.75, 0.50 and 0.25 are considered substantial, moderate and weak (Hair et al., 2018). Figure 4.5 shows value of R^2. The value of R^2 for project success is 0.404 which is considered weak; it reflects that 40% of variation in project success is elucidated by entrepreneurial orientation and technological orientation. Similarly, the R^2 value for technological orientation is 0.301 which is also considered weak; it states that 30% of variation in technological orientation is explicated by entrepreneurial orientation.

4.7.4 Effect Size (f^2)

F^2 demonstrates how much value of R^2 fluctuates if a specific exogenous construct is omitted from a model to determine the influence on endogenous constructs (Hair et al., 2016). f^2 value greater than 0.35 represents large effect size. Value that lies in the range of 0.15-0.35 represents medium effect size whereas small effect size is considered if value varies between 0.02-0.15. **Table: 4.12**, shows that two independent constructs, entrepreneurial orientation and top management support, have medium effect size while rest of the independent constructs have no effect size.

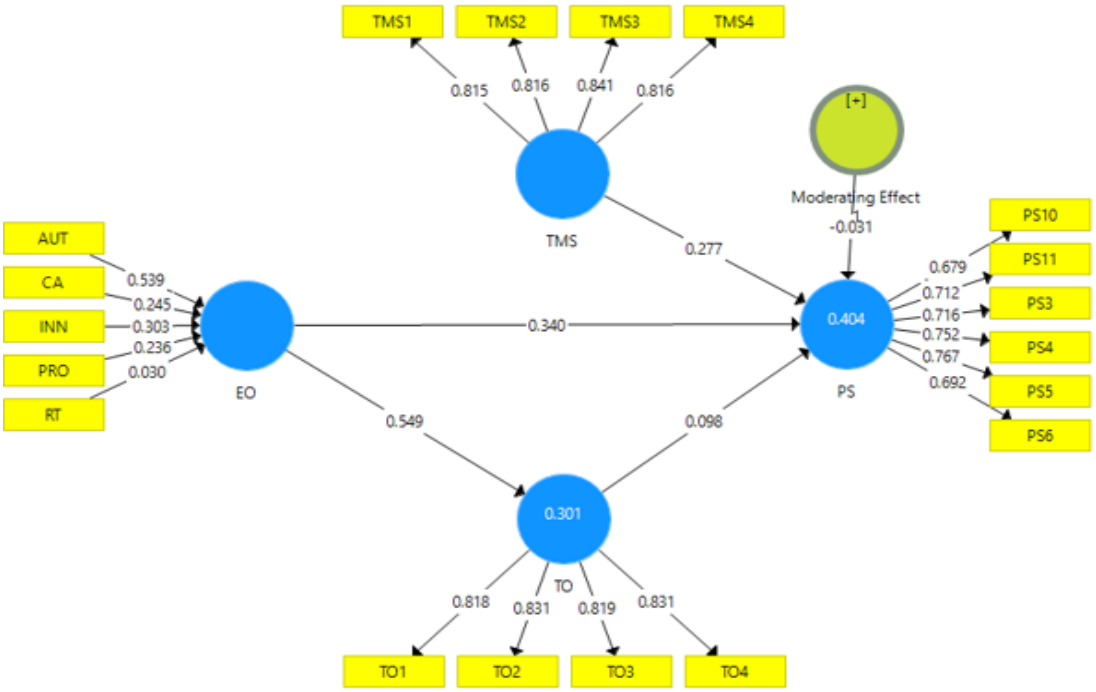

FIGURE 4.5: Illustration of Coefficient of Determination (R^2)

TABLE 4.12: Evaluation of Effect Size (f^2)

Independent Construct	**Dependent Construct**	**Effect Size (f^2)**	**Conclusion**
Entrepreneurial Orientation	Project Success	0.108	Small effect
Technological Orientation	Project Success	0.009	No effect
Top Management Support	Project Success	0.063	Small effect

4.7.5 Predictive Relevance (Q^2)

Q^2 is a method to evaluate the predictive relevance of inner model (F. Hair Jr et al., 2014). Blindfolding technique was utilized to get the value of Q^2 and the value of omission distance (D) was taken as 7. Cross-validated redundancy approach was used for measuring predictive relevance as suggested by (Hair et al., 2016).

Value greater than zero shows predictive relevancy of the model while values less than zero depicts lack of predictive relevancy (Hair et al., 2016). In **Table: 4.13**, Q^2 value of endogenous constructs are greater than 0; hence depicting predictive relevancy of the model.

Table 4.13: Evaluation of Predictive Relevance

Endogenous Constructs	**Q^2**
Technological Orientation	0.19
Project Success	0.189

4.7.6 q^2 Effect Size

Just as the f^2 was used to assess R^2, similarly q^2 is used to assess the impact of predictive relevance Q^2. It was calculated manually. Values of 0.02, 0.15 and 0.35 represents small, medium or large predictive relevance of endogenous construct by exogenous construct (Hair et al., 2016). It can be observed from **Table: 4.14**, that q^2 effect size of EO-PS relation is 0.039 which is very small while TMS-PS relation is negative.

Table 4.14: Evaluation of q^2 Effect Size

Exogenous Construct	**Endogenous Construct**	**Q^2 included**	**Q^2 excluded**	**Effect size (q^2)**	**Conclusion**
Entrepreneurial Orientation	Project Success	0.189	0.157	0.039	Small effect
Top Management Support	Project Success	0.19	0.199	-0.011	No effect

4.8 Mediation Analysis

Mediation is the phenomenon that explains the relationship of independent and dependent constructs (Hair et al., 2016). For our study, the objective of mediation analysis is to test Hypothesis 4 which states that technological orientation (TO)

acts as a mediator between entrepreneurial orientation and project success (PS). Smart PLS 3 was used to perform analysis of mediation through bootstrapping. To test whether TO possesses the characteristics of mediator, this study followed the procedure of (Hair et al., 2016). Figure 4.5 and table 4.15 demonstrate the total

TABLE 4.15: Assessment of Significance of Direct Effect

Total Effect	**Path coefficient**	**Std. Deviation**	**t value**	**p value**
EO ⇒ PS	0.599***	0.049	12.257	0.000

***p < 0.001, **p < 0.01, *p < 0.05

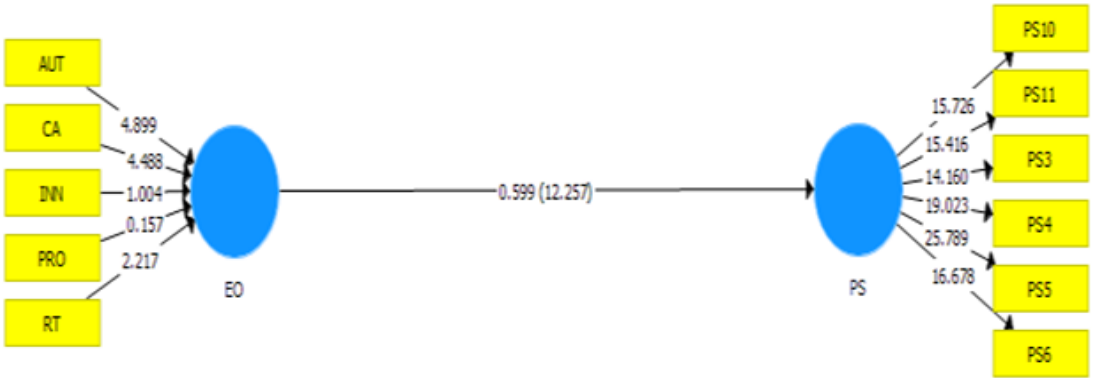

FIGURE 4.6: Direct Effect of IDV on DV Without Mediator

Hypothesis 1 states that there is positive association between entrepreneurial orientation and project success. The results, as shown in the table 4.15, has provided strong justification to accept this hypothesis. From table 4.15, it can be seen that the value of path coefficient is (β = 0.599, p = 0.000) which depicts that entrepreneurial orientation has positive and significant association with project success. Hence, Hypothesis 1 is accepted.

After the total effect was found significant, the mediator was introduced in the model to check the significance of indirect effect between EO (IDV) and TO (mediator) as well as the indirect effect between TO (mediator) and PS (DV). Figure 4.7 displays mediation analysis while table 4.16 depicts the significance analysis of mediation.

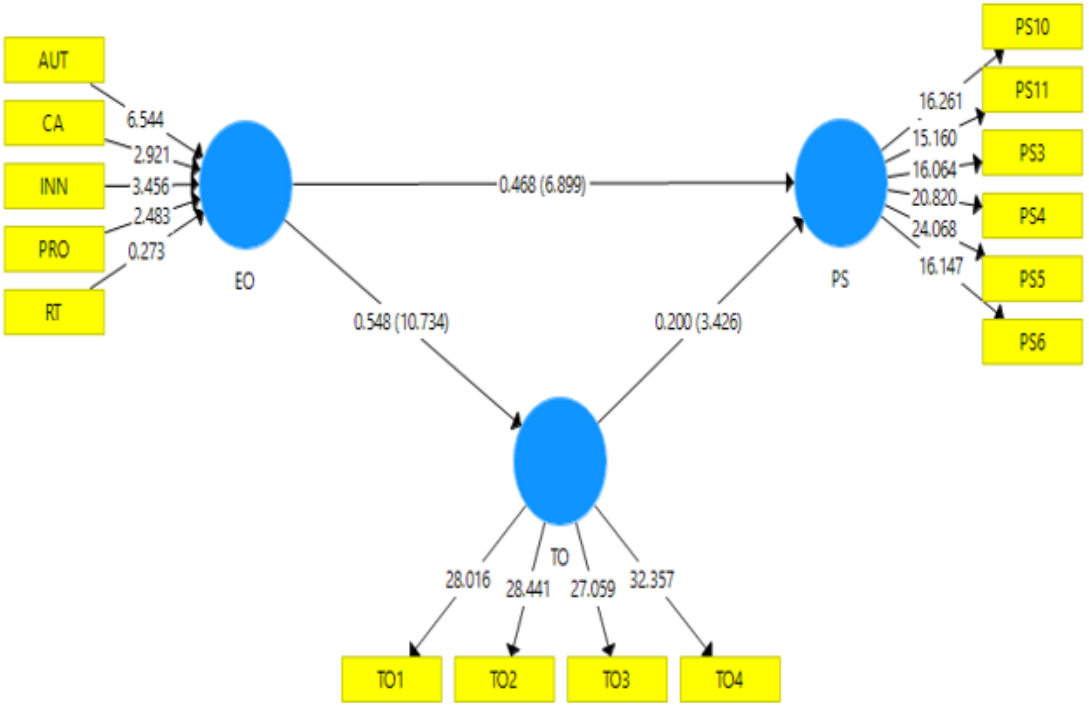

FIGURE 4.7: Mediation Analysis with Path Coefficients

TABLE 4.16: Significance Analysis of Mediation

Path Relationship	**Path Coefficient**	**Std. Deviation**	**t value**	**P value**	**Bootstrap Results LLCI**	**ULCI**
EO ⇒ PS	0.468***	0.068	6.899	0.000	0.305	0.581
EO ⇒ TO	0.548***	0.051	10.734	0.000	0.425	0.634
TO ⇒ PS	0.200***	0.058	3.426	0.001	0.086	0.313
EO ⇒ TO ⇒ PS	0.110***	0.034	3.201	0.001	0.047	0.181

***p $<$ 0.001, **p $<$ 0.01, *p $<$ 0.05.

Hypothesis 2 states that there is positive association between entrepreneurial orientation and technological orientation. The results shown in the table 4.16 has provided strong justification to accept this hypothesis. From table 4.16, it can be seen that the path coefficient of the relationship (EO $->$ TO) is (β = 0.548, p

= 0.000). The upper and lower limit value of bootstrap is 0.425 and 0.634 respectively which shows that there exists no zero between both confidence intervals. It depicts that entrepreneurial orientation has positive and significant association with technological orientation. Hence, Hypothesis 2 is accepted.

Similarly, Hypothesis 3 states that there is positive association between technological orientation and project success. The results shown in the table 4.16 has justified it to accept this hypothesis. From table 4.16, it can be seen that the path coefficient of the relationship (TO $->$ PS) is ($\beta = 0.200$, p = 0.001). The upper and lower limit value of bootstrap is 0.086 and 0.313 respectively which shows that there exists no zero between both confidence intervals. This illustrates that technological orientation has positive and significant association with project success. Hence, Hypothesis 3 is accepted.

Hypothesis 4 states that technological orientation plays a mediating role between entrepreneurial orientation and project success. From table 4.16, it can be observed that the path coefficient of the indirect path (EO $->$ TO $->$ PS) is ($\beta = 0.110$, p = 0.001). The upper and lower limit value is 0.047 and 0.181 respectively which shows that there exists no zero between both confidence intervals; hence this path is significant. Therefore, Hypothesis 4 is also accepted which states that technological orientation plays a mediating role between entrepreneurial orientation and project success.

4.9 Moderation Analysis

Moderation is a phenomenon when a third variable, refers to as moderator, moderates the relationship of independent and dependent variable or even changes the strength of the relationship between the aforementioned variables(Hair et al., 2016). In this current study, Hypothesis 5 states that top management support moderates the relationship of technological orientation and project success; such that if top management support is high, the relationship of technological orientation and project success would be strengthened. The model for moderation is given as Figure 4.8.

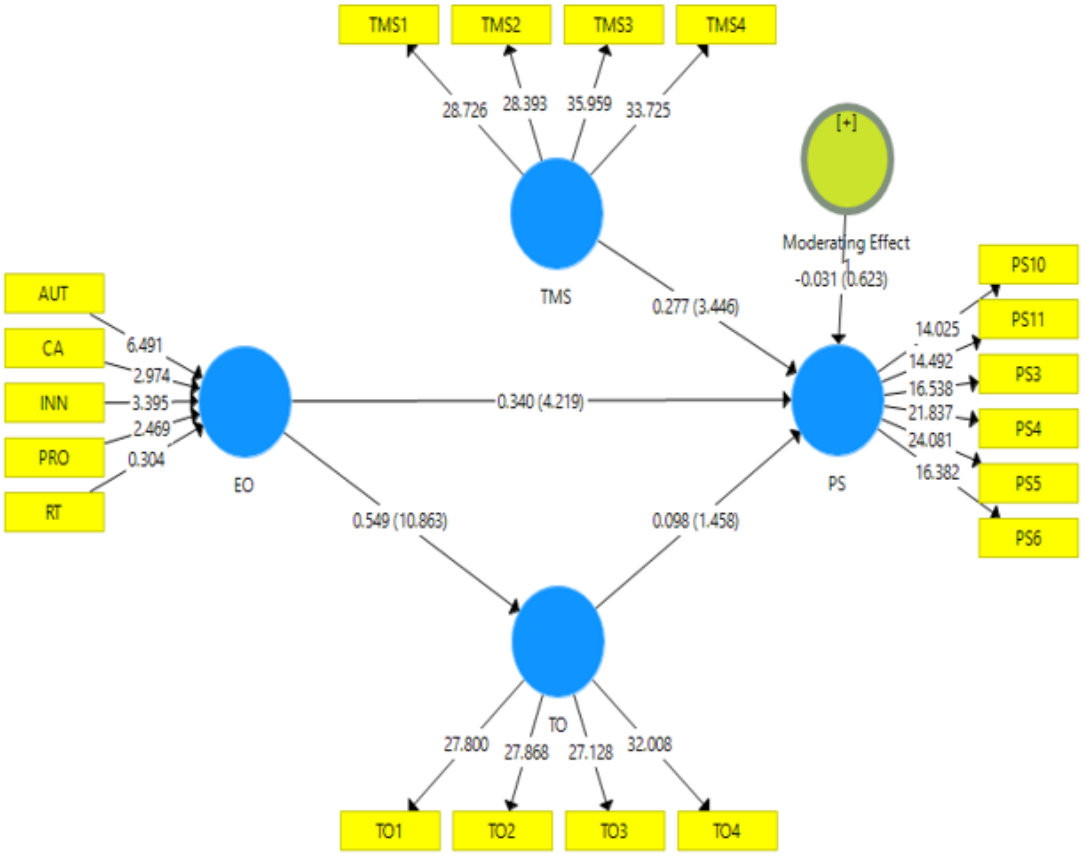

FIGURE 4.8: Moderation Analysis

TABLE 4.17: Significance Analysis of Moderation

Path Relationship	**Path Coefficient**	**Std. Deviation**	**t value**	**p value**	**Bootstrap Results LLCI**	**ULCI**
Moderating Effect 1 ⇒ PS	-0.031	0.051	0.623	0.533	-0.082	0.34
TMS ⇒ PS	0.277***	0.069	6.471	0.000	0.32	0.587
TO ⇒ PS	0.190***	0.069	2.759	0.006	0.055	0.322

***p $<$ 0.001, **p $<$ 0.01, *p $<$ 0.05.

From **Table: 4.17**, we can observe that the value of interaction term (β = -0.031, t = 0.623, p value $>$ 0.05) is insignificant while path coefficients of TMS-PS and TO-PS are significant. The bootstrap confidence intervals for interaction term has zero between upper limit and lower limit which signifies that moderation is not happening. Hence, our Hypothesis 5 which states that top management support moderates the relationship of technological orientation and project success is rejected.

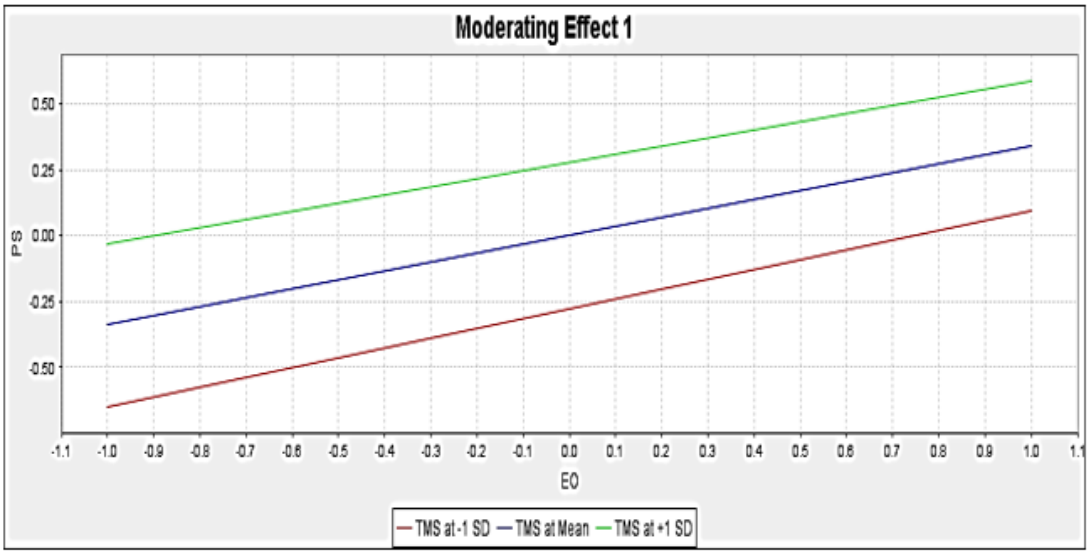

FIGURE 4.9: Interaction Graph

4.10 Summary of Hypotheses

Table 4.18 below provides the summary of proposed hypotheses of the study.

TABLE 4.18: Summary of Hypotheses

Hypothesis	**Statement**	**Result**
$\mathbf{H}_1$	There is positive association between entrepreneurial orientation and project success.	Accepted
$\mathbf{H}_2$	There is positive association between entrepreneurial orientation and technological orientation.	Accepted
$\mathbf{H}_3$	There is positive association between technological orientation and project success.	Accepted
$\mathbf{H}_4$	Technological Orientation plays a mediating role between entrepreneurial orientation and project success.	Accepted
$\mathbf{H}_5$	Top Management Support moderates the relationship of technological orientation and project success; such that when top management support is high, the relationship of technological orientation and project success would be strengthened	Rejected

Chapter 5

Discussion and Conclusion

The following chapter will discuss the outcome of this research study. It includes the discussion related to the hypotheses and their acceptance and rejection. Moreover, the theoretical and practical implication, limitations and directions for future research study will also be discussed. In the end, conclusion of the study will be presented.

5.1 Discussion

The extant literature has revealed that significant research has been carried out within Strategic Management and Entrepreneurship domain to explore the relationship of EO and organizational performance (Jeong et al., 2019; Khanagha et al., 2018). Mostly, the research on relationship of EO and performance has been carried out in traditional organizations (Pittino et al., 2016). Research by (Martens et al., 2018; Kuura et al., 2014) has emphasized the importance of studying EO in project-based organizations and suggested other variables to be explored to further expand their research.

Applying the Resource-based View (RBV) theory, the objective of the research study was to observe the relationship of EO and project success in software firms within the contextual settings of Pakistan. The study also examined the role of technological orientation as mediator in the relation of EO and project success

and role of top management support as moderator between technological orientation and project success. The research was conducted in IT sector of Pakistan, particularly software sector.

The results of the study concluded that entrepreneurial orientation is positively associated with project success which depicts that entrepreneurial orientation enhances project success. Hence, hypothesis H1 is accepted. Furthermore, there is also positive relationship of entrepreneurial orientation and technological orientation in addition to relationship of technological orientation and project success. Based on these relations, technological orientation act as mediator in the relationship of entrepreneurial orientation and project success. Thus, hypothesis H2 is also accepted. Top management support was incorporated as moderator to determine the strength and direction of relationship of technological orientation and project success. The analysis of data regarding moderating variable revealed that this relationship was insignificant, meaning that top management support did not moderate the relation of technological orientation and project success. Hence, hypothesis H3 is rejected. The details regarding each hypothesis are as follows:

5.1.1 Hypothesis 1: There is Positive Association between Entrepreneurial Orientation and Project Success

To determine the impact of entrepreneurial orientation on project success, Hypothesis 1 was proposed which stated that there is positive association between entrepreneurial orientation and project success. The results ($\beta = 0.332$, t = 4.075, p = 0.000) supported the hypothesis H1. The t value 4.075 indicates that relation of entrepreneurial orientation and project success is significant. The R^2 coefficient of determination value for project success is 0.401 meaning that 40% of variance in project success is due to entrepreneurial orientation. Moreover, the f^2 value is 0.11 depicting a small effect size. Q^2 value of 0.189 also reflects that entrepreneurial orientation predicts project success.

Literature has revealed that a strong connection exists between entrepreneurship and project management disciplines (Kuura et al., 2014). Similarly, the positive

relationship of entrepreneurial orientation and performance has also been identified by (Rauch et al., 2009). The results of our study are also in line with the study of (Martens et al., 2018) in which positive association of entrepreneurial orientation and project success was also found. These results also indicate that if the software organizations in Pakistan also exhibit entrepreneurial orientation, chances of project success will increase that can ultimately enhance the performance of these organizations.

The prior studies have shown that innovativeness is a vital element of EO as it not only enhances a firm's reputation in industry but also augments the knowledge of the firm for development of future products and strengthen the external linkages for resource acquisition (Lomberg et al., 2017; Jordan & Segelod, 2006). In high-tech industries, innovativeness has shown strong impact on performance as compared to other dimensions (Kollmann & Stockmann, 2014). This is very much aligned with our study in which innovativeness significantly contributes to project success compared to other dimensions.

Similarly, proactiveness can also enhance project success if customer's unstated needs are anticipated taking into consideration the market trends (Filser et al., 2014). The results of our study also prove that proactiveness contributes significantly in determining project success. Another component of entrepreneurial orientation is risk taking. Organizations who favor risk-taking perform better than those who do not take risk (Garcia-Granero et al., 2015; Kreiser & Davis, 2010). However, risk taking has shown insignificant results in our study which depicts that it is less important in predicting project success in our sample organizations. The insignificance of risk taking was also reported by (Loong Lee & Chong, 2019) who stated that this could be attributed to uncertain environment or the early stages of growth of a firm.

Regarding autonomy, previous study has revealed that autonomy also contributes to project success as giving authority to project managers helps them in resolving conflicts regarding allocation of resources, coordination and decision making (Gemunden et al., 2005). Results of our study have shown that autonomy has contributed significantly in project success. Last component of entrepreneurial

orientation is competitive aggressiveness. Literature has shown that to outperform the rivals, it is necessary to exploit their weaknesses by producing quality products, enhancing the production capacity or formulating a pricing strategy. The results of our study have also confirmed that it is associated with project success.

Based on above discussions, it is pertinent to mention here that it is not necessary that all five components of entrepreneurial orientation must act simultaneously for better organizational performance. It varies industry to industry and the context in which it operates (Lomberg et al., 2017).

5.1.2 Hypothesis 2: There is Positive Association between Entrepreneurial Orientation and Technological Orientation

To determine the impact of entrepreneurial orientation on technological orientation, Hypothesis 2 was proposed which stated that there is positive association between entrepreneurial orientation and technological orientation. The results (β = 0.548, t = 10.734, p = 0.000) supported the hypothesis H2. The p value indicates that relation of entrepreneurial orientation and technological orientation is significant and positive. The results of this study are very much in line with the previous studies (Zhang, 2017; Choi, & Williams, 2016) which also determined the positive relationship between entrepreneurial orientation and technological orientation.

The advancement in technologies has put pressure on the organizations to innovate in order to survive in the competitive environment. The innovative mindset of organizations has created new technological knowledge that has enabled them to utilize this knowledge in the development of new products, services or processes and to survive in the competitive environment (Yeong, & Lim, 2010). Firms who possess the competencies to manage new technologies are in a better position to develop new products or services and to outperform their competitors to become market leader (Khin, & Ho, 2019).

Firms who are proactive in acquiring the state-of-the-art technologies and integrating them with their processes are more likely to enhance their competencies and to become market leaders (Al-Ansari et al., 2013). According to the extant literature, those firms who are highly innovative, proactively and risk-taker are better equipped with resources to successfully commercialize their technologies and create value for themselves (Li, Guo, Liu, & Li, 2008). It is generally believed that the prospect of accepting and integrating new technologies within an organization is more when it is perceived as beneficial and user friendly (Gupta, Niranjan, Goktan, & Eriskon, 2016). A technologically oriented firm can also expand its operations internationally to compete with other firms at global level (Urban, 2010). Hence, the decision to formulate strategies to acquire and implement technologies within an organization represents the entrepreneurial attitude of the management.

5.1.3 Hypothesis 3: There is Positive Association between Technological Orientation and Project Success

To determine the impact of technological orientation on project success, Hypothesis 3 was formulated which stated that there is positive association between technological orientation and project success. The results (β = 0.200, t = 3.426, p=0.001) supported the hypothesis H3. The p value indicates that relationship of technological orientation and project success is significant and positive. The results of this study are very much in line with the previous studies (Yang, & Huang, 2016; Yang, Chen, & Wang, 2012) which also determined the positive relationship between adoption of technology in improving project performance.

Projects have been cited as crucial in the success of the organizations (Davis, 2016). They are initiated to achieve strategic objectives (earning profits, growth in market share, updating the technological base etc.) of an organization and its success depends upon how much do they contribute to the organization (Baccarini, 1999). Therefore, project success is on the top of list of every project manager (Müller, & Jugdev, 2012). Different factors have been identified that can contribute in the success of the project and technology is one of them. According to (Vargo et al.,

2015, p. 65), technology can be considered as "potentially useful knowledge that may provide solutions for new or existing problems". It can change the status of businesses from static to dynamic. Since every project is unique, the utilization of technology depends upon in which context the project is being carried out. Technology is considered as an important factor in completing a project successfully because it helps a project manager to make plans, schedules, budgets for a project and exchange useful information about projects by communicating with project team (Yang, & Huang, 2016).

The surge in technologies has changed the landscape of doing business (Markovic, 2008). Projects are now considered as a medium to achieve strategic objectives of the organizations (Sheykh, Azizi, & Sobhiyah, 2013). Consequently, the exponential growth of technology usage in projects has been witnessed (Papke-Shields et al., 2010; Anantatmula, 2008). It has also been observed that those project teams who are adept in using the latest technologies have the edge in resolving the problems that occur during the project and can complete the project timely according to the stated needs of the customers (Iqbal et al., 2017). Technological-oriented firms enrich their technological base by acquiring updated technologies or gather information from the market and reallocate their resources accordingly to capture the opportunities available to them in the market (Kocak et al., 2017). Hence, on the basis of above arguments it can be concluded that technological orientation is positively associated with project success.

5.1.4 Hypothesis 4: Technological Orientation plays a Mediating Role between Entrepreneurial Orientation and Project Success

In order to determine the mediating role of technological orientation, Hypothesis 4 was formulated which states that technological orientation plays a mediating role between entrepreneurial orientation and project success. The results supported the hypothesis that technological orientation mediates the relationship of aforementioned variables. The upper and lower limit value of indirect effect does not

contain zero in between them which confirms that mediation is happening. The R^2 value depicts that 36.2% of variation in project success has occurred due to the combined effect of entrepreneurial orientation and technological orientation. Predictive relevance (Q^2) value of 0.190 also reflects that technological orientation predicts project success.

Literature has shown that there is no such research available that has considered the mediating role of technological orientation in the domain of project management. However, findings of the study conducted by (Choi & Williams, 2016) concluded that technology action has mediated the relationship of entrepreneurial orientation and firm's performance. Technology is regarded as critical assets of an organization to achieve competitive edge (Haro-Dominguez et al., 2010). The results of our study are also in accordance with RBV theory which states that possession of strategic resources provides competitive advantage to the organization. It has been observed that innovativeness leads to novelty with the help of R&D and technology (Iqbal & Malik, 2019) and strengthens the firm's position relative to its competitors in the market. Technology orientation not only enables an organization to refine its existing technologies but also helps in reconfiguration of resources to avail new opportunities (Kocak et al., 2017). The rapid changes in technologies are forcing the organizations to cope with the new trends or else they will be out of competition. In high-tech industries, the dynamic changes in technologies have changed the demands of customers and the successful organizations will be the ones who will adapt to changing business environment (Markovic, 2008). In software organizations, entrepreneurial characteristics of project managers can help the organizations to implement latest technologies in their projects that will make the projects successful.

The literature on technological orientation suggests that an organization has to decide whether to acquire technology or not in case of low market turbulence (Gao et al., 2007). Nonetheless, technological orientation is a valuable asset according to RBV. Our study has also proved that the relationship of entrepreneurial orientation and project success is mediated through technological orientation significantly in the software organizations of Pakistan.

5.1.5 Hypothesis 5: Top Management Support Moderates Relationship of Technological Orientation and Project Success; such that when Top Management Support is High, the Relationship of Technological Orientation and Project Success would be Strengthened

To evaluate whether the top management support acts as a moderator in the relationship of technological orientation and project success, hypothesis 5 was proposed which states that top management support moderates the relationship of technological orientation and project success; such that if top management support is high, the relationship of technological orientation and project success would be strengthened. The results (β= -0.009, t = 0.116, p = 0.896) showed that there is insignificant top management support has insignificant effect on the relationship of technological orientation and project success. Also, there exists a zero between upper and lower limit values. This shows that top management support does not acts as a moderator in the relationship of technological orientation and project success.

Extant literature has highlighted that top management support is an important factor in project success and those projects that have the support of management are less prone to failure (Ahmed and Azmi bin Mohamed, 2017; Iqbal et al., 2015). Similarly, the technology usage in projects has made it mandatory for organizations to update their existing technology base to remain competitive in the market (Jeong et al., 2006). However, the results of our study negate this but there are some justifications that can support our results.

According to (Young and Poon, 2013), top management show little or no concern to projects after they have been initiated. Their focus is on increasing returns on the investments made by organizations or to avail other attractive opportunities and to reduce expenditures (Thomas et al., 2002). It is quite possible that technology acquisition requires allocation of ample resources which the risk-averse

management might deny due to their vested interests in other opportunities. Furthermore, research has also shown that top management's support may vary industry to industry (Zwikael., 2008). In software sector, due to restricted budget and tight schedule, top management cannot afford the project to be over-budgeted and miss the deadline. If that happens, an organization might lose its rapport among its customers and in industry as well. Hence, our study has shown that top management support did not moderate the relationship of technological orientation and project success in the software companies.

Another reason for the lack of top management support in our sample organizations is that the required tools that are to be used in the development of software are not provided to the developers. The tools that are provided are either not updated versions nor relevant for the required task. Consequently, it takes more time for a developer to develop a software than to complete it on time by using upgraded softwares. Moreover, it is a common practice in small software companies that they don't bother to purchase complete softwares and use pirated versions of the software in order to avoid expenses. This also limits the features in a software and requires more time to complete a project.

5.2 Theoretical Implications

Theoretically, it has contributed to project management literature in different ways. First of all, there is very limited literature available that has investigated entrepreneurial orientation along with project success in the domain of project management. The majority of the research on entrepreneurial orientation has been carried out in traditional organizations to determine its relationship with organizational performance (Rauch et al., 2009). Only recently, a research has been conducted by (Martens et al., 2018) to link EO with project success and suggested to study other antecedents of project success. According to our limited knowledge, our study will be the first of its kind that has studied different antecedents of project success in software organizations especially in the context of Pakistan.

It will theoretically bridge the gap between entrepreneurship and project management disciplines and will contribute to the literature of project management.
Second contribution of our study is the investigation of antecedents of project success through resource-based view (RBV) theory. Applying the RBV theory to our research model has delineated that the strategic resources of an organization contribute in the success of project. In our study, different resources have been identified that have been considered as providing value to the organization, are not easily available, are unique in nature and cannot be substituted easily. They can be bundled together to achieve competitive edge over the rivals. Appropriate deployment of these resources can provide foundation for developing strategies in order to enhance entrepreneurial culture in an organization (Grande et al., 2011) which can significantly contribute in project success. It will assist the researchers/ scholars to further explore this research in different contextual settings by including other factors that can lead to project success.
Furthermore, this research has also contributed in literature by investigating the mediating and moderating role of technological orientation and top management support which has not been studied before. Previous studies have explored technological orientation under the umbrella term of strategic orientation or in combination with marketing orientation, customer orientation or entrepreneurial orientation and in the contextual settings of new product development or performance. Hence, our study will be an addition in the domain of project management to understand antecedents of project success in the software organizations of developing countries like Pakistan where the research on these variables is very rare.

5.3 Practical Implications

In practical terms, this study has highlighted variables that can increase project's success rate. This study will help project managers to think out of the box for managing IT projects. It will enable them to have a better understanding that success in projects can be achieved by pursuing entrepreneurial activities in the organization which will ultimately enhance organizational performance. In today's

dynamic environment, it has become imperative for IT professionals to explore news methods to understand project success. They should exhibit a mix of different dimensions of EO in their decision making and methodology for improving project success.

This study has practical implications for top management as well. It will enable them to recognize which resources (i.e. tangible, intangible or organizational) will contribute to achieve strategic objectives of an organization. Furthermore, this study will guide top management to adopt best business practices and formulate strategies on the basis of best available resources in order to exploit opportunities available in the market and incorporating latest technology for successful execution of the projects; thereby increasing success rate of IT projects and to gain competitive advantage.

5.4 Limitations of the Research

Our study has confronted some limitations as well. Due to limited time frame, our study was cross-sectional in nature. Only those projects were taken into consideration by the respondents that were completed. Because of financial and time constraints, we gathered data from those software organizations that were situated at Rawalpindi and Islamabad. This limitation has resulted in small sample size. Furthermore, as the study was conducted in the software sector, the results cannot be generalized to other sectors. Moreover, the data was collected from single informants from each organization, thus the element of biasness can alter the results of the study. As it was very difficult to convince the participants to fill the questionnaires due to their busy schedule, so convenience sampling was utilized to obtain the data. Since the study was conducted in the contextual settings of Pakistan which is a developing country, the results may vary if the same research model will be tested in developed countries.

5.5 Future Research Direction

This research has opened new avenues for future research. The five dimensions of EO (i.e. innovativeness, risk taking, proactiveness, autonomy and competitive aggressiveness) can be studied individually in order to evaluate their effect on project success because these dimensions vary industry to industry. Another possible research avenue will be to examine customer orientation as an antecedent to project success. In the current study, we have focused on project-based organizations of IT sector. However, future research can also be done in different sectors to further explore our research model.

Furthermore, there are other variables that have the potential to act as mediator in the relationship of entrepreneurial orientation and project success. Variables like strategy formation, technology action, and structural organicity can also be tested as mediators to further explore the relationship of entrepreneurial orientation and project success. Similarly, stakeholders' involvement also determines success of the projects. Therefore, this variable can be studied to test how project success is moderated by stakeholders' involvement. Moreover, project's governance structure and resource availability also affect project's success that can also be considered for potential research.

5.6 Conclusion

The prime objective to conduct this research study is to determine the impact of entrepreneurial orientation on project success in the software organizations of Pakistan. For this purpose, data was gathered from public and private software development firms of Pakistan through self-administered and digital questionnaires survey to evaluate what impact does entrepreneurial orientation has on project success in the presence of mediator (technological orientation) and moderator (top management support).

Approximately, 350 questionnaires were disseminated. However, 258 were utilized

further in the analysis of data because they were completely filled. Five hypotheses were formulated to test our research model. Results have shown that there is positive association between entrepreneurial orientation and project success; hence H1 is accepted. Similarly, positive association between entrepreneurial orientation and technological orientation has led to the acceptance of H2. Moreover, H3 is also accepted which is the positive association between technological orientation and project success. Results have also delineated that technological orientation has mediated the relationship of entrepreneurial orientation and project success; hence H4 is also accepted. Furthermore, the results of moderating role of top management support concluded that top management support did not moderate the relation of technological orientation and project success in the contextual settings of Pakistan. Therefore, H5 is rejected.

This study has some limitations as well. The main limitation of this study is the small sample size as the data was collected from twin cities of Pakistan i.e. Islamabad and Rawalpindi. Future research can be done exploring other business sectors and inculcating different mediating and moderating variables to further validate the research model.

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Appendix-A

Questionnaire

Dear Respondent

I am a MS Research Scholar at Capital University of Science and Technology (CUST). I am conducting a research on "Impact of Entrepreneurial Orientation on Project Success: Mediating role of Technological Orientation and Moderating role of Top Management Support". Kindly answer these questions based on your experience in current job and organization. Your answers will be kept strictly confidential and will be used only for research purpose. Your kind cooperation in this regard will be highly appreciated please.

Regards,

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MS (Project Management)

Faculty of Management and Social Sciences,

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Section 1: Demographics

Section	**Demographics**
Gender	1- Male 2- Female
Age(years)	1 (20-30), 2 (31-40), 3 (41-50), 4 (More than 50 Years)
Experience(years)	1 (Less than 3 Years), 2 (3–5), 3 (6-10), 4 (More than 10 Years),
Education	1 (Bachelors), 2 (Master), 3 (MS/M.Phil), 4 (Others)
Organization	1 (Public), 2 (Private)

Section 2: Entrepreneurial Orientation

Keeping in view your employer, please indicate the extent of your agreement and disagreement by entering the appropriate option.

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

1	In general, the top managers of my firm favor a strong emphasis on R&D, technological leadership and innovations.	1	2	3	4	5
2	Very many new lines of products/services have been marketed in the past 5 years.	1	2	3	4	5
3	Changes in products or services in my firm have usually been quite dramatic in the past 5 years.	1	2	3	4	5
4	In general, the top managers of my firm have a strong proclivity for high-risk projects (with chance of very high return).	1	2	3	4	5
5	In general, the top managers of my firm believe that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.	1	2	3	4	5

6	When confronted with decision-making situations involving uncertainty, my firm typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.	1	2	3	4	5
7	In dealing with its competitors, my firm typically initiates actions which competitors then respond to.	1	2	3	4	5
8	In dealing with its competitors, my firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.	1	2	3	4	5
9	In general, the top managers of my firm have a strong tendency to be ahead of other competitors in introducing novel ideas or products.	1	2	3	4	5
10	My firm supports the efforts of individuals and/or teams that work autonomously.	1	2	3	4	5
11	In general, the top managers of my firm believe that the best results occur when individuals and/or teams decide for themselves what business opportunities to pursue.	1	2	3	4	5
12	In my firm individuals and/or teams pursuing business opportunities make decisions on their own without constantly referring to their supervisor(s).	1	2	3	4	5
13	In my firm employee initiatives and input play a major role in identifying and selecting the entrepreneurial opportunities my firm pursues.	1	2	3	4	5
14	My firm is very aggressive and intensely competitive.	1	2	3	4	5
15	In dealing with its competitor, my firm typically adopts a very competitive “undo-the-competitors” posture.	1	2	3	4	5

Section 3: Project Success

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

1	The project was completed on time.	1	2	3	4	5
2	The project was completed according to the budget allocated.	1	2	3	4	5
3	The outcomes of the project are used by its intended end users.	1	2	3	4	5
4	The outcomes of the project are likely to be sustained.	1	2	3	4	5
5	The outcomes of the project have directly benefited the intended end users, either through increasing efficiency or effectiveness.	1	2	3	4	5
6	Given the problem for which it was developed, the project seems to do the best job of solving that problem.	1	2	3	4	5
7	I was satisfied with the process by which the project was implemented.	1	2	3	4	5
8	Project team members were satisfied with the process by which the project was implemented.	1	2	3	4	5
9	The project had no or minimal start-up problems because it was readily accepted by its end users.	1	2	3	4	5
10	The project has directly led to improved performance for the end users/target beneficiaries.	1	2	3	4	5
11	The project has made a visible positive impact on the target beneficiaries.	1	2	3	4	5
12	Project specifications were met by the time of handover to the target beneficiaries.	1	2	3	4	5
13	The target beneficiaries were satisfied with the outcomes of the project.	1	2	3	4	5

14	Our principal donors were satisfied with the outcomes of the project implementation.	1	2	3	4	5

Section 4: Technological Orientation

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

1	We use sophisticated technologies in our new product development.	1	2	3	4	5
2	Our new products always use state-of-the-art technology	1	2	3	4	5
3	Technological innovation based on research results is readily accepted in our organization.	1	2	3	4	5
4	Technological innovation is readily accepted in our program/ project management.	1	2	3	4	5

Section 5: Top Management Support

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

1	Top management supported the project.	1	2	3	4	5
2	Top management devoted a lot of time to the project.	1	2	3	4	5
3	Top management provided adequate resources.	1	2	3	4	5
4	Top management created an enthusiastic atmosphere.	1	2	3	4	5