INFORMATION TECHNOLOGY CAPABILITIES AND FIRM PERFORMANCE: A STUDY OF MEDIUM-SIZED MANUFACTURING ENTERPRISES IN PAKISTAN

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THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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Information Technology Capabilities and Firm Performance: A Study of Medium-Sized Manufacturing Enterprises in Pakistan

Field of Study: Business Strategy and Policy

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ABSTRACT

The Small and medium enterprises (SMEs) of any country formulate an integral part of economic activities of that country and are considered as the backbone of not only for the developed countries but also for the developing ones. Despite of significant contribution of SMEs towards the economic development; these firms are facing high risk of failure and survival challenges, particularly in developing countries. The main reason for high failure rate is lack of knowledge about efficient utilization of information technology (IT) capabilities. That is way the contribution of SMEs in gross domestic products is gradually decreasing, particularly in manufacturing sectors SMEs of developing nations. In modern era of technology, IT capabilities are regarded as a tool for competitiveness for business organizations. However, the underlying mechanisms, through which IT capabilities affect performance outcomes are still not clear and needed to be explored further. In addition, the research on absorptive capacity and corporate entrepreneurship outcomes still lacks integrative examinations of innovation performance and firm performance measures.

On the basis of the resource-based view and dynamic capability view, this study contributes to the current literature by empirically analyzing an integrated theoretical model that explains that how IT capability dimensions (IT infrastructure flexibility, IT technical skills, IT integration, and IT business alignment) unfold the SMEs performance outcomes such as innovation performance and firm performance. It also explains that how the relationship between these two variables is affected by intervention of absorptive capacity and corporate entrepreneurship. Hence, this study contributes towards literature by investigating the sequential mediation role of absorptive capacity and corporate entrepreneurship between different IT capability dimensions and SMEs performance outcomes.

For the purpose, the data of 417 respondents has been collected from medium-sized manufacturing sector SMEs of Pakistan. This study employs a survey technique by using the cluster sampling approach. The respondents of this study are chief executive officers and senior management officials from medium-sized manufacturing firms of Pakistan. The direct and indirect relationship hypotheses have been analyzed through structural equation modeling (Smart-PLS). The findings of this study support all the direct relation hypotheses and also highlight that absorptive capacity and corporate entrepreneurship mediate all relationships between IT capability dimensions and SMEs performance outcomes. These results indicate that the dimensions of IT capability play a critical role in attaining the high level of innovation and firm performance. It has also been inferred from the findings that the firms also need to focus on the sequential role of absorptive capacity and corporate entrepreneurship. In the end, this study proposes potential avenues for future research regarding the firm performance and the role of IT in current business environment.

Keywords: Information Technology (IT) Capabilities, Absorptive Capacity, Corporate Entrepreneurship, Innovation Performance, Firm Performance.

ABSTRAK

Perusahaan kecil dan sederhana (PKS) dianggap sebagai tulang belakang kepada aktiviti ekonomi. Firma-firma ini memainkan peranan penting dalam merangsang sistem ekonomi negara-negara maju dan negara-negara membangun dengan mencapai sasaran pertumbuhan negera. Walaupun sumbangan besar PKS dalam pembangunan ekonomi, firma-firma ini menghadapi cabaran dengan kadar kegagalan yang tinggi, terutamanya di negara-negara membangun. Faktor utama yang menyumbang kepada kegagalan adalah kurang pengetahuan tentang kegunaan teknologi maklumat. Dengan cara ini, sumbangan terhadap PKS terus menurun, terutamnya dalam sector perkilangan di negara-negara yang sedang membangun. Dalam era teknologi semasa, keupayaan teknologi maklumat (IT) dianggap sebagai alat yang kompetitif. Bagaimanapun, mekanisma yang mendasari keupayaan IT dalam mempengaruhi prestasi syarikat masih tidak jelas dan harus dikaji lagi. Tambahan pula, penyelidikan mengenai keupayaan penyerapan dan keusahawanan korporat masih belum di periksa secara integratif terhadap prestasi inovasi sesebuah firma, sementara itu kurangnya kajian dalam meneroka hubungan antara langkah-langkah prestasi ini.

Berdasarkan *resource-based view*, dan pandangan dari *dynamic capability*; kajian ini menyumbang kepada kesusasteraan semasa dengan menganalisis secara empirikal model teori bersepadu yang menjelaskan bagaimana dimensi IT (fleksibiliti infrastruktur IT, kemahiran teknikal IT, integrasi IT dan penyelarasan perniagaan IT) berupaya meningkatkan prestasi inovasi firma dan prestasi firma keseluruhanya melalui keupayaan penyerapan dan keusahawanan korporat. Tambahan pula, kajian ini menyumbang dengan menyiasat perantaraan berturutan bagi keupayaan penyerapan dan keusahawanan korporat antara dimensi-dimensi kemampuan IT dan prestasi PKS.

Untuk tujuan ini, data 417 responden dikumpulkan daripada PKS sektor perkilangan sederhana di Pakistan. Kajian ini menggunakan teknik tinjauan pensampelan berkelompok. Responden kajian adalah ketua pegawai eksekutif dan pengurus kanan dari firma perkilangan sederhana di Pakistan. Hipotesis hubungan langsung dan tidak langsung telah dianalisis menggunakan *Smart-PLS*. Penemuan penyelidikan kajian ini menyokong semua hipotesis dan juga menekankan bahawa kapasiti penyerapan dan keusahawanan korporat memeterai semua hubungan antara dimensi kemampuan IT dan prestasi PKS. Selain itu, prestasi inovasi juga terbukti menjadi pengantaraan antara hubungan keupayaan penyerapan dan keusahawanan korporat dengan prestasi firma. Hasil ini menunjukkan dimensi keupayaan IT memainkan peranan penting dalam mencapai inovasi dan prestasi firma, selain itu firma juga perlu memberi tumpuan kepada peranan yang berurutan iaitu kapasiti penyerapan dan keusahawanan korporat. Untuk kajian masa depan, kajian ini mencadangkan pendekatan berpotensi yang boleh membantu PKS dalam mencapai prestasi tinggi.

Kata Kunci: Keupayaan Teknologi Maklumat, Keupayaan Menyerap, Keusahawanan Korporat, Prestasi Inovasi, Prestasi Firma.

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LIST OF ABBREVIATIONS

Abbreviation	Term
IT	Information Technology
SMEs	Small And Medium Enterprises
SMEDA	Small And Medium Enterprises Development Authority
RBV	Resource-Based View
ITINF	Information Technology Infrastructure Flexibility
ITTS	Information Technology Technical Skills
ITING	Information Technology Integration
ITALI	Information Technology Alignment
AMOS	Analysis of Movement Structure
PLS	Partial Least Square
FP	Firm Performance
IP	Innovation Performance
IS	Information System
ACAP	Absorptive Capacity
CE	Corporate Entrepreneurship
APEC	Asia Pacific Economic Cooperation
GDP	Gross Domestic Products
LSM	Large Scale Manufacturing
ROA	Return on Assets
ROS	Return on Sale
ROE	Return on Equity
CEO	Chief Executive Officer
ICT	Information Communication Technology
R&D	Research and Development
NPD	New Product Development
SPSS	Statistical Package for Social Sciences
CFA	Confirmatory Factor Analysis
PACAP	Potential Absorptive Capacity
RACAP	Realized Absorptive Capacity
MM	Measurement Model
SM	Structural Model
INNOV	Innovation

SREN	Self-renewal
PROA	Pro-activeness
NBV	New Business Venturing
ACAC	Accusation
ACAS	Assimilation
ACTR	Transformation
ACEX	Exploitation
SEM	Structural Equation Modeling

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

This chapter provides an overview of the current thesis by presenting the background and purpose of this research. It discusses the problem statement underpinning this dissertation along with the research objectives of the study. A summary of thesis layout has been provided at the end of the chapter.

1.1 Study Background

In several countries of Asia, such as China, India, Taiwan, Indonesia, and etc., the economic system is formed by Small and Medium Enterprises (SMEs). These countries are achieving economic growth targets by bringing SMEs into their mainstream economic activities (Gill & Biger, 2012; Poole, 2018). Currently, SMEs are becoming more innovative compared to large firms and are considered inevitably crucial for economic development (Kirby & Watson, 2017; Noori, Nasrabadi, Yazdi, & Babakhan, 2017). But On the other hand, these firms are also facing survival and performance issues that are needed to be addressed if we keep the economic importance of SMEs under consideration.

In today's era of advanced technology, if an organization wants to enhance its performance and gain the competitive advantage, it needs to remain equipped with state of the art technology and utilize the information technology (IT) to its full potential. So, in order to enhance the performance, SME's must develop the information technology (IT) capabilities (Bianchi, Glavas, & Mathews, 2017; Uwizeyemungu, Raymond, Poba-Nzaou, & St-Pierre, 2018). Despite the abundance of empirical research evidence and studies regarding SME's, very little is known about the relationship between IT and SMEs performance outcomes. In the field of strategic management, the researches, in their studies, mainly have focused on the large firms (Bharadwaj, 2000; Tanriverdi, 2005; Zhao & Priporas, 2017) and very limited researches have analyzed the effects of IT on SME's performance and where it was done, it's done without consideration of actual core issues

that normally arise in SME's (Neirotti & Raguseo, 2017; Soto-Acosta, Popa, & Martinez-Conesa, 2018). The studies on SMEs performance were characteristically based on the models and theories that were developed for large firms, but the characteristics of IT utilization in SMEs are different as compared to larger firms. Therefore, understanding how IT assists SMEs to achieve a competitive advantage is somewhat inscrutable (Palacios-Marqués, Soto-Acosta, & Merigó, 2015). Accordingly, the perspective of adopting and utilizing IT to increase SMEs performance has become an important research agenda in the fields of strategic management and information system (Benitez, Castillo, Llorens, & Braojos, 2018; Popovič, Puklavec, & Oliveira, 2019).

Over the last two decades, IT has been considered as a key resource for business competitiveness (Popovič et al., 2019; Tzokas, Kim, Akbar, & Al-Dajani, 2015) and this consideration clearly indicates that IT resources are critical in attaining high business performance. A huge number of firms have started adopting and utilizing IT resources as it has now been considered an essential element for business sustainability and growth. For instance, IT resources usage increased by 8% in 2011 as compared to 2010 and the estimated expenditure on IT resources, all over the world, had reached up to the US $ 3.7 trillion in the year 2011. This rate has been continuously increasing since then and is expected to increase more in the future (Pearlson, Saunders, & Galletta, 2016). The purpose of such a huge expenditure on IT resources is to develop and enhance the firm's IT capabilities. The constructs of IT capabilities are firm-specific and they represent the firm's ability to mobilize and deploy the IT-related resources and their capacity to influence other firm's resources to enhance the several business performance indicators (Bharadwaj, 2000; Davenport & Short, 2003; Nevo & Wade, 2010) such as, firm performance (Uma & Roger, 2003) and innovation performance (Lyver & Lu, 2018; Trantopoulos, von Krogh, Wallin, & Woerter, 2017). In this regard, the contribution of IT capabilities, in the achievement of the firm's goals and gaining competitive advantage,

should be recognized irrespective of the size and type of business. According to Ray, Muhanna, and Barney (2005) and Bharadwaj (2000), there are four dimensions of IT capabilities; IT infrastructure flexibility (ITINF), IT technical skills (ITTS), IT integration (ITING) and IT alignment (ITALI), where each of these dimensions has a fundamental role in enhancing business performance of the firm.

Based on the Resource-based View (RBV), the existing literature demonstrates the significant positive association between IT capabilities and performance of SMEs (Cragg, Mills, & Suraweera, 2013; Ling, 2017; Rivard, Raymond, & Verreault, 2006). However, the underlying mechanisms through which IT capabilities enhance the performance of the business are not clear (Chen, Wang, Nevo, Benitez-Amado, & Kou, 2015; Wang et al., 2013). Pertinent to this gap, there is a need to provide a compelling explanation of how IT capability dimensions improve SMEs performance through different intervening mechanisms. In the field of management sciences, the mediating mechanisms help in finding out the logical relationship between the predictor and the dependent variable. The intervening mechanisms offer a clear picture of processes through which IT capabilities enhance SMEs performance (Melville, Kraemer, & Gurbaxani, 2004; Raymond, Bergeron, Croteau, & St-Pierre, 2016). Therefore, the relationship between IT capability dimensions and SMEs performance in a dynamic business environment is better understood when tested through these intervening mechanisms.

A huge body of literature emphasizes the importance of adopting the dynamic approach for the firms that tend to utilize the IT capabilities and thus examining the processes by which IT adds value to the firms that are operating under today's rapidly changing business environment (Kohli & Grover, 2008). Dynamic capability view (DCV) explains the procedures of how the firm's other capabilities are redeployed and

reconfigured to utilize various business opportunities (Teece, Pisano, & Shuen, 1997). In order to explain the underlying mechanism, one needs to understand that the knowledge resources and entrepreneurial activities play a critical role between IT capability dimensions and performance outcomes. For instance, IT capabilities help the firms to assess the external knowledge (Soto-Acosta et al., 2018; Soto-Acosta, Popa, & Palacios-Marqués, 2017) and in turn, such knowledge supports the firms to engage in entrepreneurial activities (Hulland, 1999), which then in return, improves the innovation performance and firm performance (Lyver & Lu, 2018; Rehman, Nor, Taha, & Mahmood, 2018).

This study specifically aims to empirically investigate the integrated sequential mediation model through two dynamic capabilities; absorptive capacity (ACAP) and corporate entrepreneurship (CE). Although over the last two decades, the absorptive capacity and corporate entrepreneurship constructs have been given substantial academic consideration (Lane, Koka, & Pathak, 2006; Limaj & Bernroider, 2019; Zhai et al., 2018) but still, there are some underdeveloped research areas for example, limited studies have analyzed the absorptive capacity and corporate entrepreneurship in the context of SMEs (Flatten, Greve, & Brettel, 2011; Lyver & Lu, 2018). SMEs are different from larger firms in managing their knowledge resources and entrepreneurial activities.

1.2 Role of Absorptive Capacity and Corporate Entrepreneurship

It has been asserted that dynamic capabilities have an important role as an intervening mechanism between IT capabilities and business performance (Mithas, Ramasubbu, & Sambamurthy, 2011). By providing a conceptual foundation in the assessment of intervening mechanism, absorptive capacity (Zahra & George, 2002) and corporate entrepreneurship (Simsek & Heavey, 2011; Teece, 2014) are introduced as

dynamic capabilities in order to analyze the indirect effect in between IT capability dimensions and SMEs performance.

In the field of management studies, absorptive capacity (ACAP) is considered as an important component which improves innovation performance and performance of a firm (Zhai et al., 2018; Zou, Ertug, & George, 2018) and is defined as the firm's ability to identify the new external information, its assimilation and to apply this information in commercial end (Zahra & George, 2002). The Scholars have characterized ACAP as a crucial dynamic capability pertaining to knowledge creation and its utilization in knowledge-based competition, which can help the firm to gain and sustain the competitive advantage (Malhotra, Gosain, & El Sawy, 2005; Mennens, Van Gils, Odekerken-Schröder, & Letterie, 2018).

Analyzing the ACAP as a mediator is a critical concern for businesses since the firms face constant pressure to improve their knowledge related skills and competencies. It is important for the firms to take benefit from acquiring and exploiting knowledge resources in order to stay competitive and perform well (García-Morales, Bolívar-Ramos, & Martín-Rojas, 2014; García-Morales, Ruiz-Moreno, & Llorens-Montes, 2007; Huang, Lin, Wu, & Yu, 2015). It is an essential learning ability to perceive information and gain knowledge through the resources inside as well as outside the firm's boundaries. ACAP must be based on the prior related knowledge upon which a firm acquires and builds up its expertise so, as a result, the firms may be able to act more swiftly on novel ideas or new information and knowledge (Cohen & Levinthal, 1990; García-Sánchez, García-Morales, & Martín-Rojas, 2018). The IT capabilities play a key role in development and strengthening of the knowledge domain of a firm (Lee, Lee, & Pennings, 2001; Roberts, Galluch, Dinger, & Grover, 2012). Hence, in order to have a comprehensive understanding of how each IT capability dimension affects different performance

indicators of the firm, it is essential to analyze ACAP as an intervening mechanism between IT capability dimensions and performance outcomes.

The IT capabilities are also considered as essential antecedents of corporate entrepreneurship (CE) activities and play a critical role in supporting CE activities (Chen et al., 2015; Rehman et al., 2018). CE for a firm largely depends upon the relevant, reliable timely availability of information which is attributed to IT capabilities. In addition to it, Davidson, White, and Taylor (2012) and Giudice Del and Straub (2011) argue that "IT capability enables contemporary entrepreneurial endeavors", the firms with high levels of CE activities tend to invest more in innovation, new business domain exploration, and process redefinition; all before mentioned greatly enhances the firm's performance. CE is the firm's overall effort towards venturing, pro-activeness, innovation and renewal activities and it undertakes new opportunities to deploy and extend the firm's resources (Zahra, 1996). Firms that exhibit CE are typically viewed as dynamic thus always willing to take advantage of new business opportunities whenever they arise (Goodale, Kuratko, Hornsby, & Covin, 2011; Simsek & Heavey, 2011). In the context of SMEs, the CE activities have been directly linked to a firm's imperative outcomes such as profitability, growth (Heavey & Simsek, 2013; Phan, Wright, Ucbasaran, & Tan, 2009) and innovation performance (Chen et al., 2015; Lyver & Lu, 2018). On the basis of the current literature, CE appears to offer a conceptual association between IT capabilities and performance outcomes.

Moreover, ACAP helps to explain the relationship between IT capabilities and CE. Focusing on the dynamic capability view (DCV), IT capabilities enrich the understanding for new competitive actions by improving the coordination, implementation, and exchange of knowledge that flows across firm's boundaries (Malhotra et al., 2005; Roberts et al., 2012). Zahra and George (2002) argued that

"absorptive capacity influences the firm's ability to create and deploy the knowledge necessary to build other organizational capabilities". The positive role of ACAP has been recognized in escalating entrepreneurial activities, as the enhanced knowledge flows across the firms consequently enable them to adapt the changing business needs for the development of products and services, and to initiate new ventures and self-renewal activities (Zahra, Gedajlovic, Neubaum, & Shulman, 2009). The firms that acquire and exploit knowledge from various external sources and deploy this knowledge to support CE activities, those firms mostly succeed in gaining the competitive advantage and in improving their various performance indicators. Hence, the current framework explains the IT capability dimensions' impact on SMEs performance outcomes through sequential mediation role of ACAP and CE in a dynamic business environment. In addition, absorptive capacity and corporate entrepreneurship also contribute to the firm's performance through innovation performance (Chen, Lin, & Chang, 2009; De Zubielqui, Jones, & Lester, 2016; Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011). As such, the assimilation and exploitation of new knowledge help in the effective introduction of the new processes, products or services (Zahra & George, 2002), that in turn lead to better performance for the firm over time (Kostopoulos et al., 2011).

The firms with the high level of CE embrace and try new resource combinations, search for novel ideas, engage in innovative thinking, improve operational processes and actively leverage the insights about the market, which improve the innovation outcomes (Dess & Lumpkin, 2005; Laursen & Salter, 2006) that in return help the firms to achieve high level of revenue, growth and profitability (Roberts & Amit, 2003; Srinivasan, Pauwels, Silva-Risso, & Hanssens, 2009). It is important to note that CE and innovation performance is conceptually and empirically different concepts despite their apparent similarity in terms of being the dimensions of innovation (Crossan & Apaydin, 2010).

1.3 Problem Statement

The main concern in the existing literature of information system and strategic management originate a demand for relevant and rigorous theoretical models to conduct empirical studies (Mikalef & Pateli, 2017; Wheeler, 2002). Ex-ante strategic management and information system research examines the relationships between IT investment and performance of the firm (Bharadwaj, 2000; Mithas & Rust, 2016) and antecedents of IT usage (Venkatesh, Thong, & Xu, 2016; Zhu & Kraemer, 2005). However, limited studies have considered the dimensional role of IT capabilities in relation to different performance indicators of the firm, particularly, in the context of developing nations. Therefore, it is essential to develop an integrated theoretical framework to examine the relationship between IT capability dimensions and SMEs performance outcomes.

The role of IT in terms of developing other capabilities of the firms is an under-researched area hence, understanding of the concept has not been developed well (Karimi, Somers, & Bhattacherjee, 2007). Additionally, SMEs literature highlights that there is a need to develop a comprehensive framework with different category of business performance-related variables, as this perspective will enhance the current discussion and contribute towards existing research regarding SMEs performance. Comparatively, there is a dearth of knowledge about how IT capabilities affect the SMEs performance and the underlying mechanism, through which IT capability dimensions affect the SMEs performance, is also not yet clear. In addition, earlier studies have prioritized their research on IT capabilities by focusing mostly on multinational organizations or larger firms, however, limited studies have put attention on the role of IT capabilities in manufacturing sector of SMEs. These studies on SMEs performance were based on models that were developed for larger firms without even considering the actual sphere of issues that arise SMEs.

In the time of knowledge economy, globalization, and demand for innovation; firms continuously face the performance issues due to lack of external knowledge and information management skills and for this reason, SMEs may not be able to reap the benefit out of proper utilization of such knowledge and information in order to enhance the firm's performance. In this regard, knowledge is considered as the strategic resource and the firms should develop ACAP as it is an imperative component for the business success that allows the firms to absorb outside knowledge and assists the firms to comprehend customers' expectations. Such external knowledge is facilitated by the implementation of IT capabilities which consequently affects the SMEs performance.

Parallel to ACAP, as an underlying mechanism between IT capabilities and SMEs performance, CE provides a competitive advantage by ensuring the firm's survival. However, due to the lack of entrepreneurial activities, the firms are unable to cope with rising demands to improve the products and services, to monitor the customer's preferences and to introduce new ventures. Hence, it is needed to analyze, empirically, the effect of IT capability dimensions on SMEs performance by employing ACAP and CE as underlying mechanisms in one framework.

SMEs are inevitably crucial for economic development and are considered as the backbone of an economy (Ayandibu & Houghton, 2017; Zivic, Grujovic, & Miljojkovic, 2018). Therefore, SMEs have not only been prioritized by the government but also remain in the mainstream of business activities. However, even after considerable efforts and noteworthy initiatives by the government of Pakistan, like empowering SMEDA and SME banks for the service and support of this sector, it is still striving for survival and facing low-performance issues. Particularly, the manufacturing sector SMEs in Pakistan are less innovative and facing low-performance issues as compared to other countries in the South Asian region. One of the basic reasons for its low-performance may be the lack

of IT capabilities utilization that helps to ensure SMEs competitiveness and growth. Therefore, the utilization, development, and implementation of IT capabilities are essential for SMEs performance outcomes.

An emerging literature body analyzes the effect of IT capabilities on performance outcomes (Chae, Koh, & Park, 2018; Lyver & Lu, 2018). However, this literature still lacks an integrated investigation of innovation as well as firm (overall) performance measures, while extent literature falls short in exploring the interrelation between these performance outcomes. Therefore, there is a need for combinative examination of innovation as well as firm performance outcomes of absorptive capacity and corporate entrepreneurship.

1.4 Objectives of the Study

The main objective of the current study is to build up and empirically investigate the integrative model based on multiple theories by evaluating IT capability dimensions, absorptive capacity, corporate entrepreneurship and, SMEs performance. The conceptualization of four different streams of literature: entrepreneurship, information system, knowledge management, and strategic management are integrated through utilizing the resource-based view and dynamic capability view as a combined complement. Thereby the present study analyses the effect of IT capability dimensions (IT infrastructure, IT technical skills, IT integration, IT alignment) on two performance outcomes of SMEs; innovation performance and firm performance with consideration of intervening role of absorptive capacity and corporate entrepreneurship. The main reason for conducting this research in the first place is to find the missing intervening mechanisms, used in this study, along with the association of IT capabilities and that will probably serve as the solution for the problematic and less focused areas as highlighted in SMEs.

Therefore, the objectives of the study are:

RO1: To examine the effect of IT capabilities on absorptive capacity.

- RO1a: To examine the effect of IT infrastructure flexibility on absorptive capacity
- RO1b: To examine the effect of IT technical skills on absorptive capacity
- RO1c: To examine the effect of IT integration on absorptive capacity
- RO1d: To examine the effect of IT alignment on absorptive capacity

RO2: To examine the effect of IT capabilities on corporate entrepreneurship.

- RO2a: To examine the effect of IT infrastructure flexibility on corporate entrepreneurship
- RO2b: To examine the effect of IT technical skills on corporate entrepreneurship
- RO2c: To examine the effect of IT integration on corporate entrepreneurship
- RO2d: To examine the effect of IT alignment on corporate entrepreneurship

RO3: To examine the effect of absorptive capacity on corporate entrepreneurship.

RO4: To examine the effect of absorptive capacity on innovation performance.

RO5: To examine the effect of absorptive capacity on firm performance.

RO6: To examine the effect of corporate entrepreneurship on innovation performance.

RO7: To examine the effect of corporate entrepreneurship on firm performance.

RO8: To examine the effect of innovation performance on firm performance.

RO9: To find out the mediating effect of absorptive capacity?

- RO9a: To find out the mediating effect of absorptive capacity between IT capabilities and corporate entrepreneurship?
- RO9b: To find out the mediating effect of absorptive capacity between IT capabilities and SMEs performance outcomes?

RO10: To find out the mediating effect of corporate entrepreneurship?

- RO10a: To find out the mediating effect of corporate entrepreneurship between IT capabilities and SMEs performance outcomes?
- RO10b: To find out the mediating effect of corporate entrepreneurship between absorptive capacity and SMEs performance outcomes?

Based on the objective of the study, it is important to find out the answers to the following overarching research questions, in order to measure the performance of SMEs.

RQ1: To examine the effect of IT capabilities on absorptive capacity.

- RQ1a: What is the effect of IT infrastructure flexibility on absorptive capacity?
- RQ1b: What the effect of IT technical skills on absorptive capacity?
- RQ1c: What is the effect of IT integration on absorptive capacity?
- RQ1d: What is the effect of IT alignment on absorptive capacity?

RQ2: What is the effect of IT capabilities on corporate entrepreneurship?

- RQ2a: What is the effect of IT infrastructure flexibility on corporate entrepreneurship?

- RQ2b: What is the effect of IT technical skills on corporate entrepreneurship?
- RQ2c: What is the effect of IT integration on corporate entrepreneurship?
- RQ2d: What is the effect of IT alignment on corporate entrepreneurship?

RQ3: What is the effect of absorptive capacity on corporate entrepreneurship?

RQ4: What is the effect of absorptive capacity on innovation performance?

RQ5: What is the effect of absorptive capacity on firm performance?

RQ6: What is the effect of corporate entrepreneurship on innovation performance?

RQ7: What is the effect of corporate entrepreneurship on firm performance?

RQ8: What is the effect of innovation performance on firm performance?

RQ9: Do absorptive capacity mediate the relationships?

- RQ9a: Do absorptive capacity mediate the relationship between IT capabilities and corporate entrepreneurship?
- RQ9b: Do absorptive capacity mediate the relationship between IT capabilities and SMEs performance outcomes?

RQ10: Do corporate entrepreneurship mediate the relationship?

- RQ10a: Do corporate entrepreneurship mediate the relationship between IT capabilities and SMEs performance outcomes?
- RQ10b: Do corporate entrepreneurship mediate the relationship between absorptive capacity and SMEs performance outcomes?

1.5 Significance of the Study

The significance of this study is accounted for providing threefold benefits to academicians, CEOs/managers, and policymakers. Analyzing the effects of IT capability dimensions on performance outcomes of manufacturing sector SMEs in Pakistan are among the main contributions of this study.

Particularly this study offers the following:

1. To analyze the dimensional role of IT capabilities in the context of SMEs performance outcomes. As the IT capability dimensions have a distinctive role in increasing SMEs performance hence, this dimension-wise comprehensive perspective of IT capabilities and SMEs performance will guide the CEOs/managers in the manufacturing sector, as they ought to make an effort in adopting and utilizing more IT resources to enhance the IT capabilities of SMEs.
2. Contributing to the literature of knowledge capabilities and corporate entrepreneurship by analyzing the effect of IT capability dimensions on performance outcomes (innovation performance and firm performance) through both dynamic capabilities (absorptive capacity and corporate entrepreneurship). Furthermore, it examines the mediating role of corporate entrepreneurship between absorptive capacity and SMEs performance outcomes.
3. This study also contributes to the literature of innovation (product, process, market, strategy, and behavior), by investigating the mediating role of innovation performance between dynamic capabilities (absorptive capacity and corporate entrepreneurship) and firm performance. Furthermore, provide the integrated investigation of innovation performance as well as firm (overall) performance measures. In addition, in relation to IT capability dimensions, it fills the gap by exploring the interrelation between SMEs performance outcomes.

4. By following the RBV and DCV, this study provides the theoretical explanation of the sequential role of absorptive capacity and corporate entrepreneurship between IT capability dimensions and SMEs performance outcomes. As IT capability dimensions facilitate knowledge resource (absorptive capacity) which helps the firms to engage in entrepreneurial activities successfully, in return it improves the performance of SMEs. This sequential order of variables explains the mechanism between IT capability dimensions and performance outcomes.
5. This study contributes to the empirical evidence for developing the economy by exploring the dynamic capabilities concept in the context of medium size manufacturing firms. The anticipated collaborative efforts by policymakers may provide avenues for the firms to develop knowledge domains and avail entrepreneurial opportunity to increase competitive performance.

1.6 Small and Medium Enterprises (SMEs) in Pakistan

Currently, SMEs are considered inevitably crucial for economic development around the globe (Cronin-Gilmore, 2012) as they have contributed to almost 85 percent in employment growth rate, from 2002 to 2010, worldwide (De Kok et al., 2011). For a country, by and large, the SMEs help in creating job opportunities, improving the living standards and promoting equal income distribution. Despite of such significant contributions by SMEs in the economy of developing nations, these firms are less innovative and facing performance issues (Ayandibu & Houghton, 2017). Table 1.1 shows the total numbers of firms in Pakistan.

Table 1.1: Number of Firms in Pakistan

Country	No. of SMEs	Large Firms	Total No. of Firms
Pakistan	3.02 m	0.2 m	3.04 m

Source: SMEDA, (2007)

In the region of South Asia, the SMEs of Pakistan are significantly contributing towards the economy of the county; conversely, manufacturing sector firms are less innovative as compare other countries in this region. Particularly, the contribution of manufacturing sector SMEs of Pakistan in the Gross Domestic Products (GDP) is gradually decreasing (Dar, Ahmed, & Raziq, 2017). By recognizing the significance of SMEs from national as well as a global perspective, the Government of Pakistan has been taking a keen interest in the development of small and medium-sized businesses and has established the SME Bank (SMEB) and the Small-Medium Enterprise Development Authority (SMEDA) for the welfare of this particular sector. The official authority promoting the SMEs is SMEDA which is devising business strategies and providing finance to SMEs. The total number of SMEs makes up 98% of establishments which contribute nearly 30% of the Gross Domestic Product (GDP), provides 35% value addition and 25% are accountable for the larger portion of exports (Ali, 2013; Khan, Awang, & Zulkifli, 2013; Saleem et al., 2011). Table 1.2 shows the contribution of SMEs in Pakistan's overall GDP, value addition and exports earning.

Table 1.2: Economic Importance of SMEs in Pakistan

Employment	GDP	Value Added	Export Earning
78% (6.8 million)	30%	35%	25%

Source: SMEDA, (2007)

The definition of the term 'SME' is considered as same in general, but it varies across countries sometimes and it also depends upon different situations across the country. Thereby it is important to establish its definition in the context of Pakistan. According to SMEDA, a business is considered as SME if (a) it has up to 250 employees; (b) annual sales up to 250 million rupees; and (c) paid-up capital up to 25 million rupees. In the

manufacturing sector, the firms having up to 50 employees are classified as small manufacturing firms, whereas those with more than 50 employees and less than or equal to 250 employees are considered to be medium-sized manufacturing firms. Similarly, firms that have less than 10 employees and paid-up-capital up to 2 million rupees are regarded as micro firms. Table 1.3 shows the SME definition used in Pakistan by different institutions.

Table 1.3: SME Definition in Pakistan Used by Institutions

Enterprise Category	Employment Size	Annual Sales	Capital
Small & Medium Enterprise	Up to 250 employees	Up to Rs 250 million	Up to RS 25 million

Source: SMEDA, (2007)

In Pakistan, besides SMEDA, some other institutions like SME banks, The Federal Bureau of Statistics, the State Bank of Pakistan (SBP) and provincial industrial development departments have presented various definitions. Hence, there is no specific definition of all SMEs in the context in Asia. So, the number of employees and total revenue help to define SMEs (Hilmi, Ramayah, Mustapha, & Pawanchik, 2010). A detailed summary of definitions in the context of the World Bank and Asia-Pacific Economic Cooperation (APEC) is shown in Tables 1.4, and 1.5.

Table 1.4: SME Definitions by World Bank

SMEs	Employees	Assets	Annual Sales
Micro	Less than 10	Less than $100,000	Less than $100,000
Small	Less than 50	Less than $3 m	Less than $ 3m
Medium	Less than 300	Less than $15m	Less than $15m

Source: World Bank, (2013)

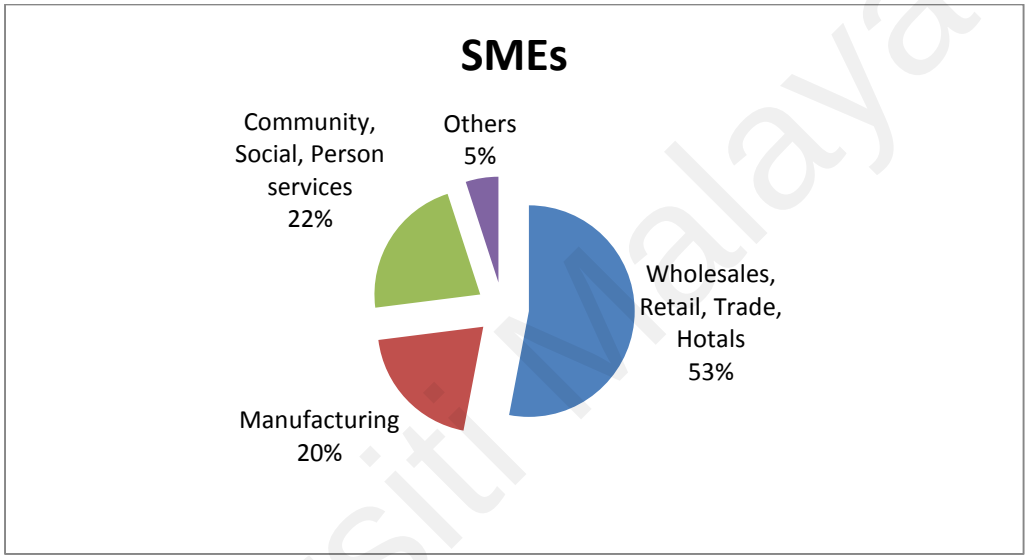
The World Bank defines SMEs by segregating them into three different categories. Micro-sized SMEs comprises less than 10 employees with assets and annual sale less than $100,000. Small-sized SMEs comprise less than 50 employees with annual assets and annual sale less than $3m. Similarly, medium-sized SMEs constitute less than 300 employees with assets and annual sale less than $15m.

Table 1.5: SME Definition in Selected APEC Member Countries

Country	Sector	Measures
Australia	Manufacturing - less than 100 employees Services - less than 20 employees	Employment
Canada	Manufacturing - less than 500 employees Services - less than 50 employees	Employment
China	Normally less than 100 employees	Employment
Indonesia	Less than 100 employees	Employment
Japan	Less than 300 employees, or ¥10 million assets Wholesaling - less than 50 employees, ¥30 million assets Retailing - less than 50 employees, ¥10 million assets	Employment Assets
Korea	Manufacturing - less than 300 employees Services - less than 20 employees	Employment
Malaysia	Varies - less than RM 2.5 million and less than 75 employees. Definitions are for SMI. Different from Bumiputera enterprises	Shareholders, Funds Employees
Philippines	Less than 200 employees P 40 million	Employment Assets
Singapore	Manufacturing: less than $12 million in fixed assets Services: less than 100 employees	Employment Fixed Assets
USA	Less than 500 employees	Employment

There are approximately 3.2 million businesses in Pakistan (SEMEDA, 2011). Among total the businesses in Pakistan, 98% (3.136 million) are SMEs, while 2.94 million are establishments and 0.19 million are household-based (Sharafat, Rashid, &

Khan, 2014). In Pakistan, the businesses like wholesale, hotel, retail, and trade constitute 53% of SMEs with a major contribution to the economy, whereas personal, social and community services constitute 22% of SMEs. The third major sector that makes a large contribution to GDP in the manufacturing sector, which is 20% of overall SMEs. The remaining 5% of SMEs are related to other sectors such as construction and mining. Figure 1.1 shows the sectoral distribution of SMEs in Pakistan.



Source: SMEDA, (2007)

Figure 1.1: Sectoral Distribution of SMEs

1.6.1 Manufacturing Sector SMEs in Pakistan

It is important to note that the Large Scale Manufacturing (LSM) sector in Pakistan grew at the rate of 7.1% from 1947 to 2010 with full support and perseverance of the government whereas, without any serious attention paid by the government, the SMEs firms showed a growth rate of 5.6% in the same time period (SMEDA, 2010). Such lack of attention by the government can be viewed as evidence that the country was devoid of proper sources in terms of data on SMEs except for the Census of Establishment in 1985 (Khurrum S. Bhutta, Rana, & Asad, 2008). However, due to the stagnant growth of the LSM sector, different initiatives like SME bank and SMEDA were taken by the Government of Pakistan to enhance the growth of SMEs.

SMEs in the manufacturing sector contributes significantly to economic growth by providing supportive services to large firms (Terziovski, 2010). The manufacturing sector has a high ratio of contribution, compared to the services sector in terms of the total number of establishments as the manufacturing sector contributes 30% to the economy with 19.72% of establishments and provides employment to 80% of the non-agricultural labour force.

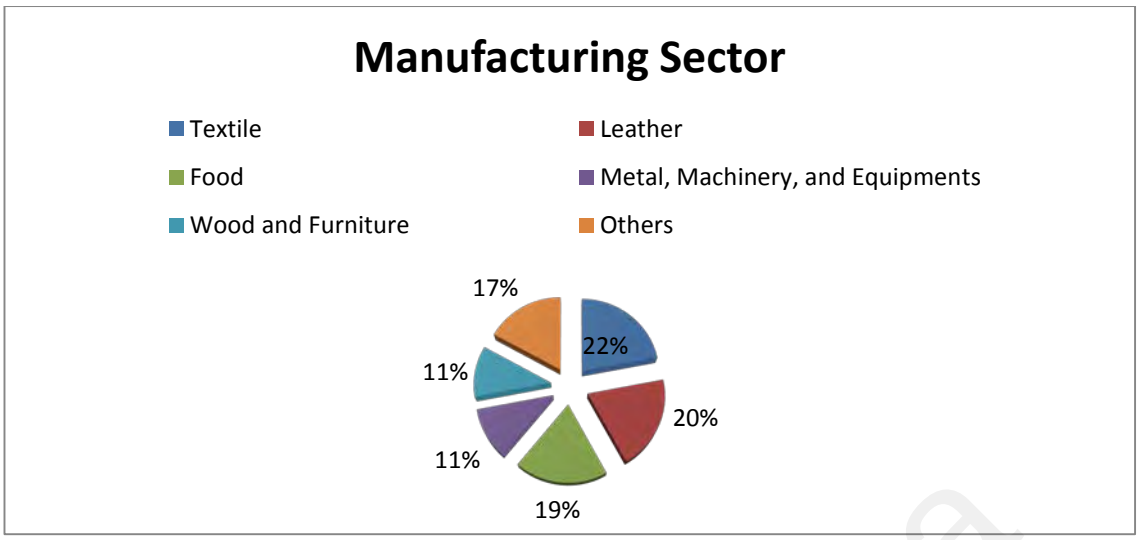
Table 1.6 represents the total numbers of establishments by manufacturing. The manufacturing sector is appropriate for this study because it is one of the major contributors to the economy and one of the most responsive sectors in response to globalization (Shankar, Kannan, & Kumar, 2017). The total numbers of manufacturing SMEs are more than 0.59 million in Pakistan.

Table 1.6: Number of Establishments by Manufacturing Sector

Sector	Micro	Small	Medium	Total SMEs	% of total SMEs
Manufacturing	521,128	61,506	14,722	597,356	19.82

Source: SMEDA, (2013)

Unlike other sectors, Pakistan's manufacturing sector is highly diversified. The major contribution to the manufacturing sector is from; textile, wearing apparel, and leather industry which contributes nearly 42%, while, food, beverage, and tobacco stand at second with 19% share in manufacturing sector, along this metal, machinery, and equipment consist the 11% share, followed by wood products as 11% and others are 17% of the total manufacturing sector. Figure 1.2 presents the industry-wise distribution of manufacturing SMEs in Pakistan.



Source: SMEDA, (2007)

Figure 1.2: Manufacturing Sector Distribution

These manufacturing SMEs are distributed among the provinces as 65% in Punjab, 18% in Sindh, 14% in KPK (Khyber Pakhtunkhwa), and 3% in Baluchistan and the capital city Islamabad (Federal Bureau of Statistics, 2012). Table 1.7 presents the total number of SMEs establishments by states.

Table 1.7: Number of SME Establishments by State

State	Total SMEs (000)	%
Punjab	1,970	65.25
Sindh	534	17.80
KPK	426	15.40
Baluchistan	62	2.75

Source: SMEDA, (2013)

The total number of registered medium-sized businesses in Pakistan is 14,722 (SEMEDA, 2013), and the total number of medium size SMEs in seven districts of Punjab are 8,623. However, very few government directories provide a complete list of SMEs in the manufacturing sector of Pakistan. In this study, the data was obtained from SMEDA and the Department of Statistics. Out of the four provinces in Pakistan, Punjab has the

maximum number of SMEs, with 65.25%. Table 1.8 presents the total number of registered medium-sized manufacturing industries by province.

Table 1.8: Registered Medium-Sized Manufacturing Industries by Province

State	Total No. of Manufacturing Sector
Punjab	9,606
Sindh	2,623
KPK	2,092
Baluchistan	308
Total	**14,722**

Source: SMEDA, (2013)

1.6.2 SMEs Performance

Over the last two decades, these two different performance outcomes of SMEs are a highly focused area for the researchers. However, current literature lacks information about investigating the interrelation between these performance outcomes. Furthermore, the empirical studies concerned with innovation outcomes treat them as a dependent variable, while, limited studies consider it as a mediator for performance (De Zubielqui et al., 2016; Soto-Acosta et al., 2017).

Several theoretical arguments support the positive role of innovation on firms' (overall) performance. First, due to impulsive consumer preferences and shifting customer demands, firms that introduce innovative products with advanced capabilities and features, are more likely to remain up to date and achieve higher levels of sales and firm growth (Srinivasan et al., 2009). Such firms possibly achieve early or first-mover advantages that have been related to higher long-term firm profitability (Roberts & Amit, 2003). Additionally, Jansen, Van Den Bosch, and Volberda (2006) highlight that, under different business environmental conditions, innovations contribute to performance profitability-based measures. Others studies also suggest related positive effects between innovation and gross profit margin and total sales (Govindarajan &

Kopalle, 2006), or between innovation and future profitability and cash flows (Sorescu, Chandy, & Prabhu, 2007).

1.6.3 Innovation Performance

It is important for SMEs that they enhance different performance indicators to remain competitive and perform well. Innovation is generally regarded as a key element in a firm's competitiveness and its ability to survive in a dynamic business environment (Gumusluoğlu & Ilsev, 2009) and innovation performance of firms is considered as a key factor for SMEs competitiveness (Gronum, Verreynne, & Kastelle, 2012). Through various innovative activities, firms can gain innovation performance (Alegre, Sengupta, & Lapiedra, 2013; Verhees & Meulenberg, 2004).

Wang and Ahmed (2004, p. 304) build on this idea by proposing that innovation performance includes "introduc[ing] new products to the market, or open[ing] up new markets, through combining strategic orientation with innovative behavior and process." This view establishes a wide perspective of innovation performance, which is lacking in earlier studies (Sethi, Smith, & Park, 2001). According to Wang and Ahmed (2004) innovation performance comprises "the introduction of new products to the current market by combining innovative process and behavior with strategic orientation". Wang and Ahmed (2004) propose five dimensions of innovation performance such as product, market, process, behavior, and strategy.

Product innovation defines the development of unique products to meet the customer's needs and provide a competitive advantage. Market innovation is defined as employing a new market strategy to promote current products and introducing the products into new markets to enhance sales. The process innovation consists of employing new approaches and methods to exploit firms' capabilities and resources efficiently and effectively. Strategic innovation refers to the development of novel strategies to create firm values. Lastly, behavioral innovation refers to firms', the management or individual

behavior and attitude towards newness. Both researchers and practitioners realize the importance of innovation as witnessed by thousands of academic papers and numerous business rankings and indices. However, innovation research is fragmented, poorly grounded theoretically, and not fully tested in all areas (Crossan & Apaydin, 2010).

1.6.4 Firm Performance

Along with the innovation performance, this study also analyzes the effect of IT capabilities on firm (overall) performance. Firm performance can be generally defined as the effectiveness and efficiency of a firm (Venkatraman & Ramanujam, 1986). The subjective and objective measures of performance are related to firms' profitability and growth as compared to that of their peer competitors (other SMEs). The financial indicators are normally related to the capability of the firm in profit-making. There is a general consensus that these financial measures are valid and relevant to SMEs performance for instance; ROA, ROE, ROS, market share and growth (García-Morales et al., 2014).

1.7 Research Structure

This study is organized into six chapters. Chapter one provides a brief introduction which deals with the background of the study. It is further comprised of the problem statement, objective of the research, and the importance of SMEs in the context of developing countries like Pakistan. Chapter two includes a detailed literature review from prior researchers who have made a contribution in the context of this study. This chapter unveils the prior literature which provides the grounds for analysing research gaps and problem areas so as to achieve the purpose of this research because it is necessary to understand why IT capabilities are important for the performance of SMEs and with this aim, the theoretical model for this study has been assembled.

Chapter three links all the main elements derived from the literature review and develops the hypothesis for this study. This chapter also provides a comprehensive

theoretical framework that will be tested in later chapters. Chapter four briefly discusses the research methodology which consists of a research plan and includes data filtration, sample size and a pilot study for the detailed research analysis.

Chapter five presents the analysis technique and analyses the data. Furthermore, on the analysis basis, the chapter provides the results of direct relation hypotheses. In addition, this chapter also presents the results of the mediating effects of absorptive capacity and corporate entrepreneurship between IT capability dimensions and two indicators of SMEs performance.

Chapter six concludes this thesis, drawing together key empirical findings in relation to the main research objective and related research questions. This chapter also highlights the distinctive contributions arising from this thesis for practice and research. Limitations of the study and future recommendations are also discussed in this chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The present thesis represents the combination of four different research streams; information system, knowledge management, entrepreneurship, and strategic management. This chapter two provides an extensive existing literature review, showing the significance and relevance of the research questions presented in the first chapter of this thesis. This explanation starts with a review of the resource-based view (RBV), and dynamic capabilities view (DCV) in order to provide a clear understanding of the major theories supporting this research. Furthermore, this chapter presents a comprehensive and relevant literature review of information technology (IT) capabilities, absorptive capacity, and corporate entrepreneurship. In the strategic management literature, RBV and DCV view are the dominant theories to explain the relationship between IT capabilities and business performance with the mediating effect of absorptive capacity and corporate entrepreneurship in a dynamic business environment. Based on the relevant theories this chapter presents an integrative theoretical framework. In the end, a summary of this chapter is presented.

2.2 Theoretical Conceptualization

2.2.1 Resource-Based View

In strategic management and information system (IS) literature, RBV is regarded as a dominant theory. According to this theory, firms compete through key resources owned by them. Initially, the purpose of RBV was to identify situations in which firms are able to achieve a sustainable competitive advantage (Barney, 1986; Rumelt & Lamb, 1997; Wernerfelt, 1984). However, later on, researchers extended RBV and added a few other elements to understand the variation in the performance of firms (Miller & Shamsie, 1996; Schroeder, Bates, & Junttila, 2002). Milgrom and Roberts (1995) provide a

complementary concept to clarify the importance of resources for business performance. RBV not only presents the conceptual support (Barney, 1991; Peteraf, 1993) but also in the extant literature of organizations, the RBV gains the significant empirical support (Barney, 2001; Newbert, 2007).

According to Barney (1991), the firm's resources can create a competitive advantage which is valuable, rare, inimitable and non-substitutable in nature and as a result, the performance improves. These resources explain the performance variation between competing firms. Firm's valuable resources enhance the effectiveness of routine procedure by increasing efficiency and providing support to the firm's management activities. Such resources can also be utilized to explore opportunities around the firm's business environment. When the firm's resources are rare, limited in number and unable to be possessed by other firms easily, then they are considered as valuable resources (Barney, 1991).

The scholars of strategic management (Miller & Shamsie, 1996; Teece et al., 1997) argued that in the RBV the source of advantage comes from two broad categories. The first one is resources that represent assets of a firm, which are used in the form of inputs in various organizational procedures. The other source is the capabilities related to the firm's capacity for combining, developing, and using resources so as to create a competitive advantage. Based on this conceptualization as capabilities are the combination of different resources, the formation process of these capabilities is highly complex and difficult to replicate owing to path dependence. The phenomena of time lag is also a main concern e.g. the long time required to determine how a capability can be developed. Furthermore, economic conditions also restrict to copy a capability as it involves a heavy investment in the core resources (Amit & Schoemaker, 1993; Dierickx & Cool, 1989). Hence, only those types of capabilities provide the competitive

advantage sources which are valuable, unique, immobile, and non-substitutable in nature (Bhatt, Wang, & Rodger, 2017; Makadok, 2001).

2.2.2 Firm Competitive Advantage

According to Porter and Millar (1985), firms gain a competitive advantage when they employ value-creating strategies and policies that competitor firms are not currently implementing in their businesses. Therefore, firms gain a competitive advantage through the implementation of superior or similar strategies in a unique way as compared to competitors. Hofer and Schendel (1978) depicted the competitive advantage as *a uniquely occupied place of a firm.* According to, Teece et al. (1997) competitive advantage is fundamental for firm performance. Since it is difficult to imitate a competitive advantage, therefore, it can direct to the long-term performance of the firm. According to Porter and Millar (1985) and Sigalas and Papadakis (2018), the sustained competitive advantage allows organizations to perform above average in the long-run. In the literature, the concepts of sustained competitive advantage, the performance of the firm, and competitive advantage are frequently used in the same direction.

2.2.3 Resource-Based View of IT Capabilities

The Resource-Based View (RBV) proposes that firms can make themselves different from their competitors by utilizing IT capabilities (Graham, Hofer, Donaldson, MacKinnon, & Schafer, 1997; Gupta, Tan, Ee, & Phang, 2018). In the information system (IS) studies, scholars have highlighted several IT-related capabilities which can enable firms to have a competitive advantage. It has been established that it is difficult to acquire or imitate distinctive IT capabilities (Bharadwaj, 2000). Concerning the performance, firms are in a better position to compete if they can manage to come out from the cost trap by developing their IT capabilities. In a comparison of the

contingency-based perspective and RBV, Oh and Pinsonneault (2007) highlight the fact that RBV has a higher predictive capacity in steering the impact of IT capabilities to achieve profit and growth targets for the firms. Table 2.1 presents the studies in relation to IT capabilities and firm performance on the basis of the resource-based view.

Table 2.1: IT Capabilities and Resource-Based View

Author	Methodology	Key Factors	Theory
Fink (2011)	Empirical	IT human capability, IT infrastructure flexibility, business capability, managerial capability, technical capability, and behavioural capability	RBV
Muhanna and Stoel (2010)	Empirical	IT capability, deployment of IT, intangible assets	RBV
Liang, You, and Liu (2010)	Empirical	IT managerial capabilities, IT personnel's knowledge and skills, IT infrastructure flexibility	RBV
Rivard et al. (2006)	Empirical	IT support for firm assets and performance, IT support for the firm strategy	RBV
Huang, Ou, Chen, and Lin (2006)	Empirical	IT resources and capabilities, IT infrastructure flexibility and human-IT resources, IT-enabled intangibles	RBV
Ravichandran and Lertwongsatien (2002)	Empirical	Core competencies, IT human capital, IT infrastructure flexibility, and IT partnership	RBV

Bhatt and Grover (2005) examine IT capabilities within the framework of value, rareness, inimitability, and organization (VRIO) to find out whether firms gain a competitive advantage due to their IT capabilities. Firms require time to develop these IT capabilities that are unique and cannot easily be replaced, thereby; these capabilities fulfill the VIRO requirement of RBV. Several researchers have commonly used RBV to find out how IT-related capabilities help managers in the decision-making process in a complex business environment (Gupta et al., 2018; Lioukas, Reuer, & Zollo, 2016; Nguyen, Newby, & Macaulay, 2015; Uma & Roger, 2003). However, it is not clear

which dimension of IT capabilities specifically provide a competitive advantage and improves performance (Bi, Davison, & Smyrnios, 2015; Wang et al., 2013).

The comprehensive assessment of extant IS and strategic management research discloses two major research streams utilizing the RBV framework to examine the business value of IT. Figure 2.1 presents these streams utilizing the RBV framework.

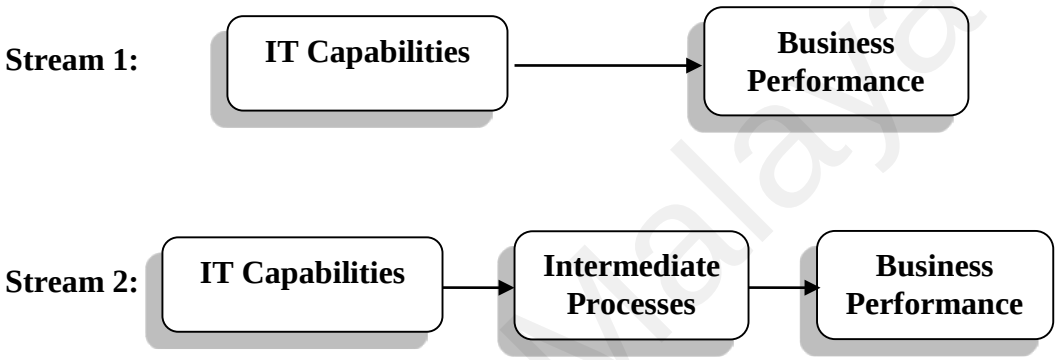


Figure 2.1: Two Streams Utilizing Framework of RBV

Stream 1 suggests that the implementation of IT and its related resources allow the firm to gain performance advantages. Firms tend to enhance their business value by utilizing IT resources effectively and efficiently, as a result, performance is improved as compared to other firms (Armstrong & Sambamurthy, 1999; Mishra, Modi, & Animesh, 2013; Zhu, 2005). It was suggested by Zhu (2005) that the success of IT value in businesses depended on the way how IT capabilities were utilized in business activities. Mishra, Konana, and Barua (2007) argue that the more use of IT in business processes is more likely to develop unique capabilities in a firm which establishes that IT capabilities leverage other non-IT resources or other capabilities to increase performance.

The differences in firms' performance and its outcomes are associated with the differences in the resources utilized by firms, for instance, knowledge resources, technological-based infrastructural resources, and expertise of IT staff. Moreover, firms are unlikely to utilize the same IT resources and capabilities. As a result, variations may cause firms to achieve the low-performance outcome or high-performance outcomes (Lu, Yu, Liu, & Yao, 2003).

Stream 2: Investigates the complementarities effects of IT and other resources of the firm (learning resources & human resources) on the firm performance. Research studies have suggested that IT capabilities are more likely to have a positive impact on business performance when there are complementary firm-level capabilities' in the relationship between IT capabilities and firm performance. These complementary capabilities as intermediating mechanisms allow IT capabilities to be combined in a unique way and enhance the firm's performance (Powell & Dent-Micallef, 1997; Tanriverdi, 2006). IT capabilities do not often create a competitive advantage when utilized alone rather they have a more positive impact when combined with other resources or capabilities (Wade & Hulland, 2004). Scholars should seek something beyond investigating the direct effects of IT capabilities to find out how business processes are leveraged by IT to effectively enhance performance (Pavlou & El Sawy, 2006, 2010). Therefore, it has been advocated that IT business importance may be enhanced to have a synergistic value by re-arranging them with other capabilities to achieve benefits for the firms (Bharadwaj, 2000; Zhu, 2004).

The RBV in the context IS offers valuable insight and develops an understanding of the strategic impact in relation to IT (Clemons, 1991; Wade & Hulland, 2004). The RBV is acknowledged as a rational and convincing model to estimate the IT business value (Santhanam & Hartono, 2003; Wade & Hulland, 2004). Even though RBV has been

considered to address the impact of IT on firm performance, but now scholars' paradigm of research has shifted from a stable environment to a dynamic one in order to investigate the impact of IT capabilities on business performance in a dynamic environment (Wang, Liang, Zhong, Xue, & Xiao, 2012; Wetering, Mikalef, & Pateli, 2017).

2.3 Dynamic Capabilities View

Currently, literary studies emphasize the prominence of adopting a dynamic view and state that the examination of processes through which IT enhances firm's performance operating under the constantly changing business environment (Kohli & Grover, 2008). This viewpoint suggests an avenue for the renewed importance of IT and extends it outside the traditional interpretations within the RBV context. The main difference between the two theories is that the RBV model is more static which is not likely to maintain a competitive advantage when the market surroundings are dynamic (Eisenhardt & Martin, 2000).

Dynamic Capabilities View (DCV) appeals to many scholars over the past decade as an extension of RBV which emphasizes its applicability in the hour of the turbulent business environment. For firm survival under the rapidly changing conditions, it is essential to develop dynamic capabilities that create, extend and modify the ways in which firms make a living (Helfat & Peteraf, 2009; Teece et al., 1997). The DCV appeared to overcome the static nature of RBV and moved from static to dynamic (Eisenhardt & Martin, 2000; Teece et al., 1997; Zahra & George, 2002). Teece et al. (1997) explained the dynamic view as a capacity to renew the currently available resources and competencies in order to achieve uniformity in aligning firms with changing business environment. Table 2.2 presents the different concepts of dynamic capabilities.

Table 2.2: Definitions of Dynamic Capability

Author & Year	Definition
Helfat (1997)	A subset of the competencies/capabilities which allow firms to create new products and processes, and to respond to changing market circumstances.
Teece et al. (1997)	A firm's ability to integrate, builds, and reconfigures internal and external competencies to address rapidly changing environments.
Eisenhardt and Martin (2000)	A firm's processes used to integrate, reconfigure, gain, and release resources to match or even create market change.
Zahra and George (2002)	An essentially change-oriented ability that helps firms redeploy and reconfigure their resource base to meet evolving customer demands and competitor strategies.
Zollo and Winter (2002)	DC is a learned and stable pattern of collective action through which organizations systematically generate and modify their operating routines in pursuit of improved effectiveness.
Zott (2003)	A set of routines guiding the evolution of a firm's resource configuration.
Winter (2003)	A capacity that operates to extend, modify or create ordinary (substantive) capability.
Lavie (2006)	A capacity to modify existing capability.
Zahra, Sapienza, and Davidsson (2006)	An ability to reconfigure a firm's resources and routines in a manner envisioned and deemed appropriate by its principal decision-makers.
Helfat and Peteraf (2009)	A capacity to purposefully create, extend, modify the resource base.
Teece (2007)	DC can be disaggregated into the capacity to sense and shape opportunities and threats, to seize opportunities and to maintain competitiveness through enhancing, combining, protecting, and when necessary, reconfiguring the business enterprise's intangible and tangible assets.
Wang and Ahmed (2007)	A firm's behavioral orientation to integrate, reconfigure, renew, and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to a changing environment in order to attain and sustain competitive advantage.

Eisenhardt and Martin (2000) explain dynamic capabilities as a process of a firm in which resources are used in a specific way, to be easily assimilated and integrated in order to match with business needs. The dynamic capabilities can be organizational and strategic routines by which firms are able to obtain new resources.

The essence of dynamic capabilities concept has its base in the dynamic business environment (Wang & Ahmed, 2007). On the other hand, dynamic capabilities reconfigure other resources and capabilities to empower firms to make an adjustment when an environment is unpredictable (Teece, 2007; Wang & Ahmed, 2007). Wang and Ahmed (2007) state that dynamic capabilities enable the firm's operational capabilities to perform better which are vital for routine business practices (Winter, 2003). Considering the knowledge-based perspective, the dynamic capabilities are viewed to create and absorb knowledge with an ability to assimilate and reconfigure resources (Verona & Ravasi, 2003).

In the business environment of Pakistan, there are many contextual factors that affect SMEs performance. Pakistan's business environment is dynamic as new technologies have been introduced and many multinational organizations have also been working here. In this regard, SMEs face challenges in the dynamic nature of business environment prevailing around them. SMEs in the manufacturing sector carry their upstream and downstream business activities with the business partner's collaboration in order to search for information and respond to business opportunities. Such coordination and responsiveness are essential for the dynamic business environment. In this regard, IT capabilities play a major role to face competitive pressures. The applications of information technologies support other capabilities of a firm to compete and exploit opportunities available to SMEs. The SMEs performance is associated with knowledge management and entrepreneurial activities which are dynamic in nature. There is a need to study these processes in order to enhance SMEs business value in the manufacturing sector so that SMEs stand out and achieve high performance by reconfiguring information resources and focusing on entrepreneurial activities to strengthen their position in the industry.

2.3.1 Dynamic View of Absorptive Capacity and Corporate Entrepreneurship

The dynamic capabilities explain the ways in which businesses can create value and increase performance by reconfiguring the firm's resources. Based on the DCV, firms not only strive to exploit current resources but also compete through renewing and developing their organizational capabilities (Teece, Rumelt, Dosi, & Winter, 1994; Wheeler, 2002). Thereby, firms should possess dynamic capabilities in order to develop and renew their resources which are particularly true for the firms competing in the dynamic business environment (Wheeler, 2002).

In a dynamic business environment, knowledge, consider as the strategic resource for firms (Martín-de Castro, 2015; Rodríguez -Serrano & M 2017). Knowledge of a firm is normally developed through either external acquisition or internal creation. For instance, absorptive capacity allows firms to update their knowledge domain and knowledge-based business activities through knowledge acquisition, assimilation, sharing, and implementation, which further helps these firms to stay update and enhances adaptability in the surrounding business environment. Absorptive capacity (ACAP) as a dynamic capability fosters firms learning the process and contributes by increasing the firm's competitiveness and performance (Mennens et al., 2018; Valentim, Lisboa, & Franco, 2016). Similarly, corporate entrepreneurship (CE) is considered a dynamic capability as its core processes have the ability to manage the potential uncertainties in the business environment. For instance, innovation activities allow firms to compete with other firms and stay one step ahead in the market surroundings. CE helps the firm to gain competitive advantage based on taking entrepreneurial initiatives to enhance business activities by meeting customer's needs and responding to pressure by embarking on successful innovation and renewal and venturing activities (Zahra & George, 2002). Firms that exhibit CE are characteristically considered as dynamic, to take advantage of new business

opportunities when they arise (Simsek & Heavey, 2011). Hence, ACAP and CE as a dynamic capability allow firms to sense and seek external knowledge; coordinate business innovation and renewal by making firms to respond to the external business environment rapidly.

2.4 Information Technology Capabilities

In the field of strategic management and information system, researchers shows the keen interest to find out the relationship between of IT capabilities and firm performance (Bharadwaj, 2000; Chae et al., 2018; Nguyen et al., 2015; Rehman et al., 2018; Uma & Roger, 2003). This is understandable because IT is considered to be fundamental for businesses and the uniqueness of IT provides a competitive advantage to the firms (Bhatt & Grover, 2005). Furthermore, the presence of IT adds strategic importance to a firm and allows to develop IT-related capabilities (Kohli & Grover, 2008; Nevo & Wade, 2010).

The literature of IT capabilities and business performance sheds light on the areas where more studies are needed to be conducted. Although several studies have been conducted to analyze the impact of IT capabilities on SMEs performance (Plattfaut et al., 2015; Raymond & Uduafemhe, 2018; Tzokas et al., 2015), most of these studies have been carried out without evaluating the actual domain issues in SMEs. Furthermore, limited studies have discussed the role of individual dimensions of IT capabilities with performance outcomes in the context of SMEs. While each dimension of IT capability has a fundamental role to enhance firm performance.

2.4.1 Definition and Background

IT and firm performance relationship have been widely discussed since the early 1980s. Scholars agree on the view that IT is a fundamental part of the growth and survival of a firm. Such as, IT spending all over the world was nearly $3.7 trillion in 2011 with an

increase of 8% as compared to 2010. Now it is expected that there will be more investment in IT in the coming years (Pearlson et al., 2016). Bharadwaj (2000) defines IT capabilities as, the firm's ability to mobilization and deployment of IT-related resources and to influence the other firm resources to enhance the several indicators of firm performance. Initially, Leavitt and Whisler (1958) stated that "there is not any well-established name for the new technology" and then they introduced the term "Information Technology". In their definition, they explained three different types of IT as processing techniques, mathematical and statistical methods applied for decision-making and high-order thinking simulation by using computer programs.

2.4.1.1 Information Technology in the 1980s

In the early 1980s, the researchers stated the important role of IT in firms' competitive advantage (Clemons, 1986; Neo, 1988). The research scholars, Gerstein and Reisman (1982) decided to take a primary step towards examining IT behavior; and Parsons (1983) published an IT framework stating that there are three different levels of IT impact on strategy, firm, and industry. To evaluate the existing IT strategic importance, a strategic grid model was introduced by (McFarlan, McKenney, & Pyburn, 1983). Later on, by using Porter's (1980) IS five competitive forces, McFarlane (1984) stated the IS opportunities for businesses. With the progress in IT research, a more refined framework, known as the customer resource life cycle, was developed by Ives and Learmonth (1984), and along with that, another framework was suggested regarding the strategic opportunity of IT (Benjamin, 1983). Porter and Millar (1985) developed a model of value chain analysis, which was the most cited framework. Later on, theoretical and fundamental research work began in 1986 and further research work was done in this field in the form of in-depth case studies, mathematical models, experiments and empirical studies. In this regard, a casual model of IT behavior was

developed (Bakos & Treacy, 1986) along with the electronic hierarchy theory (Malone, 1987), and case study work was reported by (Johnston & Vitale, 1988).

2.4.1.2 Information Technology in the 1990s

After the base work on IT in strategic management and the IS field, researchers turned their attention to improve the relationship between IT and firm performance. In the early 1990s (Grant, 1991) classified IT resources into three categories: tangible, human and intangible. Further, these resources were segregated into the tangible asset, including physical IT infrastructure elements (for instance, IT human resource contains management as well as technical IT skills) and intangible assets like synergy, customer orientation and, knowledge assets. The advancement of IT strategic applications was also examined by (King et al., 1994; King & Sabherwal, 1992; Krcmar & Lucas Jr, 1991), for instance, documented strategic applications of IT were presented (Clemons, 1991; Segars, Grover, & Kettinger, 1994) and it was argued that innovative firms normally relied on unique resources for innovative IT applications in order to gain competitive advantages.

Mata, Fuerst, and Barney (1995) put an effort into RBV and discuss the role of IT in the resource-based theory. In relation to risk concerns, other researchers stated that a substantial risk was involved from technology and process implementation and pertaining to this, a suitable risk management strategy might be devised which is depended upon the type of the risk (McGaughey Jr, Snyder, & Carr, 1994). Ross, Beath, and Goodhue (1996) explain the concept of IT capability and define it as the ability of a firm to manage these IT resources in a unique and flexible way which allow firms to improve performance.

2.4.1.3 Information Technology in the 2000s

At the start of the new millennium, the IT capability concept was explained in more detail and it was found that firms with a high level of IT capabilities performed better

as compared to others firms (Bharadwaj, 2000). IT-related resources are characterized as infrastructural IT resource, IT human resources and IT-enabled intangible resources (Bharadwaj, 2000). It has been established that IT capabilities allow firms to gain competitive advantage (Byrd & Turner, 2001; Kearns & Lederer, 2004; Sambamurthy, Bharadwaj, & Grover, 2003; Wade & Hulland, 2004). Measuring the business value of IT is complicated and as a matter of fact, several research findings highlighted the complex nature of IT (Kohli & Grover, 2008; Melville et al., 2004; Oh & Pinsonneault, 2007; Piccoli & Ives, 2005).

Researchers have started to focus on the value of information technology (Pavlou & El Sawy, 2006) and provide a compelling explanation on how IT capabilities improve business performance through the intervening mechanism, as intervening mechanisms give a clear picture of processes involved through which IT capabilities enhance SMEs performance (Melville et al., 2004; Roberts et al., 2012). For instance, the role of IT competencies and firm performance through organization learning (Tippins & Sohi, 2003). Wan and Fang (2006) analyze the impact of IT capabilities on firm performance through supply chain capabilities. Wang and Shih (2009) focused exclusively on a learning perspective when they employed IT innovation and IT-enabled knowledge management. However, the main focus of researchers was larger or multinationals firms and they analyse the performance, based on published data or secondary data. While limited studies put attention on the role of IT capabilities in manufacturing SMEs. These studies on SMEs performance were based on models that were developed for larger firms without considering the actual sphere of issues in SMEs.

2.4.1.4 Information Technology in 2010-2018

In the current era, information technology has been given more importance by SMEs due to constant innovation and technological changes. The competition among firms is

becoming stiffer and strategies for survival in the business market are necessary to have swift communication channels by adopting the latest IT and engaging highly skilled staff along with synchronized market knowledge. The relationship of IT capabilities and firm performance was tested empirically through the direct and indirect effect on the basis of configurative theory and RBV (Fink, 2011), by introducing two reductionists and two holistic models of the strategic value of IT. It was also observed by Sun, Chen, Tseng, and Tsai (2011) that the effect of the sustainable IT capabilities on the efficiency and performance of a firm during a time of economic slump contributed to the ability of the firm to recover from losses. Lim, Stratopoulos, and Wirjanto (2011) applied the meta-analysis technique to find the association between the investment process in information technology and firm performance.

Bulchand-Gidumal and Melián-González (2011) show empirically that the management and planning of IT affect firm's human and physical resources. As a result, there is a positive influence on related IT areas. Consequently, the performance of these areas influences firm performance. The influence of these variables on the performance of the firm was tested, and a model was developed to study these constructs (Chatzoglou, Diamantidis, Vraimaki, Vranakis, & Kourtidis, 2011). Tallon and Pinsonneault (2011) also studied one dimension of IT capabilities and a model was developed to test the association between the alignment of IT, and the performance of the firm through an indirect variable. Masli, Richardson, Sanchez, and Smith (2011) examine the relationship by using the balanced scorecard framework between IT investment and the value of the business through IT capabilities.

In relation to the comprehensive review of the literature on IT-business significance, Breznik (2012) explored the value of IT in the context of firm performance, yet it had not been researched adequately and thoroughly tested empirically. Lim, Stratopoulos, and Wirjanto (2012) integrate two streams: first, IT

capabilities' impact on firm performance and second, the impact of IT executives on the firm's market and financial performance. The findings show that the effect of IT executives on firm performance is directed to IT capabilities. Yayla and Hu (2012) also tried to fill the literature gap by examining IT alignment and firm performance and found the intervening role of strategic orientation and environmental uncertainty in a developing economy (Turkey). Wang et al. (2012) examined the 296 Chinese firms and found two ways to gain the IT business value: capacity building and resource structuring. It was hypothesized that IT capabilities and IT resources tended to increase the performance of the firm by providing support to the firm's core competencies and competitive strategies (Wang et al., 2012).

Guillemette and Paré (2012) recognized five distinctive "idyllic" IT management profiles in a few firms. These profiles were developed to analyse the IT value of firms. Wang et al. (2013) analyse the impact of IT capabilities on innovation performance through market orientation and find out market orientation fully mediate the relationship between IT capabilities and innovation performance. García-Morales et al. (2014) examined the effect of IT skills on the absorptive capacity that in return affected the firm's performance positively. The researchers have been focusing on the mediating role between IT capabilities and SMEs to define the mechanism of how these capabilities impact firm performance (Soto-Acosta et al., 2018). The effective use of IT capabilities also ensure the new products developments which are being brought to the market and consequently the performance of a firm increases (Berends & Antonacopoulou, 2014).

Hajli, Sims, and Ibragimov (2015) stated that IT capabilities are fundamental to the firm's survival and growth. The firms in a dynamic business environment with instability and continuous changes in market and technological conditions are better able to achieve firm performance by utilizing IT capabilities (Raguseo, Paolucci, &

Neirotti, 2015). These capabilities are distinctively path dependent on their emergence and need to be combined with other capabilities to make a more influential impact on firm performance (Teece, Peteraf, & Leih, 2016). In this regard, the significant role of IT capabilities on firm performance through the intervening mechanism has also been established by Bierwerth, Schwens, Isidor, and Kabst (2015). Similarly, Arora and Rahman (2017) analyse empirically the impact of IT capabilities on the market value and the firm's profitability in the developing economies. Neirotti and Raguseo (2017) analyse empirically the impact of IT-based capabilities on the firm's competitive advantage. Uwizeyemungu et al. (2018) examine the role of IT capabilities in the context of manufacturing SMEs and find a positive relationship between IT capabilities and SMEs performance. Chae et al. (2018) extend their work Chae, Koh, and Prybutok (2014) and find the role of industry in the relationship between IT capabilities and firm performance. Similarly IT capabilities have a significant positive effect on SMEs performance through dimensions of corporate entrepreneurship (Rehman et al., 2018). Furthermore, Lyver and Lu (2018) examine the mediating role of strategic entrepreneurship between IT capabilities and SMEs innovation performance. The result of their study presents that strategic corporate entrepreneurship fully mediates the relationship between IT capabilities and SMEs innovation performance. Raymond and Uduafemhe (2018) analyze the impact on IT capabilities on SMEs innovation performance by employing the RBV and find a positive effect on innovation performance. Aydiner, Tatoglu, Bayraktar, and Zaim (2019) examine the impact of information system capabilities on the performance of medium and large size firms. Based on the resource-based view they find out decision-making performance and business process performance mediates the relationship between information system capabilities and firm performance. Table 2.3 presents the concepts of information technology capabilities.

Table 2.3: Concepts of Information Technology Capabilities

Lee, Trauth, and Farwell (1995)	Information technology capabilities are considered as an organizational ability to assist the workflow and activities by utilizing information technology resources and combining different other related firm resources.
Bharadwaj (2000)	The ability of an organization to integrate other resources into IT resources allocation. Divided into three kinds: infrastructural IT, human IT resources, and intangible IT assets.
Wang (2007)	Combination of a firm's software, hardware, management practices, management, and technical skills.
Tippins and Sohi (2003)	The extent to which firm is familiar with IT and employs it efficiently within the firm IT operations and IT skills to manage information flow.
Peppard and Ward (2004)	Having three different unified characteristics: a combination of business and IT knowledge, an efficient use process and IT infrastructure flexibility.
Jiao, Chang, and Lu (2008)	Firm foundation, relocation and utilization of firm IT resources, supporting and improving other distinctive proficient functions in terms of strength and proficiency, and lastly latent potential building in order to maintain uninterrupted competition benefits, including relationship assets of IT, and architecture of IT, as well as routine based IT infrastructure and human IT resources including tangible and intangible assets.
Chang and Tung (2008)	The influence or aptitude to control the resources of IT and its interrelation with other firms' resources to have an impact on common IT efficiency and organizational goals that include infrastructural IT-based capability and human IT resource expertise.
Zeng (2008)	The firm's ability to mobilize, deploy, and integrate information-related resources, joined with various resources in an enterprise facility and capabilities in order to attain specific objectives that include business-IT alignment capability, IT infrastructure and IT management capability.

2.5 Dimensions of Information Technology Capabilities

IT capabilities are comprised of wide-ranging communication and common information tools (Bharadwaj, Bharadwaj, & Konsynski, 1999), along with human competency skills related to IT, and with firms' capability to deploy and control IT, which are ultimately combined in the form of tangible and intangible resources called IT capabilities (Bharadwaj, 2000). The construct of IT capabilities is characterized by a variety of dimensions and each dimension has an impact on firm performance hence,

the importance of investigating the impact of IT capability dimensions individually, for instance, IT infrastructure flexibility, IT technical skills, IT alignment and IT integration has been emphasized (Bhatt & Grover, 2005).

2.5.1 IT Infrastructure Flexibility

IT infrastructure is regarded as a firm's capability that can influence the capacity to utilize IT resources strategically (Armstrong & Sambamurthy, 1999; Duncan, 1995; Sambamurthy et al., 2003), and it has been defined as the shared set of firm's capital resources that provide the base on which IT-specific applications are developed (Broadbent & Butler, 1997; Duncan, 1995). The main elements of IT infrastructure are the applications of core data processing, computing platform (software and hardware), database, critical data-sharing, communication networking (for example, e-mail, instant messaging, and groupware), internet and intranet (Durmuşoğlu, 2009; Sethi, Pant, & Sethi, 2003; Terry Anthony Byrd, 2000).

IT infrastructure creates a comprehensive set of a firm's technological resources base to develop the present and future IT applications (Byrd & Turner, 2001; Scheibehenne, Greifeneder, & Todd, 2010). The effectiveness of the IT infrastructure can be measured by adopting changes in the business requirements efficiently. These requirements can be in terms of technical complexity, upgradability, and efficient deployment of multiple resources (Kumar & Singh, 2004). IT infrastructure serves as a prerequisite for running and sharing of the vital information throughout the organization and the flexibility provides the basis to share IT capabilities on which businesses can be flourished and grow. Rockart, Earl, and Ross (1996) reflected the ideal goals of this flexibility stating that "IT infrastructure flexibility" of telecommunication, computers, software, and data has been integrated and interlocked in a way that all types of information can be effortlessly streamlined if viewed from users' perspective which is routed via networking and redesigning of processes

involving less physical as well as intricate computer-based interface. In this way, a "seamless" infrastructure is much better to operate than interdependent and divisional infrastructures within the firm.

Prior studies point out that IT infrastructure flexibility provides competitive advantages in an uncertain business environment (Bharadwaj, 2000; Ray et al., 2005; Wade & Hulland, 2004). In particular, IT infrastructure contains communication networks, computing platforms core data processing and, crucially, shared data applications and IT infrastructure flexibility show the level to which these elements are compatible, modular and connective (Ray et al., 2005). Especially, IT infrastructure flexibility is differentiated by (1) connectivity: a connection between a firm's IT components or other mechanism in the firm; (2) compatibility: the capacity to share information such as video, data, audio, text, and image between others, across any IT component with channel partners or within the firm; and (3) modularity: a quality to add, remove and modify any element form the infrastructure without having a significant general effect. It allows a smooth flow of information and knowledge across these firms that further facilitate information sharing across the firm (Schober & Gebauer, 2011).

2.5.2 IT Technical Skills

IT technical skills are referred to as the broad level of categorical skills that are acquired by the company's IT workforce for IT application development. IT technical skills are the expertise to build IT-based applications by using the existing technology to operate and develop products (Mata et al., 1995). These include knowledge related to programming languages, operating systems, designing databases, data warehouse management, networking, and telecommunication technologies (Byrd & Turner, 2001; Tallon, 2008); and expertise which enables a firm to cope with the technical risks that involve IT investment (Mata et al., 1995). High level of IT technical skills are valuable

(Pérez-Aróstegui, Bustinza-Sánchez, & Barrales-Molina, 2015) and when these skills are distributed heterogeneously across the firm, it is often not challenging for competitors to hire away such value-creating resource from a rival firm at their market price.

The IT resources whether tangible or tangible resources can be replicated. However, the long-term gain in businesses depends on the expertise of the workforce in the organization that is challenging to replicate. The IT skills of technical staff tend to increase with the technical knowledge flow (Clark, Cavanaugh, Brown, & Sambamurthy, 1997), which allows a firm to begin having advanced level skills, on the basis of the prior knowledge. When the IT knowledge enhancement becomes inimitable and increases day by day, the firms are more likely to gain benefits for the superior IT business experience.

In a study of 26 firms, Weill and Broadbent (1998) established the skilled staff of the IT department have capabilities to add valuable business applications when the need arises. Terry Anthony Byrd (2000) found that IT departments with a heightened level of technical skills led to a competitive advantage in the key areas of business management. Moreover, (Duncan, 1995) interviewed Chief Information Officers (CIOs) and expert IT executives from 21 Fortune 500 firms and established that various respondents identified the quality of IT personnel talents in terms of skills as being an important enabler of IT management services. Similarly, a study by Cross, Earl, and Sampler (1997) at British Petroleum found that it's IT department needed to be improved considerably in order to develop as well as support more applications that were integrated and flexible. García-Sánchez, Guerrero-Villegas, and Aguilera-Caracuel (2019) argue that IT technical skills increase a firm’s capability to integrate with IT strategy as these skills have an important role in developing a reliable and cost-

effective base for the competitive business. Such firms tend to anticipate business needs earlier than their competitors.

2.5.3 IT Integration

The concept of technology integration specifies the extent to which connectivity exists among information systems and databases in a firm and firm's business partners (Zhu & Kraemer, 2005). IT integration is defined as the extent to which firms link IT with their business partners, by supporting the partners to communicate and exchange information by establishing collaborative relationships (Chen et al., 2015; Rai & Sambamurthy, 2006). IT integration helps a firm to develop its ability to respond to the market opportunities and to business process integration (Rai & Sambamurthy, 2006).

An integrated application helps the firm by gathering and analyzing required information, increasing the process efficiency and assessing the market needs. For instance, the role of IT has supported the sharing of Just-in-Time based schedules and established the informational links which can considerably minimize the consignment inconsistencies in the automotive industrial sector. IT integrative mechanisms are comprised of three elements: the flow of information integration, the flow of physical integration, and the flow of financial integration (Rai & Sambamurthy, 2006).

IT integration indicates a tradeoff between legacy systems and novel applications where few applications are abandoned, reformed or merged. In addition, such changes do imply a modification in the organization's structure including in a firm's application development requirements (Lin, Lo, & Yang, 2010). IT integration may take numerous forms (Izza, 2009) such as unified, centralized, and entirely integrated which involve several integration levels in terms of physical system integration, integration of IT applications and enterprise-level integration (Vernadat, 2002).

In the literature, a study of 1,857 firms from 10 countries indicates that the integrated mechanism of IT is the robust aspect that facilitates the process of integration of e-business innovation (Zhu & Song, 2006). Similarly, a study was conducted among 1,757 manufacturers for assessing the effect of IT integration and lean (just-in-time) performance (Ward & Zhou, 2006). In an enterprise, IT integration facilitates the coordination of operational activities, resources and the firm's decision making (Liu, Wei, Ke, Wei, & Hua, 2016; Wong, Lai, Cheng, & Lun, 2015). The literature results have indicated that integration of IT allows a firm to improve its performance by reducing the cycle time of processes with better customer services and lower procurement costs (Barua, Konana, Whinston, & Yin, 2004; Dechow & Mouritsen, 2005; Uwizeyemungu & Raymond, 2012).

2.5.4 IT Alignment

Over the last two decades, the alignment of IT and business has been studied. The main focus of these studies was to assess how IT-business alignment enhanced a firm's value (Celuch, Murphy, & Callaway, 2007; Chan & Reich, 2007). The idea of IT-business alignment is expressed as a 'fit' (Henderson & Venkatraman, 1989), 'harmony' (Luftman, Lewis, & Oldach, 1993) or a 'linkage' (Coltman, Tallon, Sharma, & Queiroz, 2015). IT alignment is the degree to which the business and IT strategy compliment each other through aligning IT resources (Coltman et al., 2015; Gerow, Grover, Thatcher, & Roth, 2014). Firms can increase profitability and gain a competitive advantage by refining the alignment between IT strategies and business strategies (Kearns & Lederer, 2003; Wong et al., 2015) whereas firms face an adverse position of financial outcomes and wasted resources if they fail to align their IT and business strategies (Ravishankar, Pan, & Leidner, 2011). A major concern of IT executives' consulting groups is how to align IT with business processes and needs. In the theoretical and conceptual framework, researchers emphasize the positive aspects of

IT-business alignment and generally focus their research efforts to find out the ways to enhance IT alignment in firms (Cragg, King, & Hussin, 2002; Rivard et al., 2006). The literature suggests that firms gain more profits by aligning their IT resources with business objectives (Avison, Jones, Powell, & Wilson, 2004; Cumps et al., 2009).

Maes, Rijsenbrij, Truijens, and Goedvolk (2000) designed a structural mechanism for aligning IT and business. In this regard, Chan and Reich (2007) emphasized the demand for structural modules for the aligned organizational processes. Initially, Henderson (1993) categorized the concept of IT-business alignment in two domains, internal and external. Then Maes et al. (2000) extended the model with two additional theories: structure (between operational and strategic domains) and information (between technological and business domains). In the model by Luftman (2004), IT-business alignment is organized into six different categories. McLaren, Head, Yuan, and Chan (2011), Tanriverdi (2006), also discussed the significance of IT alignment in providing leverage to business activities in order to shape and provide sustenance to an organization. Table 2.4 presents the four dimensions of IT capabilities in the literature.

Table 2.4: Dimensions of IT Capabilities

Literature	IT Infrastructure Flexibility	IT Technical Skills	IT Integration	IT Alignment
Bharadwaj et al. (1999)	IT infrastructure	IT management	External IT linkages	Business IT strategic thinking, IT business process integration
Bharadwaj (2000)	Physical IT assets	Managerial IT skills	Coordination of buyer and supplier	IT-enabled synergy, IT business Process integration
Ravichandran, Lertwongsatien, and Lertwongsatien (2005)	IT infrastructure Flexibility	IS human resource Specificity	IS partnership quality	
Byrd, Lewis, and Bryan (2006)	IT investment			Alignment between IS strategy and business strategy
Kohli and Grover (2008)	Infrastructural Capability	IT management Variables		Business-IT alignment
Tallon (2008)	Software modularity, network connectivity, hardware compatibility	Strategic plans for IT use, post-implementation review		IT-business partnership
Ordanini and Rubera (2010)		Manager's skills	Partners readiness	Relationship assets
Nevo and Wade (2010)		Integration efforts		Synergy, compatibility
Tallon and Pinsonneault (2011)	Hardware compatibility, software modularity, network connectivity			Strategic IT alignment
Chen et al. (2015)	IT infrastructure Flexibility	IT management	IT Integration	IT Alignment

2.6 IT Capabilities and Performance Outcomes

An emerging literature body analyses the effect of IT capabilities on performance outcomes (Chae et al., 2018; Lyver & Lu, 2018). However, this literature still lacks an integrated investigation of innovation as well as firm (overall) performance measures, while extent literature falls short in exploring the interrelation between these performance outcomes. This study provides the combinative examination of innovation as well as firm performance outcomes of absorptive capacity and corporate entrepreneurship. IT capabilities play an important role in increasing performance outcomes (Chae et al., 2018; Lioukas et al., 2016). Wang et al. (2012) hypothesized that IT capabilities enhancing IT business value by supporting competitive strategies and core competencies of firms. In the context of SMEs performance, earlier studies present the significant positive effect of IT capacities on performance outcomes; for instance, IT affects the performance of SMEs in Japan. Similarly, Rivard et al. (2006) conducted a survey of 96 small and medium enterprises and establish that IT capabilities have an impact on firm performance. Nguyen et al. (2015) discuss the benefits of IT implementation in small firms. Furthermore IT capabilities also influence the innovation performance of the firm.

2.6.1 IT Capability Dimensions and Performance outcomes

IT capabilities is a combination of four dimensions: (1) IT infrastructure flexibility, (2) IT technical skills, (3) IT integration and, (4) IT alignment (Bharadwaj, 2000; Nevo & Wade, 2010; Rai & Tang, 2010; Tallon, 2008). The scholars have shown the effect of IT capabilities by using a single dimension or aggregate of IT capabilities with business performance. However, limited attempts have been made to analyze the IT capability dimensions with performance outcomes.

IT infrastructure flexibility is one of the fundamental IT capability dimensions of a firm which provides the technological foundation to build IT resources and applications. The literature shows that IT infrastructure is valuable, rare, and imitable

that is essentially attained by firms in order to thrive in a rapidly changing business environment (Bharadwaj, 2000; Ray et al., 2005; Wade & Hulland, 2004). IT infrastructure flexibility enables a firm to perform well by quickly adopting the changing trends in IT (Ajamieh, Benitez, Braojos, & Gelhard, 2016; Bardhan, Whitaker, & Mithas, 2006 ; Uma & Roger, 2003), for instance hardware, software, technological services and business-specific applications (Melville et al., 2004).

IT infrastructure flexibility helps businesses to improve IT applications by accessing timely information. Ray et al. (2005) and Fink and Neumann (2009) examined the flexibility of IT infrastructure from multi-dimensional perspectives and found that IT flexibility affects the value of the firm and enhances business performance. Bhatt and Emdad (2010) found that IT infrastructure flexibility enhances customer responsiveness and product innovation that's to achieve business advantages. IT infrastructure flexibility enables a firm to innovate by facilitating information-sharing across different departments and instigating wide-ranging changes in business practices (Byrd & Turner, 2001). Consequently, firms with strong IT infrastructure flexibility have the benefit of better communication and collaboration among their several functional departments and business partners. These firms tend to expand the scope of R&D activities so that innovation processes can be effectively executed and performance of a firm increase. IT infrastructure flexibility has a positive impact on innovation performance and firm performance (Xu, Zhang, & Barkhi, 2010).

IT technical skills refer to the know-how which is needed to execute an update IT applications, for instance, knowledge of programming languages, experience in operating systems, and understanding of communication protocols. Technical skills are related to application development, operational competencies, integration among multiple systems, and maintenance of current systems. IT staff is essential for solving

technology-based business dilemmas and helps to explore business opportunities by providing reliable and continuous IT support to the business (Bullon, 2009).

The development of IT technical skills covers the level of IT technical competencies (database management systems, networks, etc.) within the organization (Byrd & Turner, 2001), which fosters new knowledge integration within a firm's knowledge directories (Alavi & Leidner, 2001). Currently, the anticipation of future IT trends is essential that requires IT professionals, to keep their IT technical skills updated, and provides a base of competitive advantage for firms (Siqueira & Fleury, 2011). According to Wade and Hulland (2004), the relative mobility of IT personnel is likely to be high, but there are some IT skills which take time to learn and cannot be simply transferred, and therefore such resources ensure competitive advantage. These skills include the capability to transform newly learned knowledge into practical knowledge (Griffith, Sawyer, & Neale, 2003), to build advanced IT applications with expertise (Dehning, Richardson, & Zmud, 2003) (such as software or network handling competencies) by exploiting related and complementary knowledge resources with a high degree of coordination within and across the firm (Jiménez-Barrionuevo, García-Morales, & Molina, 2011; Tanriverdi, 2005). IT technical skills are more likely to have a direct impact on performance outcomes (Wang, Chen, & Benitez-Amado, 2015) (Bullon, 2009; Zhang, Majid, & Foo, 2010).

The integrated activities of an on-going business across several regions bring the most substantial contribution to a firm's performance from the strategic and financial perspectives. Moreover, the exclusive focus of many studies is to explore the impact of integrating application programs for the reason that integration provides the uninterrupted and durable maintenance of systems in order to ensure operational excellence (Granlund, 2003; Madapusi & D'Souza, 2005). A number of perspectives

are suggested by different research studies that help to gain integration of the IT successfully. Similarly, it was stated by Giacomazzi, Panella, Pernici, and Sansoni (1997) that the basis of IT integration depends on the mutual necessity of firms to interchange information as well as to assimilate the important procedures of a business.

The integrated IT capability from the manufacturing perspective is the degree up to which the central information system in a firm provides data and process integration. Hence, manufacturing companies can ensure to provide integrative IT capabilities with unified and reliable access to the pertinent customer in terms of market data, production and orders. It also helps in facilitating the process integration by linking the relevant partners from the supply chain. The functionality of an integrated information system is intended to facilitate business process linkages which enhance the flow of information and perceptibility of a customer (McAfee, 2002). These improvements ensure a good flow of integrated activities, standardization of business and control mechanisms in order to avoid any delays, inaccuracy, and chances of errors in processing orders. Thus, an integrated system helps in replacing ineffective and disorganized processes (Gattiker & Goodhue, 2005).

Tanriverdi and Uysal (2011) state that high technology integration in businesses tends to achieve an elevated level of performance in routine business procedures in the long run. Additionally, it has been suggested that the integrative capacity in supply chain and market orientation affects firm performance positively (Tseng & Liao, 2015). Firms with IT integration facilities are reported to achieve high performance from the financial perspective (M. Beheshti, Oghazi, Mostaghel, & Hultman, 2014).

The creation of well-aligned resources is possible due to dynamic capabilities that (Eisenhardt & Martin, 2000) allow integration and coordination of the information in business functional areas and firm’s frontiers of the comprehensive value chain

(Davenport, Harris, & Cantrell, 2004). Information Technology integration helps in achieving synergy benefits from other IT resources of a firm (Swafford, Ghosh, & Murthy, 2008). Hence, it is argued that the integration capabilities of IT can enable firms to explore and respond to many challenging issues by making quality improvements which increase the profitability of an enterprise. Therefore, IT integration capability is an essential firm resource to maintain business innovation performance and improving performance (Francalanci & Morabito, 2008; Raymond, Bergeron, & Croteau, 2013; Soto-Acosta et al., 2017).

IT business alignment tends to elevate business and IT up to the level where it can boost the IT value of a business. The outcomes of IT business alignment studies are observed in various organizations where the IT and business strategies are well-aligned which increases the firm's performance (Schwarz, Kalika, Kefi, & Schwarz, 2010). In this preview, an example of an IT market is considered, where IT business alignment can make it possible to identify the evolving IT solutions that can create an opportunity for organizations to alter their strategy in order to have a strong infrastructural base, and therefore achieve a competitive advantage (Tallon & Pinsonneault, 2011). The identification of a gap between IT and business activities can be bridged through IT business alignment (Luftman, 2004).

Scholars and IT specialists in the domain of IT and business have highlighted the significance of IT business alignment (Preston & Karahanna, 2009). In this regard, an example may be considered of the Society for Information Management (MIS), where an annual survey was conducted, and results showed that the foremost management concern was ITALI in 2003-2009 (Luftman, Ben-Zvi, Dwivedi, & Rigoni, 2010). Hence, exclusive consideration has been given to the IT business alignment

frameworks, particularly when there are a number of ways in which these frameworks can be employed to attain IT alignment in businesses to achieve high firm performance.

The concept of alignment is viewed as having multiple dimensions with various levels in the current IT business alignment frameworks. These levels differ from one other according to a base theory in relation to the framework under study (Chan, Sabherwal, & Thatcher, 2006). However, in a comprehensive analytical review, it was pointed out by Chan and Reich (2007) that exploring concrete and real-world features of alignment mostly lack strong theoretical grounds. This means that the procedures and frameworks, which are aimed at offering support to IT specialists in incorporating IT business alignment usually, do not have a resilient theoretical basis. Moreover, according to Palmer and Markus (2000), there are a few philosophical theories, for instance, RBV, and DCV of complementarities, which can be applied to the IT alignment concept because of its multi-faceted nature. However, efforts have been made to design procedures and frameworks that can bridge the gap between the theoretical base and real-time support. The literature presents the significant positive effect of IT alignment on firm performance (Budiarto, Prabowo, Djajanto, Widodo, & Herawan, 2018; Cragg et al., 2002; Schwarz et al., 2010). Furthermore, SMEs manufacturing sector can make significant improvements and tend to achieve high innovation performance by utilizing these IT capabilities (Lyver & Lu, 2018).

2.7 Absorptive Capacity

To learn about the market structure and customer-supplier demands are necessary for firms to explore the critical traits of an on-going business environment for future development. Absorptive capacity (ACAP) is considered to be a vital component for improving the performance of firms (Cohen & Levinthal, 1990). It has been defined as a firm's ability to reorganize new information, assimilate it, and also apply that

information to commercial ends (Cohen & Levinthal, 1990; Tu, Vonderembse, Ragu-Nathan, & Sharkey, 2006; Zahra & George, 2002). According to Wang and Ahmed (2007), ACAP is related to the utilization of knowledge resources (Pavlou & El Sawy, 2006; Zahra & George, 2002). These knowledge-based resources are regarded as the most strategic resources among all the possible resources of a firm, for gaining competitive advantages (Gupta & Govindarajan, 2000). By redefining knowledge-based assets, a firm is able to improve performance (Zahra & George, 2002).

Absorptive capacity is frequently studied by different scholars (Gao, Yeoh, Wong, & Scheepers, 2017; García-Sánchez et al., 2018; Rafique, Hameed, & Agha, 2018; Zhai et al., 2018). Acquiring external knowledge and exploiting this knowledge allows firms to expand their abilities by responding quickly to the outside business environment which helps in the minimization of technological uncertainties (Lane & Lubatkin, 1998). ACAP helps firms to learn more and achieve success in scientific inventions beyond their limits (Deeds, 2001; Sun & Anderson, 2010). With absorptive capacity, firms acquire the outside knowledge and in return, they are able to enhance their innovation abilities, hence by adapting the changes, they make competitive moves (Cepeda [illegible]; Darroch, 2004; Garrigos-Navarro, & Escribano, Fosfuri, & Tribó, 2009).

According to Lane et al. (2006), applications of ACAP in various domains include, mergers and acquisitions, innovations, development of new products, and inter-organizational learning and all these factors highlight the importance of ACAP in increasing firm performance, which means empowering a firm with an edge of gaining competitive advantage on a long-term basis (Lane et al., 2006). A number of researchers conducted studies on ACAP, in several different ways, such as predicting new technology patterns (Cohen & Levinthal, 1994), rearranging the ability of current firms

(Pavlou & El Sawy, 2006), and creating innovation in products and services and knowledge replenishing (Van den Bosch et al., 1999). Moreover, other insights give importance to collective practices of individuals, which promotes collective behavior. As a result, the absorptive capacity of a firm tends to increase (Volberda, Foss, & Lyles, 2010). However, the literature lacks in explaining the role of ACAP as an intervening mechanism between IT capability dimensions and firm performance (Kim, Akbar, Tzokas, & Al-Dajani, 2014).

The literature of IT capabilities and ACAP have its vital role in assisting firms to utilize IT resources and knowledge-based mechanisms to improve its capabilities as a result firms grow and survive in a competitive business environment. Most of the studies have not discussed the role of IT capability dimensions with ACAP to enhance firm performance, besides, studies have mostly focused the aggregate role of IT capabilities and ACAP (Cragg et al., 2013; Neirotti & Raguseo, 2017). The literature review mentioned above has a gap in terms of not investigate the role of IT capability dimensions and ACAP in the SMEs of developing countries. In relation to this gap, there is a need to conduct more studies to explain how IT capabilities indirectly improve firm performance through ACAP. This may enhance to understand the mechanisms through which IT capabilities impact on SMEs performance (Mithas & Rust, 2016; Peng, Zhang, & Dubinsky, 2016). According to Tallon (2008), dynamic capabilities play an important role in relation to IT capabilities for instance ACAP. This perspective elaborates that firms tend to strive by exploiting current resources (Teece et al., 1997; Wheeler, 2002).

2.7.1 Absorptive Capacity Definitions and Models

Scholars take ACAP as a multi-dimensional construct (Lane & Lubatkin, 1998; Todorova & Durisin, 2007; Xia & Roper, 2008). Since the initiation of the theory,

scholars have outlined five contributions by ACAP, starting with the major contributions that provide the base work. The model by Cohen and Levinthal (1990) was later on, followed by the re-conceptualization and further development of a model by Todorova and Durisin (2007), Zahra and George (2002), Volberda et al. (2010) and Lane et al. (2006).

Cohen and Levinthal (1990) gave the definition of ACAP as the ability of firm (1) to recognize the value of knowledge, (2) to assimilate it, (3) to apply new outside information to marketable domains. According to Cohen and Levinthal, firms' prior complementary knowledge, is important for ACAP. They emphasize the importance of recognizing outside knowledge which is difficult without prior early knowledge. Cohen and Levinthal described the term "assimilation" as ACAP which is critical and significant with respect to new external knowledge throughout the firm. Knowledge assimilation is also affected by the firm's individual members, behavioral and cognitive sciences that encompass knowledge and learning acquisition. ACAP is based on combined and collective earlier knowledge of its people and can be improved through investment in research and development (R&D) of individuals' ACAP, thus expanding the potential border between social networks and external information sources within firms.

The ACAP "assimilation" component includes the ability of the firm to transform, re-deploy and re-configure resources for exploiting new information. Cohen and Levinthal identify that, though the individual's knowledge has a significant role, "assimilation" ACAP depends on effective and well-organized socialization besides exploitation of first-hand external facts in terms of information. This highlights the fact that maintenance of knowledge into corporate reminiscence is paramount and aided by the encouraging participation among different firm's domains.

According to Cohen and Levinthal (1990), the application of new external information is exploited by the firms to attain an understanding of the market. It was argued that exploiting first-hand external valuable information is a critical and important part of the innovative capability of a firm.

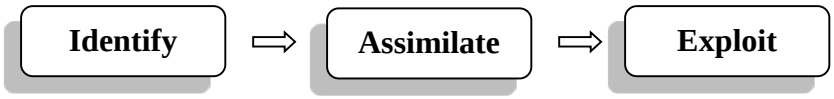


Figure 2.2: Absorptive Capacity Model: Cohen and Levinthal (1989)

Zahra and George (2002) re-conceptualized ACAP besides describing it as a dynamic capability and dividing it into two subsets as potential ACAP and realized ACAP. Zahra and George (2002) modified as well as extended the work of (Cohen & Levinthal, 1990) by dividing ACAP into four main dimensions: knowledge acquisition, knowledge assimilation, knowledge transformation, and knowledge exploitation. The potential absorptive capacity which has two dimensions: acquisition of knowledge (which was newly added to the concept of absorptive capacity) and the assimilation of knowledge (which was taken from Cohen and Levinthal's model). The second sub-set of ACAP was also divided into two dimensions: first, commercial exploitation of knowledge (also part of Cohen & Levinthal's model) and second, the transformation of knowledge, and this second dimension of realized ACAP was new in their model and considered very important for the realized ACAP in a firm.

Zahra and George (2002) established that ACAP tends to increase the ability of a firm in gaining and sustaining a competitive advantage. They acknowledged that these capabilities are rooted in the processes of firms and such characterizations are analogous to the concept of Cohen and Levinthal (1990). Zahra and George (2002) followed this concept of Cohen and Levinthal's to explain the term "acquisition",

defining it as a firm's ability to identify and acquire external knowledge, while they explained the term "transformation" as a firm's ability to develop and refine the process in a combination of prevailing, newly acquired and assimilated knowledge. Along with 'knowledge acquisition' and 'knowledge transformation', they also focused on the absorptive capacity efficiency view, which deals with the efficiency of decreasing the gap between firms' potential and realized ACAP.

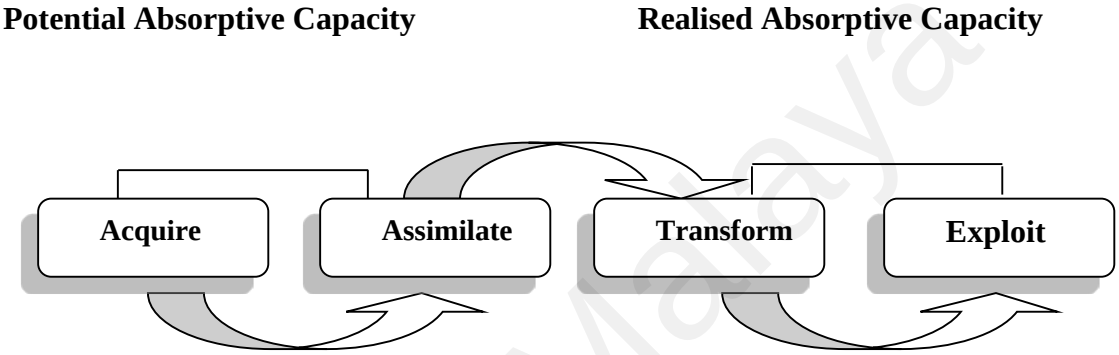


Figure 2.3: Absorptive Capacity Model: Zahra and George (2002)

Lane, Koka, and Pathak (2006) hypothesized that the literature on ACAP had a variation from the basic principle of proposed constructs by (Cohen & Levinthal, 1990). Hence, Lane et al. (2006) suggested five important assumptions which were established in the literature since 1990 and proposed a novel definition to revitalize ACAP and its repositioning with the basic concept. Later on, in the work of Cohen and Levinthal (1994), it was acknowledged that ACAP allowed firms to foresee the technology trends. Lane et al. also defined ACAP as the capability of a firm to utilize knowledge by three successive methods: Firstly, to recognize and understand new knowledge that is outside the boundary of a firm by an exploratory learning system, (2) assimilating valuable novel knowledge by a transformative learning system, and (3) the use of assimilated knowledge in creating new knowledge besides profitable outputs through the role of exploitative learning (p. 856). Additionally, the definition as given reflects the transformation part of the ACAP framework previously anticipated by Zahra and

George (2002) which was initially suggested by (Cohen & Levinthal, 1990). Lane et al. (2006) validated that the transformational component was to be integrated and presumed in the assimilation as well as exploitation component of their model.

Todorova and Durisin (2007) suggested it is possible to have a few thoughtful uncertainties and misunderstandings in Zahra and George's (2002) work regarding the re-conceptualization of the ACAP construct. Afterward, both; Todorova and Durisin argued that the work done by Cohen and Levinthal (1990), mentioned the exclusion of "recognizing the value", considering it a dimension from the part of a construct, as well as the positioning of the "acquisition" dimension which is inappropriate. Additionally, according to Todorova and Durisin (2007), the "transformation" dimension is a component of realized ACAP as stated by Zahra and George (2002) and it is not just a mere consequence of the potential ACAP components "acquisition" and "assimilation." Instead, the component view is criticized on the basis that it shows both "transformation" and "assimilation" components which are alternately (and interactively) consequential to the "acquisition" as an antecedent and are, in turn, antecedent to the "exploitation" dimension. Todorova and Durisin also acknowledged that the conditional factors as described by Zahra and George (2002) are comprised of "regimes of appropriability," "activation triggers," and "social integration mechanisms," that can have a noteworthy effect on the construct itself. It has been argued by them, nevertheless, that these contingent aspects have an influence on different dimensions of the construct besides introducing other contingency related factors such as "power relationships" in this scenario (Todorova & Durisin, 2007). As a result of the above-stated discussion of ACAP components, Todorova and Durisin called into question by splitting the construct into sub-sets of potential ACAP and realized ACAP.

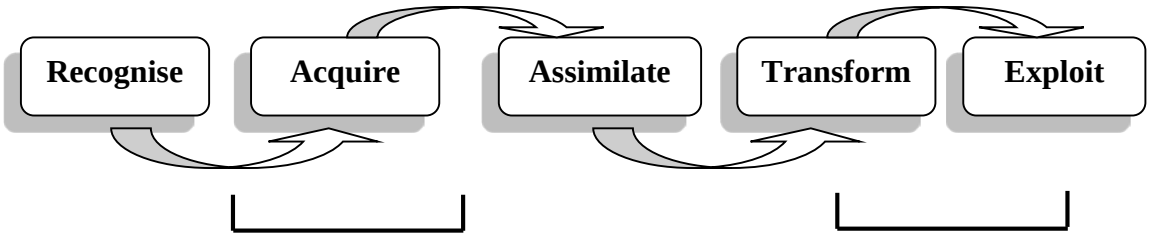


Figure 2.4: Absorptive Capacity Model: Todorova and Durisin (2007)

Volberda et al. (2010) proposed an integrated framework for ACAP that is based mainly on the previous work of Zahra and George (2002) in the model; though the most significant contribution to ACAP theory is the emphasis on multilevel antecedents as well as on contingent factors that can have an influence on the outcome of an organizational ACAP. Therefore, a bibliometric analysis was conducted on ACAP, and in this regard, Volberda et al., (2010) suggested that it was necessary to consider the intra-organizational antecedents and managerial antecedents as significant drivers of organizational ACAP. Such drivers contain the organizational arrangement, the configurations of incentive, casual networking and the competence for communicating internally, inside the boundaries of an enterprise and every driver is critically important to the proliferation of freshly attained knowledge.

2.8 Corporate Entrepreneurship

Schumpeter (1934) initially presents the concept of entrepreneurship and defines the entrepreneur as the person who interrupts the market equilibrium though bringing new combinations of resources and helps to advance the economy of a country. It means that entrepreneurship can take place in the existing firm by encompassing new combinations of resources. Corporate Entrepreneurship (CE) includes informal and formal firm-level activities that focus on finding new business opportunities through business venturing, strategic renewal, and innovation (Guth & Ginsberg, 1990; Sharma

& Chrisman, 2007). Corporate entrepreneurship is regarded as an emergent area for managers, entrepreneurs and research scholars in the field of management (Heavey & Simsek, 2013). Corporate entrepreneurship is considered a key source of business revival (Chen et al., 2015; García-Sánchez et al., 2018). Firms practicing CE in a dynamic business environment can accommodate themselves during change (Baruch & Holtom, 2008; Hulland, 1999).

A considerable literature looks at CE as an imperative means for multinational companies and large firms to revive their business (An, Zhao, Cao, Zhang, & Liu, 2018; Dunlap [illegible] Hinkler, Kotelly, & Mondaro, 2019) to adapt to business environment changes (Chen et al., 2015). However, the present studies highlight that the role of CE is also effective for renewal to SMEs (Boukamcha, 2019; Shafique & Kalyar, 2018). The more recent focus on SMEs is particularly timely and pertinent considering that for SMEs, in pursuing growth opportunities and becoming larger in the new global economic reality, a key challenge is to continuously adapt and renew them. The SMEs are intensively focused for growth perspectives due to recent economic revival and shifting of the momentum towards SMEs (Heavey & Simsek, 2013) and is very important to provide opportunities to this sector. Firms are involved in corporate entrepreneurship activities for strategic or financial reasons (Phan et al., 2009). The studies differentiate various corporate entrepreneurship activities when firms focus on their performance outcomes. Prior studies show that CE affects the objective performance measures, such as profitability, return on assets, return on sales (Zahra & Covin, 1995) and growth of the firm (Salimath, Cullen, & Umesh, 2008).

Research studies lack the in-depth investigation of the relation between IT capability dimensions and CE to increase firm performance. The role of CE as a mediator is also needed to be studied with the dimensional role of IT capability

dimensions and firm performance because CE enables the integration of numerous business aspects related to information and processes that are considered critical and enrich the understanding of IT-enabled CE and SMEs performance.

2.8.1 Definition and Dimensions of Corporate Entrepreneurship

In the literature, researchers do not agree on a common point of view regarding qualities which are necessary for the firms to endeavor entrepreneurship. The notion of corporate entrepreneurship was presented by Pinchott (1985), who gave suggestions and provide the strategy for the management, how to develop novel ideas in businesses.

2.8.1.1 Definitions

Vesper (1984) illustrated three basics of CE: a new strategic way, starting from the ground, and the establishment of a business venture. According to Vesper (1984), the conceptualization of CE is any one or all of these categories which can be reckoned as CE. In the same way, Covin and Miles (1999) identified three categories of CE: the establishment of new business in already existed business, a novelty in the idea of products in settings of corporate, and situations in which the whole firm is transferred through entrepreneurial philosophy. Jennings and Lumpkin (1989) stated four activities in relation to CE, for instance, participation-based decision-making skills, specialized member participation, the participative formation of performance objectives and the willingness to take the risk by top management. This explanation is similar but more detailed than the one presented by Birkinshaw (1997), who described CE as a separate and proactive undertaking that leads to a novel method for the business to deploy its resources. (Stevenson & Jarillo, 1990) reviewed the literature on entrepreneurship comprehensively, looking for to provide a pattern for developing a relationship in entrepreneurship as being a process by which people exploit opportunities either inside or separately without taking into consideration the resources they currently utilize. They

depict that entrepreneurship is not a one-time activity in a business venture, but instead constitutes in a series of activities by the firm.

Covin and Miles (1999) confer that because the meaning clarity issues of CE so it is hard to describe the of CE activities sources. They state that there is an existence of countless meanings that are associated with the concept of CE which is the cause of the confusion. They argued that no thorough causes have been presented as to why this concept has resulted in competitive benefits. They stated that the ground for the competitive benefit has not been systematically and explicitly associated with corporate entrepreneurship. Moreover, they contend all possible domains of business in which corporate entrepreneurial activities are frequently displayed and have not been uniformly presented in the literature of CE. They described this concept as a multidimensional phenomenon.

Dess et al, (1999) proclaimed that even some researchers like Vesper (1984) restricted the idea of entrepreneurship to the creation of new business, yet CE could be interpreted more comprehensively in two ways: (1) the development of a new business within the established venture through joint venture (2) a firm's strategic transformation or self-renewal. Moreover, Birkinshaw (1999) differentiated between dispersed and focused CE and explained that dispersed CE takes place all over the firm whereas focused CE takes place in creating a new venture division, which is mainly focused on indicating and targeting the opportunities for new business (Kuratko & Audretsch, 2013). Birkinshaw (1999) stated that instead of establishing different units or divisions as an entrepreneur, the establishment of an entrepreneurial culture was the main factor to start with (Goldsby, Kreiser, Kuratko, Bishop, & Hornsby, 2018).

2.8.2 Corporate Entrepreneurship Models

In the early stage of CE literature, maximum empirical studies related to CE have been developed based on the entrepreneurship theory (Naffziger & Kuratko, 1992). The emerging models and theories of CE focused on the relationship between the environment and individual personality (Potkay & Allen, 1986). These theories consist of Gartner's (1988) model to establish the new business, Greenberger and Sexton's (1988) framework of developing the new business Bygrave's (1989) pattern for entrepreneurial study. The other model provides the detailed concept of CE and extends the early work.

2.8.2.1 Guth and Ginsberg's Model of Corporate Entrepreneurship

Guth and Ginsberg (1990) presented a model of CE on the basis of their conceptualization. According to them, CE consists of two aspects: 1) establishing the new business within an already established firm, and 2) the dramatic change in the firm through self-renewal. They illustrated the CE model according to the strategic management point of view. Guth and Ginsberg (1990) divided the CE model into two classes: 1) venturing and innovation, and 2) self or strategic renewal. Environment, strategic leadership, firm conduct or firm performance is recognized as corporate entrepreneurship factors. The disadvantage of this framework is that it justifies the reciprocal effect between antecedents and firm performance. Also, it is not rational to suppose that just one-sided effect from the environment, leadership and the organizational process on the activities of the entrepreneurship is enough to explain the relationship, without considering other factors associated with this concept.

2.8.2.2 Covin and Slevin Model of Corporate Entrepreneurship

Covin and Slevin (1991) propose a mixed model of CE which describes the relationship between a firm's entrepreneurial position and its environment, strategic renewal,

internal antecedents, and performance. Their model showed an emphasis on entrepreneurial orientation or firm-level performance. The major attributes of their framework are the external, strategic and internal factors which are directed to firm performance. According to their framework, entrepreneurial orientation is related to environmental, strategic, and internal antecedents and it has a significant association with the performance of the firm.

Although these constructs are relevant they are distinct in fact. Concerning the entrepreneurship locus, Zahra (1993) stated that CE appeared at multiple levels in a firm. Therefore, Covin and Slevin's (1991) framework was not compromised over these multiple levels in their conceptualization of the CE-performance association. Concerning dismissal, there are some measures in the framework; Zahra (1993) stated that factor situations lack clarity, as there is an association between entrepreneurial position and technological sophistication. Moreover, Zahra (1993) argued that Covin and Slevin's (1991) framework remained unsuccessful in identifying the potential that differentiated entrepreneurial positions which might affect different measures of performance.

2.8.2.3 Zahra's Model of CE

Zahra's (1993) model transformed the framework and proposed an additional aspect of an environment as proposed by Covin and Slevin (1991) and removed the technological sophistication which was summarized in environmental dynamism. Zahra (1993) develops one more measure, "munificence", which denotes a richness of chances for newness in the sector. In outlining entrepreneurial behavior, Zahra (1993) focuses to study global entrepreneurial behaviors. Lastly, Zahra stated that managerial background and values, organization structure, managerial system, and firm culture should be taken into account for the development of CE models.

2.8.2.4 Lumpkin and Dess Model of Corporate Entrepreneurship

In contrast, Lumpkin and Dess (1996) portrayed a substituted framework for entrepreneurial orientation. They explained the entrepreneurial orientation in the form of five measures: autonomy, innovativeness, risk-taking, pro-activeness and competitive aggressiveness. They define the entrepreneurial orientation as the process and decision making behavior which is directly related to the new entry, and state that new entry is achieved by penetrating the new market with both novel and already existing products. In this perspective, the new entry is the concept that inspires the idea of CE. Major measures that describe entrepreneurial orientation have a tendency to act separately with readiness to innovate, take the risk, and a propensity to be proactive in relation to marketplace options (Lumpkin & Dess, 1996).

The framework provided by Lumpkin and Dess (1996) is distinguished from the model by Covin and Slevin (1991). It shows both environmental and organizational antecedents that affect the association of entrepreneurial orientation and firm performance, but it has not identified firm performance as being able to have an effect on entrepreneurial orientation. This establishes that the framework illustrated by Lumpkin and Dess (1996) shows a constant outlook of the firm with no feedback between performance, entrepreneurial orientation and environment, and organizational antecedents. Covin and Slevin's framework has taken into account the response of different associations between the variables which suggest that entrepreneurial orientation itself is a dynamic idea.

2.8.2.5 Barret and Weinstein's Model of CE

Barret and Weinstein developed a model constituting CE, flexibility (F) and market orientation (MO) in an attempt to describe the business mission strategy, identifying

the link between CE, F, MO, and firm performance. They reported the reciprocal effect of different strategic measures in their model.

2.8.3 Summing Up

Analyzing the above-stated definitions, models and theories of different scholars show a mutual design with general antecedents amongst the diverse metaphors. Common points among the different conceptualizations of CE are as followed:

- The creation of a new business inside an already established business
- Revival and transformation of major and historical structural methods
- Creation, innovation, and renewal in the already established firm

ii. The establishment of the firm is entrepreneurial if it involves primary organizational and strategic decisions. Therefore, entrepreneurship is all about taking the initiative of entrepreneurial activities in a firm and putting an emphasis on enlarging the firm's area of capability and operations. Innovation is entrepreneurial as it includes novel compliments of resources or perhaps the utilization of methods that transformed the level of completion in the sector concerned.

2.8.4 Corporate Entrepreneurship Elements

The present study employed the main four elements of corporate entrepreneurship as, business venturing, firm's innovation, pro-activeness, and self-renewal. Innovation refers to the newness/novelty in the organization's products (i.e. services and goods). It means the development of novel products, improvement of existing products and establishing new production processes. The key concern is, to what degree a firm's activities or products are new, diverse, and distinctive, or whether the idea is to lead a problem which has not previously been discussed, or to transform the method by which the firm wants to deal with this problem, and to discover whether it transforms development over a traditional pattern. The second element of corporate

entrepreneurship is new business venturing and it can be described as the formation or commencement of a new business in an established business by transforming the firms' products or by producing a new market. Self-renewal is about a firm's transformation by redefining its main objectives. It refers to strategic and radical transformational consequences and entails redefining the business ideas, reformation, and initiation a system-wide transformation for novelty. Self-renewal considered as an entrepreneurial effort, which ushers the significant changes in a firm's strategy, or in the hierarchy of firm. These variations transform the existing relations between the firms or within a firm and its external environment (Hayton, 2005). The last element of corporate entrepreneurship is proactiveness and can be defined as the actions and initiatives were taken by the members of firms for competitive aggressiveness and risk assumptions (Lumpkin & Dess, 1996).

2.9 Summary

Based on the comprehensive literature review, there are literature gaps which have been identified in this chapter and are related to IT capabilities, absorptive capacity, corporate entrepreneurship, and performance outcomes. By applying a resource base theory in the support of IT capabilities and dynamic capability view to explain absorptive capacity and corporate entrepreneurship, the present research is carried out with the purpose to fill the gaps from literature. The detailed description of the theoretical model and the formation of hypotheses for the present study are presented in the next chapter.

CHAPTER 3: RESEARCH MODEL AND RESEARCH HYPOTHESES

3.1 Introduction

This chapter explains the hypothesized research model which demonstrates the ten hypotheses. First, this study develops the direct relation hypotheses of IT capability dimensions with absorptive capacity and corporate entrepreneurship. Furthermore, this study establishes the direct relation of absorptive capacity with corporate entrepreneurship. Additionally, this study analyzes the direct relation hypotheses of absorptive capacity with innovation performance and firm performance. Moreover, this study develops the direct relation hypotheses of corporate entrepreneurship with innovation performance and firm performance. Furthermore, this study establishes the relationship of innovation performance with firm performance. Lastly, this study develops the mediating hypotheses of absorptive capacity and corporate entrepreneurship between IT capabilities and performance outcomes.

3.2 Integrative Multi-theoretical Conceptual Model

Wheeler (2002) suggested that there was a demand for a theoretically sound and practically applicable model or frameworks based on empirical researches to guide scholars in the field of IT. Straub (2009) also, recommend building the strong linkage between IT capabilities with the theory for the further validation of reliability and validity of the previously presented literature. In this regard, studies can be conducted through integrated frameworks to help researchers in learning and evaluating the relevant perspectives of IT capabilities. This may enhance the understanding of the interrelationships of IT capability dimensions with other variables (Kim, Shin, Kim, & Lee, 2011).

Corley and Gioia (2011) discussed that theory is a statement which constitutes conceptions and the interrelationships of these concepts show in that way a

phenomenon occurs. It has been emphasized by DiMaggio (1995) and (Weick, 1995) that theories have an imperative role in management studies. Sutton and Staw (1995) suggests that when the research includes no theoretical background, then the value of that research becomes susceptible. Weick (1995) states that sound theoretical support has the power to explain and predict by theorizing a process related to the theory. It also highlights the relationship, connection, and interdependency of the phenomenon involved. It is important to consider that theories become the comprehensive passage of time and scholarly additions. Furthermore, every theory has limitations, still, noble theories are advocated by scholars as they are more narrative, comprehensive and cover laws related to these theories (DiMaggio, 1995).

The present framework emphasizes upon employing the RBV and DCV to provide a sound theoretical basis to investigate how individual dimensions of IT help to absorb and seek to utilize external knowledge for the growth of SMEs which further make grounds for entrepreneurial activities to grow and enable firms in achieving the sustainable competitive advantage. Specifically, this framework offers the conceptual support that how IT capability dimensions are imperative resources, and highlight important linkages of these IT capabilities with dynamic capabilities, for instance, the ACAP, and CE, in order to understand these relationships in manufacturing SMEs. The RBV delivers a theoretically sound rationale to link IT capabilities as antecedents of ACAP and CE, and how it increases firm performance. Whereas, DCV explains the dynamic processes and how they are leveraged by IT capabilities of a firm to reconfigure and redeploy in order to exploit given opportunities to compete in a dynamic business environment. Both absorptive capacity and corporate entrepreneurship provide positional advantages for firms. Hence, by testing and suggesting an integrative theoretical model make out the impact of IT capabilities, absorptive capacity and corporate entrepreneurship on SMEs performance outcomes.

As presented in Figure 3.1, this conceptualization forms the basis of the conceptual model developed and analyzed in the current thesis.

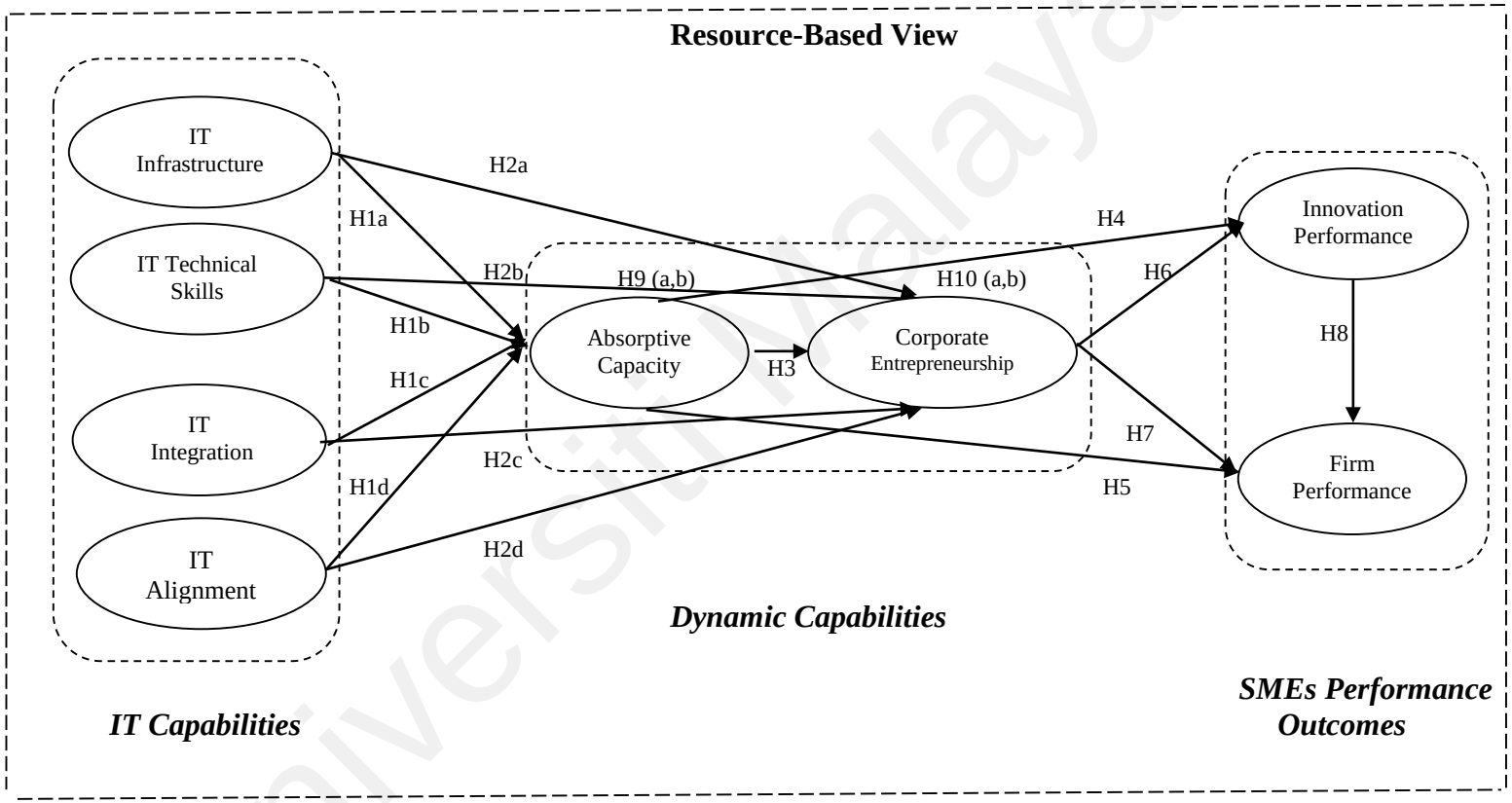


Figure 3.1: Theoretical Model

In figure 3.1, the theoretical framework shows the dimensions of IT capabilities (IT infrastructure flexibility, IT technical skills, IT integration and IT alignment) as independent variables, while innovation performance and firm performance as the dependent variable. ACAP and CE are predicted as mediators in the relationship between IT capability dimensions and firm performance.

3.3 Hypotheses Development

The theoretical model includes ten main hypotheses. Hypotheses H1 and H2 (sub-divided into H1a, H1b, H1c, H1d, H2a, H2b, H2c, and H2d) analyze the direct relationship of IT capability dimensions with absorptive capacity, and corporate entrepreneurship respectively. Furthermore, hypothesis H3 show the direct relationship of absorptive capacity with corporate entrepreneurship, while hypotheses H4 and H5 shows the direct relationship of ACAP with innovation performance and firm performance. Furthermore, H6 and H7 present the direct relationship of CE with innovation performance and firm performance respectively. Finally, H8 analyze the direct relationship between performance outcomes such as innovation performance and firm performance. After that, this study analyzes the mediating effects of absorptive capacity and corporate entrepreneurship between IT capabilities and performance outcomes of SMEs. Hypothesis H9a show the mediating effect of ACAP between IT capability and CE, similarly, H9b show the mediating effect of ACAP between IT capability and performance outcomes of SMEs. Hypothesis H10a show the mediating effect of CE between IT capability and performance outcomes of SMEs, similarly, H10b show the mediating effect of CE between ACAP and performance outcomes of SMEs.

3.3.1 Information Technology Capabilities and Absorptive Capacity

On the basis of the research objectives, this study develops a framework to find out how IT capabilities (IT infrastructure flexibility, IT technical skills, IT integration and IT alignment) enable firms to increase their absorptive capacity.

According to Pavlou and El Sawy (2006), information technology facilitates the use of codified knowledge and increases the knowledge assimilation capability of a firm (Benitez et al., 2018). IT enhances the firm's capability of problem-solving along with the capacity to create new knowledge; as a result, firms are able to transform knowledge. ACAP enhances the level of understanding and sharing of knowledge across the firm (Spender, 1996; Zahra & George, 2002) by affecting a firm's knowledge structure and content (Baskerville, Pawlowski, & McLean, 2000). Thereby it helps the flow of knowledge and reduces the complexity of IT for the users (Baskerville et al., 2000; Raymond et al., 2016).

3.3.1.1 IT Infrastructure Flexibility and Absorptive Capacity

IT infrastructure flexibility helps to heighten absorptive capacity through increasing knowledge exchange and flow across the firm. IT infrastructure flexibility increases the communication, collaboration, coordination, problem-solving skills and collective interpreting (Alavi & Leidner, 2001; Gold, Malhotra, & Segars, 2001) and enables firms to gain new knowledge (Alavi & Leidner, 2001). In this way, IT infrastructure flexibility allows firms to gather current knowledge and enhance the capability to acquire and value new external knowledge (Gold et al., 2001; Uma & Roger, 2003). The connectivity of IT components helps firms to exchange knowledge and communicate with other channel partners, which increases acquisition and assimilation of knowledge (Gold et al., 2001; Jasimuddin & Naqshbandi, 2019; Todorova & Durisin, 2007) and in turn enhance the firms' knowledge (Malhotra et al., 2005).

Furthermore, IT connectivity allows a firm to recombine and transfer knowledge in different operational units. It also helps in knowledge exchange with the high data format and explicit knowledge through text, documents, pictures, audio and video within the boundaries of the firm and across the boundary of different business partners along the channel, thereby ultimately increasing the firm's knowledge domain (Sambamurthy et al., 2003). The modularity of IT infrastructure helps a firm to modify its processes and meeting different requirements of knowledge enhancing activities. In particular, due to this capability, firms are able to standardize products by connecting and updating IT components, through increasing data source integration within and across the boundaries of the firm (Benitez et al., 2018; Kumar & Singh, 2004; Ray et al., 2005).

3.3.1.2 IT Technical Skills and Absorptive Capacity

The IT technical skills constitute the depth and breadth of IT-related competencies, for instance, expertise in the management of database systems and networking, etc. (Byrd & Turner, 2001). The collection of IT technical skills fosters the formation of corporate knowledge directories and knowledge networking (Alavi & Leidner, 2001), thereby increasing the organization's ability to capture and assimilate knowledge.

Technical skills of IT help to develop other important organizational capabilities, such as ACAP (Byrd & Davidson, 2003). Applications of IT enable firms to gain an easy and quick knowledge from external sources by strong channels of communication (Corso, Martini, Paolucci, & Pellegrini, 2003), therefore, the utilization and expertise in new and advanced technical IT skills help to develop of ACAP (Daghfous, 2004). These skills are essential for the designing of advanced storing technologies databases and sophisticated data retrieval techniques to increase knowledge-storing capabilities (Choi, Poon, & Davis, 2008). Similarly, technical IT

skills are necessary in order to utilize groupware which enables organizations to access new information rapidly (Chen, McGaughey, Zeltmann, Lu, & Lee, 2018; Civi, 2000). To exploit the knowledge capabilities, there involves a significant cost that can be minimized with greater coordination of IT experts (Tanriverdi, 2005). Firms with more expertise in technical IT skills use advanced IT applications, for instance, software or network architectures helps to reduce the coordination costs with the exchange of a higher quality data formats (Jiménez-Barrionuevo et al., 2011).

Nowadays, it is important for IT professionals to keep their IT skills updated to anticipate the future trend in IT, which allow firms to achieve competitive advantage (Mishra, Gunasekaran, Papadopoulos, & Childe, 2018; Siqueira & Fleury, 2011). These skills facilitate the firms to develop knowledge exchange domains by transforming and exploiting knowledge (Bolívar-Ramos, García-Morales, & Martín-Rojas, 2013; Kotabe, Jiang, & Murray, 2011). Generally, organizations demand advanced IT technical skills that may support advanced applications including emails, virtual meetings (Choi, Lee, & Yoo, 2010). Furthermore, these technical skills are used by workplace teams as they affect the ability of teams in transforming prospective knowledge into practical knowledge (Griffith et al., 2003).

3.3.1.3 IT Integration and Absorptive Capacity

IT integration is the degree to which a firm's applications and systems are linked with other allies and support information exchange mechanisms by developing a collaborative relationship (Rai & Sambamurthy, 2006). IT integration helps to develop a piece of effective and efficient information and communication exchange environment within and outside the boundaries of the firm, thereby improving absorptive capacity. For example, a firm with its computer-supported design and new knowledge linkages connects with corporate partners, in order to deliver relevant and

fast designs (Bhatt & Grover, 2005). In addition, integrated applications and systems facilitate firms in information sharing through different channels, which in turn helps to manage activities and related processes to design an effective response to counter competitors' moves (Grover & Saeed, 2007). IT integration of a firm tends to increase functional coordination by disseminating the operational information from suppliers to the firm's various business divisions in an efficient manner (Francalanci & Morabito, 2008).

In addition, integrated IT capability enhances ACAP by helping a firm in acquiring and assimilating knowledge within and outside the firm's boundaries. Firstly, integrated IT capability supports a firm in acquiring knowledge to enhance IT coordination. This integration is critical for synchronization and connecting communication networks across the firm. With more IT technical coordination, the knowledge acquisition becomes easy, effective and reliable. Integrated systems tend to enhance the overall efficiency of IT systems by offering cross-functional interfaces (Jansen, 2005). Information coordination helps manager's increases the ability to assimilate knowledge and identify shifts in the dynamic business environment. This maximum participation from experts with different domains can help in interpreting and analyzing the acquired and assimilated knowledge.

An integrated IT platform enables to connect expert staff across a firm's network (Dewett & Jones, 2001). The lack of integration between the assimilated knowledge and process may not assist managers to interpret the available knowledge into meaningful information which can be utilized to attain maximum benefits (Zahra & George, 2002). In contrast, the uniform access and the same shared meaning of acquired knowledge help experts to interpret knowledge for effective use. Hence, integrated IT capability enables a firm to better acquire and assimilate knowledge.

Moreover, integrated IT capability enhances strategic coordination and transforms the firm's operational element which includes production planning, capacity building programs, networking, and designing. This transformation needs coordination from multiple stakeholders because the firm's transformational capabilities are affected by these stakeholders. Though, due to the busy schedules, differing priorities, a few stakeholders may find it difficult to participate in such discussions. Integrated IT capability helps to coordinate between these participants through electronic brainstorming and electronic meetings (Gallupe et al., 1992) which enhances collaborative learning (Alavi, 1994). In order to build knowledge exploitation, firms tend to engage in activities that enhance the responsiveness of customer complaints and develop techniques to implement new products and processes. These cross-functional activities include operational planning meetings with sales and marketing personnel that increases coordination between the firm's functional units (Lapide, 2007), which enhances the knowledge flows across various departments. This flow of information is intertwined with digital processes that are crucial in managing interdepartmental competencies (Bharadwaj, Bharadwaj, & Bendoly, 2007) and building cross-functional efficiency of a firm (Pavlou & El Sawy, 2006).

3.3.1.4 IT Alignment and Absorptive Capacity

IT business alignment refers to the extent to which IT and business operations share congruent goals and maintain a harmonious relationship (Luftman & Brier, 1999). Alignment of fundamental IT business systems is a driving force of knowledge activities as it increases the capacity of the knowledge channels to evolve. IT alignment helps resource and information sharing across and within firms (Kearns & Lederer, 2003), permits trading partners to codify jointly valuable market knowledge into explicit strategies (Wu et al., 2006), and support firms to coordinate strategic planning

processes that are important for allocating and organizing resources efficiently (Segars et al., 1998).

Furthermore, IT alignment supports to increase collaboration and responsiveness across and within firms along value chains in the context of varying market demands (Malone, Yates, & Benjamin, 1987; Philip & Booth, 2001). IT business alignment helps to diffuse the voice of customers into the voice of the engineer by enhancing the collaborative spirit along with sound communication amongst all working units of a firm, hence promotes research and development, in coordination with all working units to better design and develop new products and services for customer convenience. Empirical research (Kearns & Lederer, 2003; Wu et al., 2006) shows that IT alignment affects firm performance through the development of dynamic capability.

The hypotheses are:

H1a: IT infrastructure flexibility has a positive effect on absorptive capacity.
H1b: IT technical skill has a positive effect on absorptive capacity.
H1c: IT integration has a positive effect on absorptive capacity.
H1d: IT alignment has a positive effect on absorptive capacity.

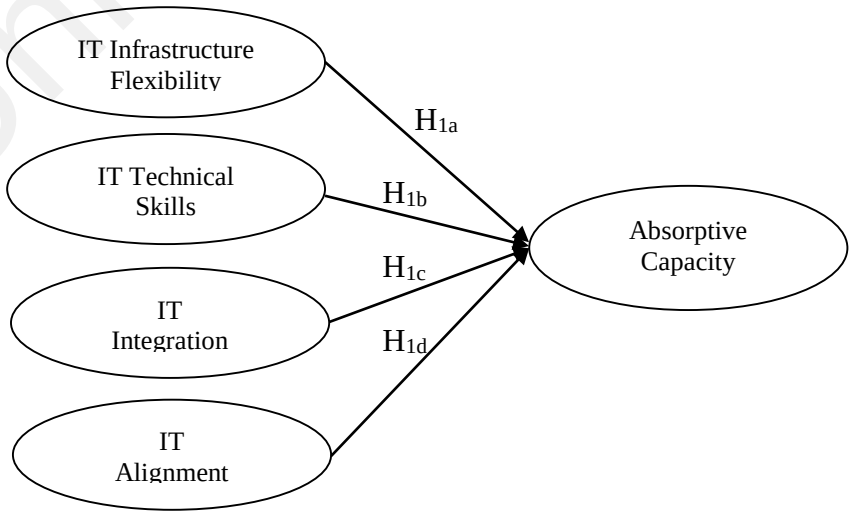


Figure 3.2: Relationship between IT Capability Dimensions and Absorptive Capacity

3.3.2 Information Technology and Corporate Entrepreneurship

IT capabilities are deemed one of the most important antecedents of CE activities, as they possess the potential to anticipate, explore and take opportunities that arise by bringing integration among several business processes and focusing on innovation activities. IT capabilities ensure the efficiency of the firm's activities and considered important for initiating and promoting CE activities (Chen et al., 2015). IT capabilities are of the utmost support in the creation and sharing of relevant information, hence ensures smoothness in various business processes. IT capabilities play a critical role in supporting corporate entrepreneurship activities for instance, in the creation of new ventures by firms, such as steps to be undertaken (data collection, interpretation analysis in relation to emerging changes in a competitive environment) for effective CE activities (Zahra, 1991). Furthermore, effective communication with stakeholders across firms is a necessary source of CE activities.

3.3.2.1 IT Infrastructure Flexibility and Corporate Entrepreneurship

A conducive technological environment supports CE related activities. In this regard, the strategic use of IT infrastructure flexibility enables the desired entrepreneurial activities to be conducted with proactive alertness (Simsek, Lubatkin, Veiga, & Dino, 2009). Firms need to adopt an aggressive approach for data scanning and skimming due to the changing trends in the market which helps to promote CE activities. The data collected from diverse sources and prompt updates about consumers' preferences are required to boost sales and develop new products (Chaudhuri, Dayal, & Narasayya, 2011). In this regard, it is important to state the case of General Motors, in which the development of web-enabled tools was acquired so as to gather data regarding consumer preferences in order to design better products (Sawhney, Verona, & Prandelli, 2005). Such information pertaining to several stakeholders (competitors and partners) is used to gauge possible changes in the market, and upcoming trends and

opportunities can be explored with the involvement of new IT-based tools in the market. Hence, to adopt a proactive approach, on-time availability of accurate data to help in decision-making seems crucial for firms to continue their entrepreneurial initiatives.

Furthermore, IT infrastructure helps the firm's in purposes through IT sharing which facilitations firm's procedures and support innovation activities (Bharadwaj, 2000). This capability strengthens firm's management to accelerate innovation and manages the efficiency of all business functions (Pavlou & El Sawy, 2006; Ray et al., 2005; Rehman et al., 2018). IT infrastructure flexibility helps in the firm's development which creates market equilibrium accordingly by initiating introducing innovative activities (Todd & Javalgi, 2007). Thereby, firms have to develop strong IT infrastructure flexibility which can lead a firm towards innovation.

The development of IT infrastructure within firms tends to have strong communication, cooperation, and the association between departments in terms of well-coordinated activities. The relationship between IT infrastructure flexibility and business venture is based on providing assistance in the identification of new business venture needs and execution of venturing activities (Weill, Subramani, & Broadbent, 2002). Moreover, IT infrastructure flexibility is helpful from the perspective of business venturing decision making and related upcoming business strategies for the exploitation of venturing activities (Armstrong & Sambamurthy, 1999). Entrepreneurial activities are facilitated by firm's IT infrastructure by renewing firm's business requirements (Bhatt & Emdad, 2010) and allow firms to redefine firm's processes with the help considerable investments in renewal activities (Collinson, 2003; Teece, 2014). Consequently, CE activities can successfully be initiated when leveraged by IT infrastructure flexibility (Giudice Del & Straub, 2011).

3.3.2.2 IT Technical Skills and Corporate Entrepreneurship

The key aspects of business strategy can be managed effectively by utilizing IT technical skills. These capabilities provide leverage in acquiring data through speedy processes and understanding the spectrum of business (Bharadwaj, 2000). The IT technical skills facilitate in data collection, data processing, usage and sharing of data amongst different working clusters play a crucial role in identifying potential business opportunities in response to changing the market environment.

IT technical skills allow the sharing of relevant technical knowledge needed to facilitate entrepreneurial decision making (Edquist, 1997). CE activities need a reliable means of communication with an integrated view of collaborative efforts among communication channels. This would lead to meet challenges to comprehend and promote entrepreneurial planning activities (Zahra, 1991). IT technical skills also help to sort issues regarding collection and interpretation of data about the firm's competitors and changes in industry trends. Such information may be useful for introducing or launching a new business venture (Rehman et al., 2018; Zahra & Covin, 1995). These skills help disseminate information without any technological deficiencies and enhance entrepreneurial activities within a firm.

3.3.2.3 IT Integration and Corporate Entrepreneurship

IT integration plays a vital role in bridging the gaps between consumers and competitors; thus by establishing sound communication within and outside firms and seeking maximum involvement from participants, sponsors, and related stakeholders. This would further reinforce communication and networking for the compliance of successful entrepreneurial ventures. IT integration facilitates the sharing of relevant information for the entrepreneurial processes and practices across the departments (Edquist, 1997). Such information may be useful for introducing or launching a new

business venture in the firm (Zahra, 1991; Zahra & Covin, 1995). Firms, use integrated strategies and activities which are further observed as business ventures.

IT-based integrated processes enable firms to efficiently collect and disseminate information through electronic integration of various business activities. In this way, IT integration assists CE to modify and re-establish business activities (Collinson, 2003). In addition, IT integration tends to play a positive role in a firm's innovation strategies (Brynjolfsson & Hitt, 2000) by supporting research and development activities to encourage new product developments (Chaudhuri et al., 2011). Hence, the success of product development can be effectively accomplished by the use of IT integration. IT integration has the potential to create new business strategies and taking initiatives by focusing on gathering and interpreting information about a firm's competitors and bring changes in industry trends (Zahra & Covin, 1995).

3.3.2.4 IT Alignment and Corporate Entrepreneurship

IT business alignment enhances the collaboration and communication amongst all working units of a firm, hence promotes research and development, to better design and develops new products and services for customer convenience. In this regard, the time span is an essential element to gauge how active business refinement processes are adopted by a firm. The promptness, efficiency of changing mechanism and transformations in products and processes are significant contributors of IT capabilities to a firm's CE. IT Alignment allows a firm to enhance the prompt availability of new products, new applications, ease in accessing data and development of networking in a firm. The "frequent flyer program" is one example, for instance in the USA airlines reservation system aims to make arrangements for hotel booking and car hire, which enhanced the flexibility as well as integration in the market for the current business customers (Karimi, Somers, & Gupta, 2001). The enhancement of IT Alignment

supports the implementation of new systems in line with ongoing business trends (Bhatt & Emdad, 2010).

H2a: IT infrastructure flexibility has a positive effect on corporate entrepreneurship.

H2b: IT technical skill has a positive effect on corporate entrepreneurship.

H2c: IT integration has a positive effect on corporate entrepreneurship.

H2d: IT alignment has a positive effect on corporate entrepreneurship.

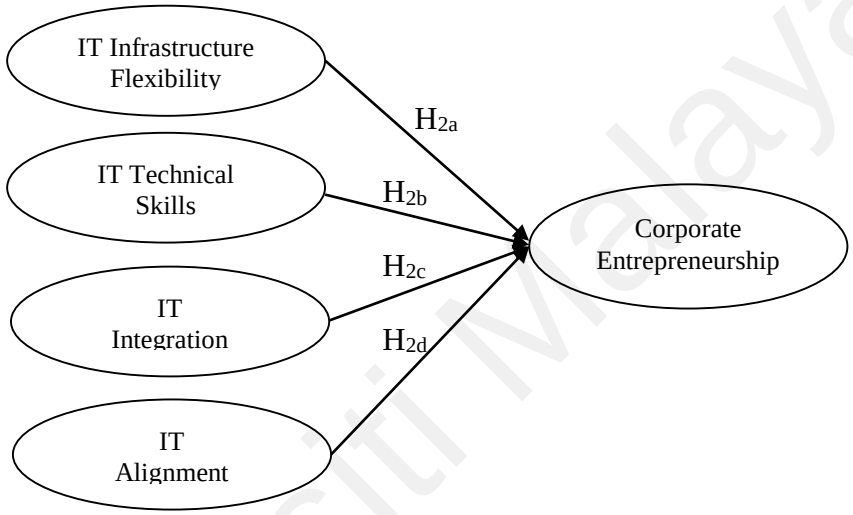


Figure 3.3: Relationship between IT Capability Dimensions and Corporate Entrepreneurship

3.3.3 Absorptive Capacity and Corporate Entrepreneurship

The knowledge activities are a noteworthy aspect of corporate entrepreneurship (García-Morales et al., 2014; García-Sánchez et al., 2018; Zahra et al., 2009) and considered vital in the exploration of alternative ways to get things done as required in the modern era. Gregor (2006) narrates corporate entrepreneurship in terms of dealing with the new knowledge and R&D in the respective fields (Hitt, Ireland, & Lee, 2000; Zahra & George, 2002). The knowledge aspect in CE requires the integration of external resources with value creation processes in order to minimize the risks associated with emerging opportunities by promoting the development of new products, technologies, and systems (Chesbrough & Schwartz, 2007; Laursen & Salter, 2006). In

this way, firms are capable of reaping benefits from new external knowledge by investing in the capacity building and facilitation for maximum utilization of external new knowledge (Laursen & Salter, 2006).

The study by Zahra, et al. (2009) identifies the core of corporate entrepreneurship as the extraction of diverse knowledge from multiple resources. Zahra & George, (2002) highlights the important characteristic of firms in relation to absorptive capacity which forms the basis to integrate external knowledge with existing knowledge and transforming it for commercial uses. In this way, the key function of absorptive capacity is to enable firms to use the transmission of (external and existing) knowledge to pursue corporate entrepreneurship. Similarly, Zahra, et al. (2009) highlight the importance of external and existing knowledge of organizations in meeting the upcoming challenges for corporate entrepreneurship. The spectrum of learning by doing is what enables companies to excel in the domain of corporate entrepreneurship.

According to Kuratko and Audretsch (2009); Simsek and Heavey (2011) emerging opportunities are the fundamental considerations of corporate entrepreneurship. There exists a close relationship between opportunities and instabilities in the competitive environment, which draws the attention of firms towards an outburst of knowledge while relying on internal resources in the context of corporate entrepreneurship (Gregor, 2006; Zahra et al., 2009). In addition, the absorptive capacity allows the influx of rich processes, bridges knowledge gaps and ensures the outbursts of new knowledge to enhance corporate entrepreneurship (Lane et al., 2006). Figure 3.4 presents the relationship between absorptive capacity and corporate entrepreneurship.

H3: Absorptive capacity has a positive effect on corporate entrepreneurship.

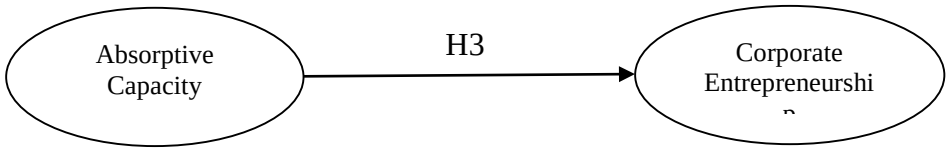


Figure 3.4: Relationship between Absorptive Capacity and Corporate Entrepreneurship

3.3.4 Absorptive Capacity and Innovation Performance

Absorptive capacity of a firm is important for innovation activities and support to enhance its innovation performance (Crossan & Apaydin, 2010). In a dynamic business environment, the dimension of ACAP, knowledge acquisition capacity makes possible a firm to quickly recognize its external environment (D'Este, Mahdi, Neely, & Rentocchini, 2012; Scuotto, Del Giudice, & Carayannis, 2017) and assists these firms to increase the breadth and depth of available knowledge (Kuratko, 2016). In addition, the outside acquired knowledge can enhance the capacity of the firm for the creation of the novel links (Miles, Paul, & Wilhite, 2003). Several earlier scholars have associated knowledge acquisition to the innovation performance (Chen et al., 2009; Xie, Zou, & Qi, 2018). The other dimension of ACAP, assimilation of external knowledge helps to increase the problem-solving rate and reduce the time period of the new product development cycle. Furthermore, external knowledge assimilation can evade monotonous work, keep the firm's knowledge reserves updated (Fichman, 2000; Zhai et al., 2018), and improve a firm's competitiveness and innovativeness (Oh & Pinsonneault, 2007). Therefore, a high level of a firm's knowledge assimilation capacity helps the firm in the form of innovation performance (Acur, Kandemir, De Weerd). Wiley & Sons, 2010 waste its intellectual resources that don't have enough ability of knowledge assimilation (Newbert, 2008).

Knowledge transformation speeds up the new knowledge absorption and realizes efficient innovation and integration, likely squashy higher performance of the business

(Kuratko, 2016). The transformation of knowledge is more important for the firm, when firms find the differences between new knowledge and current knowledge, as the firm cannot instantly comprehend external knowledge. With the help of knowledge transformation, firms can rebuild their cognitive structure from a new angle (Todorova & Durisin, 2007; Xie et al., 2018), thus improve their performance of innovation. Furthermore, a high level of knowledge exploitation capacity of a firm can constantly translate new and current knowledge into services and products innovation (Lim et al., 2012). Additionally, a firm's knowledge exploitation can support to promote its outcomes of innovation through developing individual creativity performance (Cheung, Chau, & Au, 2008). Hence, firms should expand the outside knowledge application to attain better innovation performance (William, 2003; Zhai et al., 2018).

H4: Absorptive capacity has a positive effect on innovation performance.

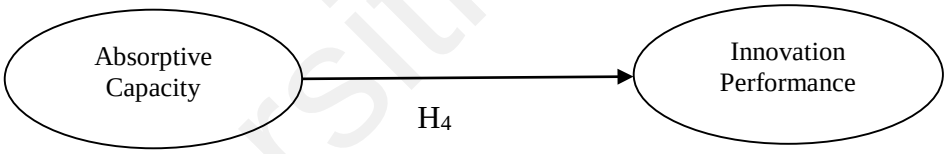


Figure 3.5: Relationship between Absorptive Capacity and Innovation Performance

3.3.5 Absorptive Capacity and Firm Performance

Absorptive capacity has been considered critical in utilizing and creating knowledge, which ultimately brings improvement and assists in gaining and sustaining a competitive position (Malhotra et al., 2005; Pavlou & El Sawy, 2006; Zahra & George, 2002). In the literature, performance is the outcomes of a firm's absorptive capacity (Kinnear & Taylor, 1987; Roberts et al., 2012; Tsai, 2001). Absorptive capacity allows a firm to comprehend various complex situations with ease and helps to assimilate different available aspects of knowledge. When the knowledge-based assets of an

organization are redefined and arranged skillfully, then an organization able to manage changes by restructuring its capabilities, aligning the change with respect to its operations and other domains, and thus enhancing its financial standing (Fabrizio, 2009; Martínez-Caro, Cegarra-Navarro, Garcia-Perez, & Cepeda-Carrión, 2018; Pavlou & El Sawy, 2006).

The firms with high-level absorptive capacity are likely to attain new knowledge externally, from competitors, customers, channel partners, and suppliers. Firms then apply such knowledge in order to recognize market opportunities (Cohen & Levinthal, 1990; Malhotra et al., 2005), customer inclinations, innovation in technology, and the tendency for marketplace changes; all these elements will critically enhance the level of profit and market share (Camisón & Forés, 2010; Mithas, Krishnan, & Fornell, 2004; Tsai, 2001). It also helps in establishing knowledge among diverse functional domains (Tsai, 2001; Zahra & George, 2002). Chen et al. (2009) posit that a high stage of absorptive capacity permits manufacturing concerns to achieve excellence and help to rectify process efficiencies.

Absorptive capacity integrates new external knowledge and the application of this knowledge from a commercial standpoint, which generates profitable opportunities and productivity. In this way, absorptive capacity accelerates performance in all domains and ultimately firms can achieve overall excellence (Cohen & Levinthal, 1990; Rafique et al., 2018; Tsai, 2001). The employees' absorptive capacity is effective in relation to high-level output in venturing projects and ultimately enhances the capability of firms to cope with internal risk factors (Rhee, 2008). Uma and Roger (2003) find that with respect to dynamic capability, absorptive capacity provides a margin to increase the overall growth of a business in terms of quality and value.

According to Murray and Kotabe (1999) firms should improve their efforts to acquire new knowledge by developing activities that would enhance sharing, distribution, and interpretation of knowledge, in return these knowledge activates directly affect the firm performance. Similarly, Harvey et al. (2010) argue that absorptive capacity directly influenced by the internal and external conditions of business and in return absorptive capacity enhances the performance of the firm. Likewise, Lichtenthaler (2016) establish an inverted U-shaped association between absorptive capacity and financial performance of the firm. García-Sánchez et al. (2018) analyze the two-dimensional role of absorptive capacity and find out the potential absorptive capacity of a firm is directly linked with the realized absorptive capacity, in return realized absorptive capacity significantly influence the firm performance. The knowledge transformation and exploitation of such knowledge provide avenues into the creation of new goods, systems, processes and knowledge (Spender, 1996; Zahra & George, 2002). As a result, firms will find themselves in a better position to promote business activities and achieve better firm performance. According to Kotabe et al. (2011) firms that lack knowledge transformation and exploitation do not have the capacity to internalize knowledge into their existing applications, procedures, and routine work to improve its market performance. According to Jansen, Van Den Bosch, and Volberda (2005), absorptive capacity provide the financial benefits to a firm by transforming and exploiting knowledge into products and services. Figure 3.6 presents the relationship between absorptive capacity and firm performance.

H5: Absorptive capacity has a positive effect on firm performance.

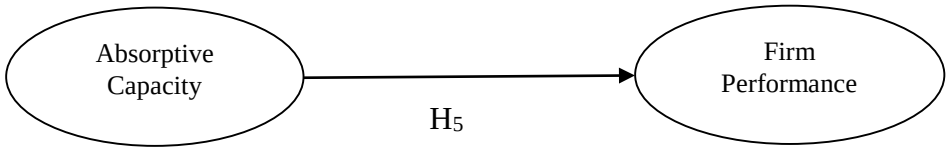


Figure 3.6: Relationship between Absorptive Capacity and Firm Performance

3.3.6 Corporate Entrepreneurship and Innovation Performance

Corporate entrepreneurship helps to explain the variations in performance indicators of the firm (Zahra & Covin, 1995). For instance, strong CE leverages the managerial expertise and the financial resources to develop a new product or services (Zahra & Covin, 1995). A high level of firms entrepreneurial venture considered a proactive attitude in observing the business environment and leverage the competitions and market insights to support take better decisions regarding new product innovation (Dess & Lumpkin, 2005). In addition, by focusing the innovation performance, firm with high of level CE try to find novel ideas, improve the operational processes and engage in the thinking of innovation that direct the firm to creation of new technologies and insights (Laursen & Salter, 2006; Rehman et al., 2018), which are essential for gaining high level of returns from the efforts of innovation. Additionally, a high level of self-renewal abilities of firms frequently embraces and strives the combinations of a new resource, which helps to advance in the processes of innovation and increase innovation performance. It is important to note that CE and innovation performance are conceptually and empirically different concepts despite their apparent similarity in terms of the dimension of innovation (Chen et al., 2015; Crossan & Apaydin, 2010; Lyver & Lu, 2018; Seidler, 1974). Innovation is a process by which attempts are made to transform inventions into marketable and value-adding products, processes, services, or organizational changes (Hayton, 2005). It encompasses the R&D activities that a firm undertakes for the purpose of improving innovation performance. According to Wang and Ahmed (2004), the innovation performance includes introducing new products to the market, or opening up new markets, by combining strategic orientation with innovative behavior and process.

H6: Corporate entrepreneurship has a positive effect on innovation performance.

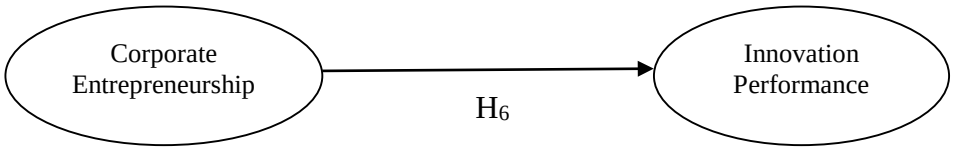


Figure 3.7: Relationship between Corporate Entrepreneurship and Innovation Performance

3.3.7 Corporate Entrepreneurship and Firm Performance

Corporate entrepreneurship is an antecedent of firm performance and an important strategic variable for a firm's process of survival in a competitive business environment (Armstrong & Sambamurthy, 1999; García-Sánchez et al., 2018; Tallon, Kraemer, & Gurbaxani, 2000). In the current environment of animosity, financial crisis, and low opportunities for business, it is necessary for firms to enhance their entrepreneurial activities by allowing business owners to seek innovative solutions and thus enhances firm performance (Covin & Slevin, 1991; Martín-Rojas, García-Morales, & García-Sánchez, 2011). The firms can achieve the targets of growth and profitability by recognizing the weakness and threats they face and solutions through corporate entrepreneurship activities (Antoncic & Hisrich, 2001; Tallon et al., 2000). Scholars suggest that entrepreneurial behavior is important for all types of firms to flourish in a competitive business environment (Simsek & Heavey, 2011). Hence, firms engage in corporate entrepreneurship activities (innovation, self-renewal, business venturing, and pro-activeness) to enhance competitiveness (Del Giudice & Straub, 2011; Simsek & Heavey, 2011) and achieve a first-mover advantage, which affects firm performance positively (Lindner, Murphy, & Briers, 2001).

In manufacturing firms, entrepreneurial behavior helps to exploit opportunities, creating a margin to introduce new services or products and fosters new business alliances (Martín-Rojas et al., 2011; Tallon et al., 2000). The studies (Lindner et al., 2001; Martín-Rojas et al., 2011) have shown a significant relationship between

corporate entrepreneurship and the performance of firms. Similarly, several studies show that entrepreneurial innovation encourages firms to take advantage of achieving a competitive edge over their rivals (Antoncic & Hisrich, 2001; Lindner et al., 2001). A firm's performance is elevated by incorporating innovation that ultimately empowers it to keep a track by evaluating improved changes in its different arrays of products and service (Zahra & Covin, 1995) which reduces firm's costs and incorporate high quality in a wide range of products (Pérez-López & Alegre, 2012). Similarly, the trail of cultivating innovation and incorporating the culture of R&D, firms tend to support the developmental changes in products and services to uplift the firm's performance (Crossan & Apaydin, 2010). Moreover, innovation-related activities enable firms to comprehend preliminary performance outcomes as an essential component to strengthen its financial performance.

Firms can gain emerging business opportunities by using the proactive approach that allows them to act on the demands of a future market (Lumpkin & Dess, 1996). CE is pertinent when an organization needs a successful business venture which has a positive influence on its performance. Past studies have also established the relationship between CE and firm performance (Aydiner et al., 2019). CE provides support in developing various departments for upcoming business enhancement and therefore makes it possible for organizations to attain success in business ventures, which in turn enhances firm performance (De Kok et al., 2011). The inclination of businesses towards venturing activities helps in improving overall performance in order to have a better competing position in the industry. The initiative of corporate entrepreneurship enables businesses to grow and learn, which in turn elevates firm performance (Benner, 2003; Vanacker, Zahra, & Holmes, 2017).

However, the strategic renewal process, which has been given an excessive value in firms, is implemented in the presence of corporate entrepreneurship (Heavey & Simsek, 2013). In recent times, SMEs have been giving consideration to explore new opportunities accessible to them and are aware of global trends, therefore, SMEs' inclination towards adopting a strategic renewal process has increased (Phan et al., 2009). In the strategic renewal process, organizations redefine themselves in terms of routine tasks, operational activities, and actions performed according to the base approach they follow. Such activities are different ways a firm tends to adopt when focuses on renewal process (Teece et al., 1997). Kotabe et al. (2011) argue that firms have a high survival rate as compared to other firms when the interest in entrepreneurial activities is high. Figure 3.8 presents the relationship between corporate entrepreneurship and SMEs performance.

H7: Corporate entrepreneurship has a positive effect on firm performance.

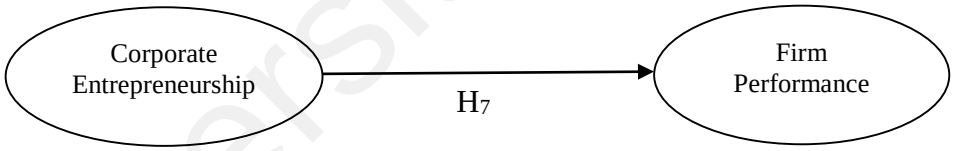


Figure 3.8: Relationship between Corporate Entrepreneurship and Firm Performance

3.3.8 Innovation Performance and Firm Performance

In the current era of the knowledge economy, innovation considered as the main source of competitive advantage (Daghfous, 2004; Kotabe et al., 2011). Innovation helps to create "isolation mechanisms" which shield the firm's profit margins and provide the financial benefits (Lavie, 2006). The existing literature shows that innovation outputs has a significant positive effect on firm performance and suggest that innovating firms are highly profitable as compare non (Jones & Grimshaw, 2016; Roberts, 2015). According to and Roberts (1999) the continuous level of innovations achievement

presents persistently high profits at the firm level. Similarly, Martínez-Caro et al. (2018) observed that innovation speed and magnitude positively influenced firm ROA. Innovation also presented a positive effect on firm sales growth of service firms (Kotabe et al., 2011). Furthermore in Canadian manufacturing firms, (Thornhill, 2006) highlighted that when knowledge assets are high, the effect of new innovations on revenue growth was greater for high -technolog

deploy and create their capabilities that help in long-term business performance (Teece, 2007). Based on the successful innovation, the other firms cannot easily imitate, which allow the firm to sustain their advantages (García-Morales et al., 2007), in return innovation performance enhance the firm performance. Figure 3.9 presents the relationship between innovation performance and firm performance.

H8: Innovation performance has a positive effect on firm performance.

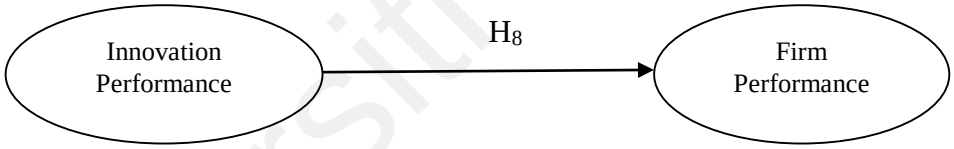


Figure 3.9: Relationship between Innovation Performance and Firm Performance

3.4 Mediating Role of Absorptive Capacity

Based on the dynamic capability view, dimensions of IT capability helps the firms to enhance the knowledge capabilities of firms which show the consistency with prior studies that proposed that IT capabilities can support the firms in developing the dynamic capabilities (Bolívar-Ramos et al., 2013; Pavlou & El Sawy, 2006; Uma & Roger, 2003). IT capabilities tend to enhance absorptive capacity through increasing knowledge exchange and its flow across a firm by quickly accessing the firm's database to make important decisions. Furthermore, IT capabilities enhance the ability of firms to acquire and manage new external knowledge. These capabilities enable firms to acquire,

assimilate, transfer and exploit knowledge resources within and across the boundaries of the firm. Furthermore, the firm's absorptive capacity also shapes this entrepreneurial behavior, which permits the company to develop learning processes that may help achieve a complex knowledge structure affected by the nature of initial experience and the cognitive attributes of entrepreneurs (BolíVar-Ramos, GarcíA-Morales, & GarcíA-SáNchez, 2012; Camisón & Forés, 2010).

Furthermore, IT increases the problem-solving ability of firms by exploiting knowledge to achieve performance goals. Firms invest in IT-based capabilities to manage advanced learning mechanisms that can lead a firm to attain competitive advantage (Mikalef & Pateli, 2017; Sambamurthy & Subramani, 2005). In addition, absorptive capacity acts as a key factor in determining the effectiveness of innovation (Sciascia, D'oria, Bruni, & Larrañeta, 2014). Thereby, absorptive capacity also mediates the relationship between IT capability dimensions and performance outcomes.

H9a: Absorptive capacity significantly mediate the relationship between IT capabilities and corporate entrepreneurship

H9b: Absorptive capacity significantly mediates the relationship between IT capabilities and performance outcomes.

3.5 Mediating Role of Corporate Entrepreneurship

The role of IT is presumed to be essential for entrepreneurial activities. IT capabilities ensure the efficiency of the firm's operational capabilities and are considered as an integral antecedent of initiating and promoting corporate entrepreneurship activities. IT capabilities support in the creation and sharing of relevant information, hence ensures smoothness in various business processes. Furthermore, effective communication with stakeholders across firms is a necessary source of corporate entrepreneurship activities. In addition, IT capabilities help to

anticipate exploring and taking opportunities that arise by bringing integration among several business processes and focusing on innovation activities.

Corporate entrepreneurship helps to explain the variations in performance indicators of the firm (Zahra & Covin, 1995). For instance, high corporate entrepreneurship leverages the managerial expertise and the financial resources to develop a new product or services (Zahra & Covin, 1995). A high level of firms entrepreneurial venture considered a proactive attitude in observing the business environment and leverage the competitions and market insights to support take better decisions regarding new product innovation (Dess & Lumpkin, 2005). In addition, by focusing the innovation performance, firm with high of level corporate entrepreneurship try to find novel ideas, improve the operational processes and engage in the thinking of innovation that direct the firm to creation of new technologies and insights (García-Sánchez et al., 2018; Laursen & Salter, 2006), which are essential for gaining high level of returns from the efforts of innovation outcomes. Additionally, a high level of self-renewal abilities of firms frequently embraces and strives the combinations of a new resource. Therefore, Firms with high levels of IT capabilities could engage in corporate entrepreneurship in a manner that develops new products, ventures in new business, and renews the existing operation with efficiency and effectiveness. Organizations that engage in entrepreneurial activities achieve higher levels of innovation performance and the overall performance of the firm (Chen et al., 2015). The results of the mediation analysis demonstrate that CE mediates the relationship between IT capability dimensions and performance outcomes.

Absorptive capacity is an important channel in capturing business opportunities because emerging opportunities are fundamental considerations of corporate entrepreneurship (García-Sánchez et al., 2018; Kuratko & Audretsch, 2009; Simsek &

Heavey, 2011). As, these channels support firms to minimize the risks associated with emerging opportunities and time constraints in the development of novel products and advanced technologies (Chesbrough & Bogers, 2014; Gregor, 2006). Absorptive capacity allows the influx of rich processes, bridges gaps in knowledge sharing processes and ensure to access the avenues to new knowledge for corporate entrepreneurship (Lane et al., 2006).

H10a: Corporate entrepreneurship significantly mediates the relationship between IT capabilities and performance outcomes.
H10b: Corporate entrepreneurship significantly mediates the relationship between IT capabilities and absorptive capacity.

3.6 Summary

The theoretical framework is elaborated in this chapter. In addition, hypotheses are built to conduct the research. The current framework has been built on the three famous theories which are resource-based theory and dynamic capability theory with the baseline assumption that IT capabilities are scarcely available resources, for instance, human expertise, specially designed software, etc., where are ACAP and CE are dynamic capabilities as they allow firms to adopt dynamic business environment to compete with other firms by utilizing knowledge and entrepreneurial resources in a unique combination to enhance firm performance. In elaborating this concept, IT capability dimensions allow knowledge activities to grow and in return, entrepreneurial activities flourish and SMEs performance increases. This research tests the direct relation hypotheses along with mediation paths between IT capabilities, ACAP, CE, and SMEs performance. The research method employed to empirically examine the eight main hypotheses and the mediation paths are discussed in the following chapter. The literature on the relationship between IT capabilities and SMEs performance shows the deficiency to explain the underlying mechanisms. Pertaining to this, the hypotheses

proposed in this study are hypothesized to suggest that ACAP and CE might be the missing link to explain the underlying mechanisms.

CHAPTER 4: RESEARCH METHOD

4.1 Introduction

This chapter confers the methodology of research employed as a part of this investigation. This chapter is alienated into twelve different parts. By following the first section, the second part constitutes a detailed discussion about research paradigms. The third part is about the research design. Furthermore, the fourth section explains the data collection along with the questionnaire development. The fifth part of this chapter explains the measurements of variables. The sixth section explains the pre-testing of measures and provides the results of a pilot study. After the significant results of the pilot study, section seven discussed research sampling designs, sample size, and selected sample justification for the full survey. In section eight, there is a discussion about data analysis technique. Section nine and ten describe the evaluation of the measurement model and the structural model of this study. Section eleven explains the mediation process. In the last section summary of this chapter is presented.

4.2 Research Paradigms

In the early 1960s, Thomas Kuhn initiated the philosophy of paradigm. It reinforced the thinking patterns and actions that depict value judgment, norms, standard, the frame of context, ideologies, myths, and theories as well as approved procedures (Gummesson, 2000). To conduct research, the selection of research design always depends upon the selection of the topic as well as the research paradigm (Creswell, Plano Clark, Gutmann, & Hanson, 2003). However, the research paradigm has also been described as “a basic set of beliefs, certain realistic assumptions that facilitate in designing a roadmap” (García-Sánchez, García-Morales, & Martín-Rojas, 2018). According to Erickson (1986), the positivist approach is assumed to be the most useful and became widely accepted in social science research.

García-Sánchez et al. (2018) pointed out a noteworthy aspect, in relation to the effectiveness of this approach, in which realities, objects and other measurable entities are explored. These studies have emphasized the nature of social science specifically about thinking patterns, actions, and behaviors of humans, which are necessary to be explored by the respondent(s). According to the philosophy of methodological analysis, the impersonality and objectivity of positivist research contributes to the concepts of reliability and validity, as it involves quantitative research methods; on the other hand, these concepts are not available in interpretive research because it is difficult to analyze the relationship between the researcher and what is being researched (Tashakkori & Creswell, 2007). Logical positivism employs experimental and quantitative methods by examining hypothetical deductive generalizations (Liu et al., 2016), and it is a dominant methodological approach in strategic management and IS literature (Foddy & Foddy, 1994).

4.2.1 Research Approach (Quantitative vs. Qualitative Methods)

In business and management research, the quantitative and qualitative approaches are commonly used to show the various data-gathering mechanisms and data analysis methods (Saunders & Lewis, 2009): namely, a questionnaire or a data analysis process such as statistics or graphs, used as part of the quantitative methods. The qualitative method involves interviews or data analysis procedures such as classifying information on a non-statistical basis.

According to Oppenheim (2000), the research questions determine the approaches to be adopted to conduct the research. Therefore, a quantitative method is employed in this study to assess the hypotheses and to extract data from the questionnaire. Van Teijlingen and Hundley (2001) states that a quantitative method is a systematic approach for combining deductive reasoning based on experimental

observations of the behavior patterns of individuals in order to find and verify a series of causative factors that could forecast broad patterns of human interactions.

A study by Hair Jr, Hult, Ringle, and Sarstedt (2016), suggested that quantitative research allows scholars to determine the relationship between the external and internal constructs on statistical grounds. This study computes the variables in the theoretical framework which is an essential component of the study in the paradigm of quantitative research (Westphal & Fredrickson, 2001). Hair Jr et al. (2016) state that they could validate a hypothesis with a high degree of reliability and this approach has also been applied in related strategic management studies with a high degree of success. Thus as this thesis examines the causal relationships among the underlying constructs based on empirical evidence, the quantitative approach is considered the more suitable one (Sharma, 1996).

4.2.2 Justification of the Research Paradigm Choice

The framework that has been selected to conduct this research is based on positivist ontology, empirical epistemology, and quantitative methodology. Several justifications for adopting this methodology are described below.

Firstly, renowned scholars have adopted a positivist approach in this area of research. According to Liu et al. (2016), the literature review provides the rationale for designing the framework regarding a particular phenomenon and its behavior, and this is essential for a researcher to formulate a model or research paradigm of their study. In a similar way, the present study also relies on the quantitative approach, as the existing literature provides a sound rationale to adopt the known variables and theories that actually support this study. Furthermore, this research has been undertaken to find out critical points (either in support of previous results or against the findings of previous studies). In addition to this, the quantitative approach exhibits various

advantages (for instance, it is a scientific method to explore realities) that are considered to be the foundation of positivist research, thereby providing sound reasons to test the hypotheses and utilize the data that supports the results of previous studies, is critical to the interpretive approach (Wicks & Freeman, 1998).

Researchers such as Hair Jr et al. (2016) and Westphal and Fredrickson (2001) have also pointed out the benefits of applying the quantitative approach in a way that demonstrates reliability and validity after the verification of the hypothesis. Furthermore, the replication of data is possible in future research if a scientific method is used, as it involves the replication of results that are essential for the testing of a theory (Flew, 1979). A positivist approach in the context of Pakistan provides many avenues to assess the greater benefits of IT capabilities. Finally, IT capability is a topic that has been explored using the quantitative approach. Thus it could be assumed that academics have shown a tendency to utilize the quantitative approach to investigate the topic of IT capabilities and SMEs performance, and therefore this approach could be adapted to conduct this particular study in the manufacturing sector SMEs of Pakistan.

4.3 Research Design

According to Kline (2005), the design of the research is an overall plan to answer the questions in the research study by determining the sources of data collection, and considering the potential limitations of the research as well as identifying the reasons for selecting a certain institution or field and then rationalizing its selection as an element for analysis. In general, the formulation of a research design is premised upon the aim of the study, the reason behind the objective of research, the area of research, the degree to which the researcher is able to manage the research, and the level of analysis. A survey is used in this study as it is beneficial to the study to have the interrelation, distribution and relative incidence of sociological and psychological

variables (Chin & Newsted, 1999). The research design is presented in the research methodology objectives section.

4.3.1 Research Methodology Objectives

The research methodology objectives used frequently in the literature are investigative, descriptive, or illustrative for an explanation (Saunders & Lewis, 2009). Explanatory research provides insights into the research problem and analyzes the issues from different perspectives. Kline (2005) state that explanatory research is a useful means of identifying events, obtaining new perspectives, making inquiries and analyzing experiences.

Descriptive research examines a particular hypothesis to analyze and verify predetermined theories. This type of research provides outlines the detail about people, occasions, or circumstances (Kline, 2005). The design of descriptive research enables researchers to analyze and determine the behavioral patterns of owners and managers. It establishes a causal relationship between variables and illustrative study (Saunders & Lewis, 2009). The importance of this type of research is to analyze circumstances with an objective of elaborating the association among variables, by performing an experiment and studying the events over a period of time (Cooper, 2000). This study has the main objective to explore and analyze the impact of IT capability dimensions on manufacturing SEMs performance in Pakistan. Therefore, this study undertakes the descriptive approach.

4.4 Data Collection Technique

This part describes the survey method related issues, sampling technique and demographic characteristic of responding firms in relation to this study.

4.4.1 The Survey Method

The suggested theoretical model is a sample of SMEs in Pakistan, as mentioned earlier. In this regard, the survey methodology, in particular, the questionnaire was the most suitable instrument for gathering data due to following reasons. Firstly, it is intended to take into consideration the disposition and orientations of the survey respondents' thoughts and to collect these responses and beliefs (Drost, 2011). Secondly, it is a precise measure for evaluating the data and the researcher can make deductions from the responses that can be generalized to reflect the whole population (Cohen, West, & Aiken, 2014). Thirdly, the survey methodology is the most appropriate method for causal research (Hair et al., 2003). Finally, the survey methodology is beneficial because this approach is fast, relatively inexpensive, effective and suitable for large samples (Karahanna, Straub, & Chervany, 1999). According to Luftman and Brier (1999), the survey methodology is the most appropriate tool when dealing with a sample size of more than 200 respondents.

On the other hand, there have been criticisms that the survey method depends on self-reported data, although it has its positive aspects (Spector, 1992). Problems are encountered when independent and dependent variables are calculated within the same measurement. This raises doubts regarding the inferences made from systematic responses that are misrepresented, as well as concerning the reliability and validity of the measures used in the instruments. The absence of control over punctuality, trouble in ensuring the truthfulness of responses from selected respondents and non-availability of detail or depth of data are some of the difficulties associated with survey methods (Fai Pun & Bhairo-Beekhoo, 2008). Hence, the guiding principles proposed by Fai Pun and Bhairo-Beekhoo (2008) were taken into consideration to ascertain the accuracy and reduce related problems. The following measures were taken to address those issues as, reliable and valid scales adapted from highly ranked journals (all the measures were

adopted from ISI, Q1and Q2 ranked journals) to measure the underlying constructs. The questionnaire was designed for easy comprehension and an unbiased response from the respondents. This minimizes the misrepresentations in the symmetric responses of the respondents.

4.4.2 Survey Questionnaire Development

Many surveys utilize a method known as questionnaire methodology to gather primary data (Saunders, 2011; Sharma, 1996), in which the questionnaire is essentially a set of specially designed and pre-formulated questions on a specific research topic (Karahanna et al., 1999). The questionnaire put to the respondents aims to take their responses in either written form or verbal responses, and as mentioned, the questionnaire methodology is often used for collecting data from large samples (McClelland, 1994).

One of the limitations faced by researchers in using this tool is the length of the questionnaire. It should not contain too many questions, to make it difficult for the respondents to answer, which may result in collecting insufficient data. In this regard, there are different views expressed by researchers. Lorelle Frazer and Lawley (2000) are of the view that a questionnaire that is twelve pages in length is adequate, whilst William (2003) believes that it should not be more than six pages. The questionnaire used in this thesis has fewer than six pages and is within the recommended length. The questions are clearly numbered and spaced to reduce eyestrain. Furthermore, considerable care was taken to ensure that the questions are in a logical sequence. Proper sequencing is imperative so as to overcome incomplete responses to the questions, which could affect the validity of the analysis (Foddy & Foddy, 1994). The flow of the topics was another criterion given serious attention in the design of the questionnaire. The topics were logically sequential, ensuring that the questions were

comprehensive in dealing with each topic before moving on, while simultaneously adhering to the objective of the research (Oppenheim, 2000).

The language and terminology used in this questionnaire were for easy communication with all respondents, including those that have nominal formal education level. The questions were clearly defined, easy to answer, unbiased, contextual and appropriate to SMEs. According to Lorelle Frazer and Lawley (2000), the respondents to the questionnaire should be able to read and comprehend the questions. This would motivate the respondents to answer the questionnaires in full.

The draft questionnaire was initially put through a test process by submitting it to several experts in their field for comments and suggestions, in an effort to identify any problems in the questionnaire. This process assists in minimizing vagueness and enhancing the clarity of the terms used in the questionnaire and thus ensure the reliability and validity of the research (Frazer et al., 2000). Much effort was applied by the researcher to develop an attractive instrument, with clear and easy to follow instructions, which could contribute to an increased rate and reduce the error of measurements (Sanchez, 1992). Based on the suggestions of academic scholars and industry experts, some changes bring in the questionnaire, such as statements of items refined and some questions are removed that are not suitable in the context of developing nations. Furthermore, as the survey was conducted for SMEs in Pakistan, it was necessary for the questionnaires to be made available in two languages, the national language of Pakistan, which is Urdu, and the language of international communication, English. This enabled the respondents to exercise their prerogative of answering in the language of their choice (see Appendix 2 & 4).

To obtain better participation in the survey, a necessary cover letter was provided, and attached to the first page of the questionnaire, inviting respondents to

contribute to the survey (see Appendix-1 & 3). The covering letter was aimed to motivate participants to answer each question entirely and to submit the completed questionnaire to the researcher. The introduction of the study along with objectives, as mentioned in the covering letter provided the assurance of upholding the confidentiality of responses and safeguarding the anonymity of respondents. It also provided other pertinent details, for instance, the researcher's contact particulars.

The questionnaire constitutes six sections. The first section contains questions with respect to demographics, whereas the other five sections are comprised of questions related to constructs. It was anticipated that individual respondents would need around 20 minutes to complete the questionnaire.

Section A: In this first section, questions were asked about each respondent's profile, including gender, education, age, experience, position in the firm and the number of employees in the firm.

Section B: In this section, eighteen questions were presented to respondents so that they could evaluate the IT capabilities: IT infrastructure flexibility, IT technical skills, IT integration and IT alignment. There are four questions on IT infrastructure flexibility, five questions on IT technical skills, four questions on IT integration, and five questions related to IT alignment.

Section C: This section discussed the respondent's interest in assessing the absorptive capacity of their firm, and required them to answer a total of eleven questions on absorptive capacity.

Section D: This section contained sixteen items relating to the corporate entrepreneurship of the firm and reflected four dimensions of corporate

entrepreneurship: innovation, self-renewal, business venture, and pro-activeness. The respondents were requested to make an assessment of abilities.

Section E: This section contained five items which reflected the innovation performance of SMEs. The respondents were asked to rank the innovations of performance items. The questions were asked regarding the process, product, behavior, strategy, and market innovation.

Section F: This section contained five items which reflected the firm performance. The respondents were asked to evaluate the performance of their firm as compared to that of competitors during the previous three years.

4.4.3 Questionnaire Translation and Back-to-Back Translation

Based on the nature of the study, some of the respondents of this questionnaire were non-English speakers and instead spoke in their own language, which is Urdu. Therefore, translation and back-to-back translation was necessary for the questionnaire. This process is crucial in such research, as different cultural dispositions could dictate the perspective of the responses, which could lead to variances and complication of the findings. So the researcher adopted a two-step approach to translating this questionnaire, as the development of the original questionnaire was in English. Furthermore, a qualified native Urdu translator, who is proficient in both languages, translated the original text in English into Urdu, as the first step in the translation process. After this, another accredited native Urdu-speaking translator, who is also fluent in both languages, translated the Urdu version back into English, and so through this process, it was possible to discover any variances or differences in the questionnaire translation. If there were any differences, actions to adjust for conflicting responses would be made by modifying the questions to ensure the similarity between the two versions. As pointed by (Malhotra, Agarwal, & Peterson, 1996), it is an important

criterion to ensure that the translators are proficient in both languages and accustomed to the culture, as a direct translation of particular words and phrases could lead to error. In order to ensure, therefore, that those translated versions were similar in the respective languages, a pre-testing of the survey prior to the actual survey was performed (Salciuviene, Auruskeviciene, & Lydeka, 2005).

4.5 Ethical Approval Process

In this study, first approval was granted by the research supervisor for the collection of data. After that, by following the guidelines of ethics committee, the data was collected from required sampling frame. A letter was attached with the questionnaire and present to each respondent, which show the approval from university. Based on the recommendations this study follows the following key points:

4.5.1 Respecting Autonomy

This study respects the autonomy of the individuals involved in this research. This includes:

1. Providing research participants with sufficient information to make an informed decision as to whether to take part in research (informed consent);
2. Ensuring that participants are not subject to coercion to take part or penalty for not taking part;
3. Ensuring that participants are, and are aware that they are, free to withdraw from the research at any time without giving a reason and without a prejudice;
4. Protecting and respecting personal data provided by participants through rigorous and appropriate procedures for confidentiality.

4.5.2 Maximizing Benefit

Ensuring that, this study provides the maximum benefits to respondents. This includes:

1. Designing, reviewing and conducting research in a manner that ensures quality and integrity and maximizes the chance of obtaining useful results;
2. Ensuring that research is effectively and appropriately disseminated;
3. Ensuring that the aims of the research are transparent and that the methodology used is appropriate in addressing them.

4.5.3 Being Fair

The nature of research not always allow the benefits, risks, and costs of the research to be distributed in a strictly fair manner and does not unfairly discriminate against certain individuals or groups.

4.6 Measurement of Variables

This research contains different scale validation techniques in order to measure the main constructs presented in the detailed integrated framework. The scale validation was conducted according to the sample of the research. Summing up, a 55 item scale was used to measure the constructs of this research. The items of the study were selected according to the criteria mentioned. First, only those items were chosen that met the threshold value of reliability (Alpha value 0.70 or above). Additionally, for the selection of items, theoretical judgment was used to analyze whether the items were from the domain of the constructs.

4.6.1 Operationalization of Constructs

The Likert scale has been used in this research for the operationalization of constructs. According to Kent (2001), to measure the latent constructs, the Likert scale is commonly used by researchers. This study applies the seven points of the Likert scale, that has a range from 1 = strongly disagree to 7 = strongly agree. For instance, IT

infrastructure flexibility was assessed by using the scales, where "1" presents the strongly disagree and "7" presents strongly agree. Seven point scales optimized the reliability and resulted in a strong correlation with the t-test results. If the scale point drops down by five or higher than seven, then data show less accuracy. A multi-item construct was employed in this study. Furthermore, a multi-item construct was basically used to ensure a comprehensive evaluation and for the avoidance of the single scale item measure (Nunnally, 1978; Peter, 1979). To accommodate the research sample, modifications were made and items were selected by following the suggestions of research scholars and targeted industrialists. After selecting, these items were validated in a pilot study.

4.6.2 Exogenous Variables

This study utilizes the four dimensions of IT capability as exogenous variables: IT infrastructure flexibility, IT technical skills, IT integration, and IT business alignment. Each dimension of IT capability has an important and distinctive role in defining performance outcomes. The items used to measure these variables are discussed in the following subsections.

4.6.2.1 IT Infrastructure Flexibility

IT infrastructure flexibility is defined as an ability of a firm to build a complete set of technological resources, which gives a base for IT applications development (Byrd & Turner, 2001; Ray et al., 2005; Saraf, Langdon, & Gosain, 2007). IT infrastructure flexibility is measured by four items, and respondents were asked about their firm's IT infrastructure flexibility as adoption for information sharing, compatibility, scalability, and modular. This study measures the IT infrastructure flexibility from Bhatt and Emdad (2010) and Premkumar and Potter (1995). Table 4.1 presents the items of IT infrastructure flexibility.

Table 4.1: Items of IT Infrastructure Flexibility

	Items
IT Infrastructure Flexibility (ITINF)	
1	Our firm information systems are adapted to share information.
2	Our firm information systems are more compatible.
3	Our firm information systems are scalable.
4	Our firm information systems are modular.

4.6.2.2 IT Technical Skills

IT technical skills are defined as, "The IT expertise to build IT applications by utilizing the existing technology and to develop products" (Mata et al., 1995). These skills contain knowledge of operating systems performance, programming languages, computer-based technical expertise, business application software performance, networks, and communications services efficiency (Byrd & Turner 2001; Tallon, 2008). IT technical skills were measured by five items on the 7 points Likert scale, and the measured from (Bolívar-Ramos et al., 2013; Ray et al., 2005). Table 4.2 presents the items of IT technical skills.

Table 4.2: Items of IT Technical Skills

	Items
IT Technical Skills (ITTS)	
1	Our firm's IT technical skills are closest to competitors in hardware and operating systems performance
2	Our firm's IT technical skills are closest to competitors in business applications software performance.
3	Our firm's IT technical skills are closest to competitors in communications services efficiency.
4	Our firm's IT technical skills are closest to competitors in the generation of programming languages.
5	Our firm's IT technical skills are closest to competitors in our staff possessing a high degree of computer-based technical expertise.

4.6.2.3 IT Integration

IT integration is defined as the extent to which firms link IT with their business partners, by supporting the partners to communicate and exchange information by establishing collaborative relationships (Chen et al., 2015; Rai & Sambamurthy, 2006). IT integration was measured by four items on the 7 points Likert scale, and the measured from Rai and Tang (2010). Table 4.3 presents the items of IT integration.

Table 4.3: Items of IT Integration

	Items
IT Integration (ITING)	
1	Our firm transfers data with our partners.
2	Our firm provides a seamless connection between our partner systems and our systems.
3	Our firm easily aggregates relevant information from our partner databases.
4	Our firm easily accesses data from our partners.

4.6.2.4 IT Alignment

IT alignment is defined as the extent to which IT and business operations share congruent goals and sustain a harmonious association (Kearns & Lederer, 2003; Luftman, Lyytinen, & Zvi, 2017). The five-item scale of IT business alignment with 7 points Likert scale and adapted from Kearns and Lederer (2003). Items of IT alignment were assessed on the basis of the business plan, strategies, external business environment forces and plan for specific information technology. Table 4.4 presents the items of IT alignment.

Table 4.4: Items of IT Alignment

	Items
IT Alignment (ITALI)	
1	Our firm's IT plans to reflect the business goals
2	Our firm's IT plans to support business strategies
3	Our firm's IT plans recognize external business environment forces
4	Our firm's plans refer to IT Plans
5	Our firm's plans refer to specific information technologies

4.6.3 Endogenous Variables

4.6.3.1 Absorptive Capacity

Based on the presented literature absorptive capacity considered as the second-order construct (Malhotra et al., 2005; Miles et al., 2003) with the dimensions of acquisition, assimilation, transformation, and exploitation. The first dimension of absorptive capacity, acquisition reflects the ability to recognize and acquire newly relevant knowledge; assimilation focuses on the ability to absorb and understand the newly obtained knowledge; transformation refers to the ability to combine the existing knowledge and the newly obtained knowledge; and exploitation reflects the ability to use new knowledge to attain the objectives of firm.

In this study, absorptive capacity was measured by eleven items, and Zahra and George (2002) developed these measures. Later on, Flatten et al. (2011) and Jiménez-Barrionuevo et al. (2011) refined these measures. After that, Jiménez-Castillo and Sánchez-Pérez (2013) assured the reliability of these measures. In the present research to measure the dimensions of absorptive capacity as knowledge acquisition is measured by utilizing the three items, similarly knowledge assimilation is measured by utilizing two items, knowledge transformation is assessed by four items and knowledge exploitation is measured by utilizing two items with 7 Likert scales. By considering a firm that has regular contact with your firm during the last three years, or by considering

with which your firm would like to do contact for the purpose to exchange or gain the current information or to gain the helpful knowledge to perform the firm's business. The measures adopted by Jiménez-Barrionuevo et al. (2011). Table 4.5 presents the items of absorptive capacity.

Table 4.5: Items of Variables Absorptive Capacity

	Items
Knowledge Acquisition (ACAC)	
1	Close personal interaction exists between the two organizations.
2	The relationship between the two organizations is characterized by mutual trust.
3	The relationship between the two organizations is characterized by a high level of reciprocity.
Knowledge Assimilation (ACAS)	
4	The organizational cultures of the two organizations are compatible.
5	The operating and management styles of the two organizations are compatible.
Knowledge Transformation (ACTR)	
6	Interdepartmental meetings are organized to discuss the development and tendencies of the organization.
7	The important data are transmitted regularly to all units.
8	When something important occurs, all units are informed within a short time.
9	The organization has the capabilities or abilities necessary to ensure that knowledge flows within the organization and is shared among the different units.
Knowledge Exploitation (ACEX)	
10	The division of functions and responsibilities regarding the use of information and knowledge obtained from outside is clear
11	The organization has the capabilities and abilities needed to exploit the information and knowledge obtained from outside.

4.6.3.2 Corporate Entrepreneurship

Corporate entrepreneurship is composed of four different dimensions of new business venturing, organizational innovation, self-renewal, proactiveness (Antoncic & Hisrich, 2001; Knight, 1997; Zahra, 1993). Business venturing reflects an emphasis on the creation of a new business unit or acquisition of a new business, and self-renewal reflects domain

redefinition and business model reconstruction. Innovation captures the creation and introduction of products, production processes, and organizational systems. Proactiveness is a stance that anticipates acting on future needs and market lacks, in that way generating an advantage over competitors by being the first to act.

The present research adopted sixteen items to measure corporate entrepreneurship. The four items adapted to measure the new business venturing, that was developed by the Zahra (1993), similarly, four items used to measure the organizational innovation, that was developed by the Zahra (1993), proactiveness is measured by utilizing four items which were developed by De Vaus and de Vaus (2001), and self- renewal is measured by utilizing four items which were developed by Collinson (2003) employing the 7 point-Likert scales. Table 4.6 presents the items of corporate entrepreneurship.

Table 4.6: Items of Corporate Entrepreneurship

	Items
In the last three years:	
New Business Venturing	
1	The organization has stimulated new demands for the existing products/services in the current markets through aggressive advertising and marketing.
2	The organization has broadened its business lines in the current industries.
3	The organization has pursued new businesses in new industries related to the current business.
4	The organization has entered new businesses by offering new lines and products/services.
Organizational Innovation	
5	Our firm has significantly increased its spending on new product/service development activities.
6	Our firm has significantly increased the number of products/services added by the organization and already existing in the market.
7	Our firm has significantly increased the number of new products/services that the organization introduces for the first time in the market.
8	Our firm has significantly increased its emphasis on R&D, technological leadership, and innovations.

Proactiveness	
9	In dealing with competitors, the organization is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
10	In general, the top managers at this firm have a strong inclination toward high-risk projects (with chances of very high returns).
11	In general, the top managers at this firm believe that owing to the nature of the environment, bold wide-ranging acts are necessary to achieve the firm's objectives.
12	When confronted with decision-making situations involving uncertainty, this organization typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.
Self-Renewal	
13	The organization has reorganized units and divisions to increase organizational innovation.
14	The organization has coordinated activities among units to enhance organizational innovation.
15	The organization has adopted flexible organizational structures to increase innovation.
16	The organization has trained and encouraged its employees to be creative and innovative.

4.6.3.3 Innovation Performance

Wang and Ahmed (2004, p. 304) build on this idea by proposing that innovation performance includes "introduc[ing] new products to the market, or open[ing] up new markets, through combining strategic orientation with innovative behavior and process." By following the work of Wang and Ahmed (2004) this study measures the innovation performance by five items. Wang and Ahmed (2004) conceptualized the innovation performance in five dimensions: (I) product; (II) process; (III) strategy; (IV) behavior; and (V) market innovation. A five-item short scale was developed by (Parida, Sjödin, Lenka, & Wincent, 2015) by following the conceptualizations of Wang and Ahmed (2004). Before conducting the survey the measures of innovation performance were modified and pretested by following the suggestions of practitioners and scholars. The items of innovation performance are assessed by employing the 7 point-Likert scales,

where 1 = strongly disagree and 7 = strongly agree. Table 4.7 presents the items of Innovation performance.

Table 4.7: Items of Innovation Performance

	Items
Innovation Performance	
1	In our firm, we are better able to replace products/services being phased out than our competitors in the industry.
2	In our firm, we are better able to extend our existing product/service range using new technologies.
3	In our firm, we are better able to extend our existing product/service range using improved technologies.
4	In our firm, we are better at extending our product/service range outside our main product/service field than our competitors in industry
5	In our firm, we have a lower average cost per innovation project than our competitors in the industry

4.6.3.4 Firm Performance

Firm performance defined as the effectiveness and efficiency of a firm (Venkatraman & Ramanujam, 1986). This study adopts the scale of five-items to measure the performance of a firm which was developed by Murray and Kotabe (1999). In the strategic management studies, it is the common practices to utilize the scales for evaluating the performance of the firm as compared to main competitors (Choi et al., 2008). There exists a high concurrent validity among the subjective and objective data on the performance, which implies that both are valid when analyzing the performance of the firm (Venkatraman & Ramanujam, 1986). Therefore the present study contained items involving both kinds of measurement in the survey questionnaire. These items of firm performance were also utilized by Alegre et al. (2013) to assess the growth and profitability in SMEs. The items of firm performance are assessed by employing the 7 point-Likert scales, where 1 = Much worse than my competitors and 7 = Much better than my competitors in the last three years. Table 4.8 presents the items of firm performance.

Table 4.8: Items of Firm Performance

	Items
Firm Performance (FP)	
1	Our firm has been able to increase its return on assets.
2	Our firm has been able to increase its return on equity.
3	Our firm has been able to increase its return on sales.
4	Our firm market share increased as compared to major competitors in the market.
5	Our firm sale growth increased as compared to major competitors in the market.

4.7 Pre-Test

According to Lewis, Templeton, and Byrd (2005), pre-testing is the process to obtain the empirical response from a targeted sample to judge the suitability of the original instrument. During the process of pre-testing, the respondents are requested to complete the research instruments and review the matters related for the preliminary design of instruments, such as content, format, terminologies, understandability, and speed and ease of completion (Lewis et al., 2005). (Bell, Bryman, & Harley, 2018) suggest that an instrument pre-testing is an important process as it shows how well research questions stream and develop the instruments comprehension, and permits the research scholar to ensure the instructions provided sufficiency to respondents.

According to Straub (1989), the process of pretesting is also important to establish the content validity of instruments, as content validity presents the appropriateness of the items on the instruments for measuring a variable (Lewis et al., 2005; Straub, Boudreau, & Gefen, 2004). By following the guidelines of Lewis et al. (2005) current study establishes the content validity through carrying out the pre-tests and pilot study.

4.7.1 Pilot Study

A pilot study was performed to find out the uniformity of the questionnaire items and the respondents' understanding of the research questionnaire. According to (Van Teijlingen & Hundley, 2001), with the help of a pilot study, the researcher can be on the safe end for future research by following the respondents' suggestions in relation to any awkward techniques or questions. In this pilot study, a simple random sampling technique was used in the sample selection. By following the suggestions of Luckas, Hair, & Ortinau (2004), for the appropriate statistically testing procedures, total 83 respondents were engaged in this test study, whereas the respondents were familiar with the research objectives and with the environment of the manufacturing sector in Pakistan.

4.7.1.1 Participants

Table 4.9 presents the demographic information of respondents for the pilot study. The response rate in each industry was textile 23%, leather 17%, sports 13%, food & beverages 38%, metal 07%, wood & furniture 07% and others 22%. The overall response rate from the industry was 39%. Dess, Ireland, and Hitt (1990) stated that collecting samples from multiple industries allows having a wide range of information and present higher generalizable results than taking data from only one industry. About 73% of entrepreneurs were male and 27% were female.

Table 4.9: Demographic Characteristics of Responding Firms

Demographic Profile	Respondents (83)	Valid %
Industry:		
Textile	19	23
Leather	14	17
Sports	11	13
Food and Beverage	09	11
Metal	06	07
Wood	06	07
Other	18	22
Gender:		
Male	61	73
Female	22	27
Age:		
Less than 40 years	52	63
More than 40 years	31	37
CEO Education Level:		
Metric	13	16
FA/ FSC	22	27
BA/BSC	34	40
Masters or More	14	17
Experience:		
<5 years	19	23
5-10 Years	46	55
>10 years	18	22

4.7.1.2 Results Discussion of Pilot Study

The observation and suggestions of respondents in the pilot study highlight many flaws in the questionnaire. For instance, respondents suggest that extra space should be between respective groups of questions within a similar section would make it feasible to read the questionnaire. The respondents of the pilot study further proposed that the instructions for each construct should be more précised and simplified, while the scale should be given on each page for those items of the questionnaire that occupied more

pages. Therefore, before the full data collection, the questionnaire was amended and improved in all these aspects.

The Cronbach alpha was used to assess constructs reliability (Churchill, 1979). Commonly, the acceptable value of the Cronbach alpha (reliability) is higher than 0.70 (Hair Jr et al., 2016). Table 4.10 shows the composite reliability values ranged from 0.862 to 0.937, and Cronbach's ranged from 0.827 to 0.913. The reliability and validity of composite reliability (CR) values and Cronbach's alpha values were above than 0.7 and acceptable, hence, all values of all constructs fell into the acceptable range. However, due to the small sample size in the pilot study, it is not possible to check the validity of the data. Therefore, the validity assessment was performed after the collection of the final data collection.

Table 4.10: Reliability for Pilot Study

	Cronbach's Alpha	Composite Reliability
ACAP	0.913	0.927
CE	0.901	0.937
FP	0.886	0.901
IP	0.851	0.873
ITALI	0.846	0.891
ITINF	0.836	0.862
ITING	0.827	0.875
ITTS	0.869	0.899

4.8 Sampling Design

Sampling design is concerned with the detection and explanation of the target population, sampling frame and sample size (Cooper & Schindler, 2000). These concepts are explained in the following section.

4.8.1 Target Population

The target population is the total number of units of analysis (Cooper & Schindler, 2000) and it can also be described as the total cluster of units of analysis required for research (Hire at al., 2007). Four factors have been identified to impact the target population: information on the area of interest, ease of approach to the unit analysis (firms), availability of these units, and the period of time. A unit of analysis refers to the degree of accumulation of data gathered in the initial stage of data analysis (Uma & Roger, 2003). In the present thesis, the unit of analysis is a medium-sized manufacturing firm. Information was gathered through questionnaires from the founders/CEOs of the firms (SMEs), who are the key informants, suggested by (BolíVar-Ramos et al., 2012; Westphal & Fredrickson, 2001). The criteria were defined for the informants, for instance, firstly, informants must be able to generalize the patterns of significant behavior based on the summary of observed or expected firm relations (Seidler, 1974). Secondly, informants must have enough knowledge to comprehend the contents of the research study (Phillips & Bagozzi, 1986). According to Seidler (1974), a single key informant method is justifiable on the basis that one informant per unit of analysis would have equivalent access to information just like other prospective participants of the study. In this way choosing the most suitable key informant tends to reduce complications related to the non-adoption of multiple informant methods (Kumar et al., 1993). Based on the given reasons, a single key informant technique is implemented for the current study, which has also been adopted in related IS research areas (Armstrong & Sambamurthy, 1999; Tallon et al., 2000). An in-depth overview of the founders/CEOs related to their company's business activities was a critical consideration. Furthermore, many information systems and management researchers (Chen et al., 2015; DeLone & McLean, 1992) suggested that executives/senior managers are a critical source of information not just because they

have personal experience as the direct IT users, but also as they have involvement in making IT investment decision making.

This study considered those firms that are registered by SMEDA. So, while the total numbers of registered medium-sized firms (50–250 employees) are 9,606 in Punjab. In this study, only medium-sized firms are under observation, based on the SME definition by the SMEDA (2013). In Pakistan, there are 72 districts and the major clusters of manufacturing SMEs are in Lahore, Faisalabad, Karachi, Multan, Sialkot, Gujarat, Hyderabad, Sheikhupura, Gujranwala and Quetta. Out of these 10 major clusters, seven districts are located in Punjab (Khurrum S. Bhutta et al., 2008). Manufacturing SMEs are divided into different industries based on the clusters; namely, textiles, leather, metal, food, and sports. This study uses all manufacturing sector industries as the population to enhance the generalizability of this study. Earlier studies in a similar context also take all industries and analyze the performance of manufacturing sector SMEs (Jones & Grimshaw, 2016; Stoffels & Leker, 2018).

4.8.2 Sampling Frame

A sampling frame is a complete record of units from which the sample is selected (Hair et al., 2007). As outlined by Sekaran (2003), the sampling frame, which provides a record of the diverse units in the population, is usually not updated periodically. However, a few inclusions or omissions would not have a major effect on the study. The design of the sampling frame is done upon obtaining the profiles and contact details of SMEs in the manufacturing sector. The information on the SMEs in Punjab province of Pakistan was provided by SMEDA.

4.8.3 Sampling Method

According to Bordens and Abbott (2002), a study will normally deal with a representative portion of the population, as it is different to study the total population. Based on their study, a sample is a sub-component selected form the total population. Referring to previous studies by Bordens and Abbott (2002); Uma and Roger (2003); and Saunders and Lewis (2009), the two varied sampling approaches are:

I. Probability or representative sampling; and

II. Non-probability or judgmental sampling

According to Saunders and Lewis (2009), it is possible to generalize the research findings from a sample of the population statistically, provided a probability or representative sampling method. Here, to reflect the representativeness of the population, this study adopted a probability-based sampling method. Also for this study, cluster sampling is a more appropriate and suitable sampling technique because SMEs in the manufacturing sector have a cluster in the province of Punjab.

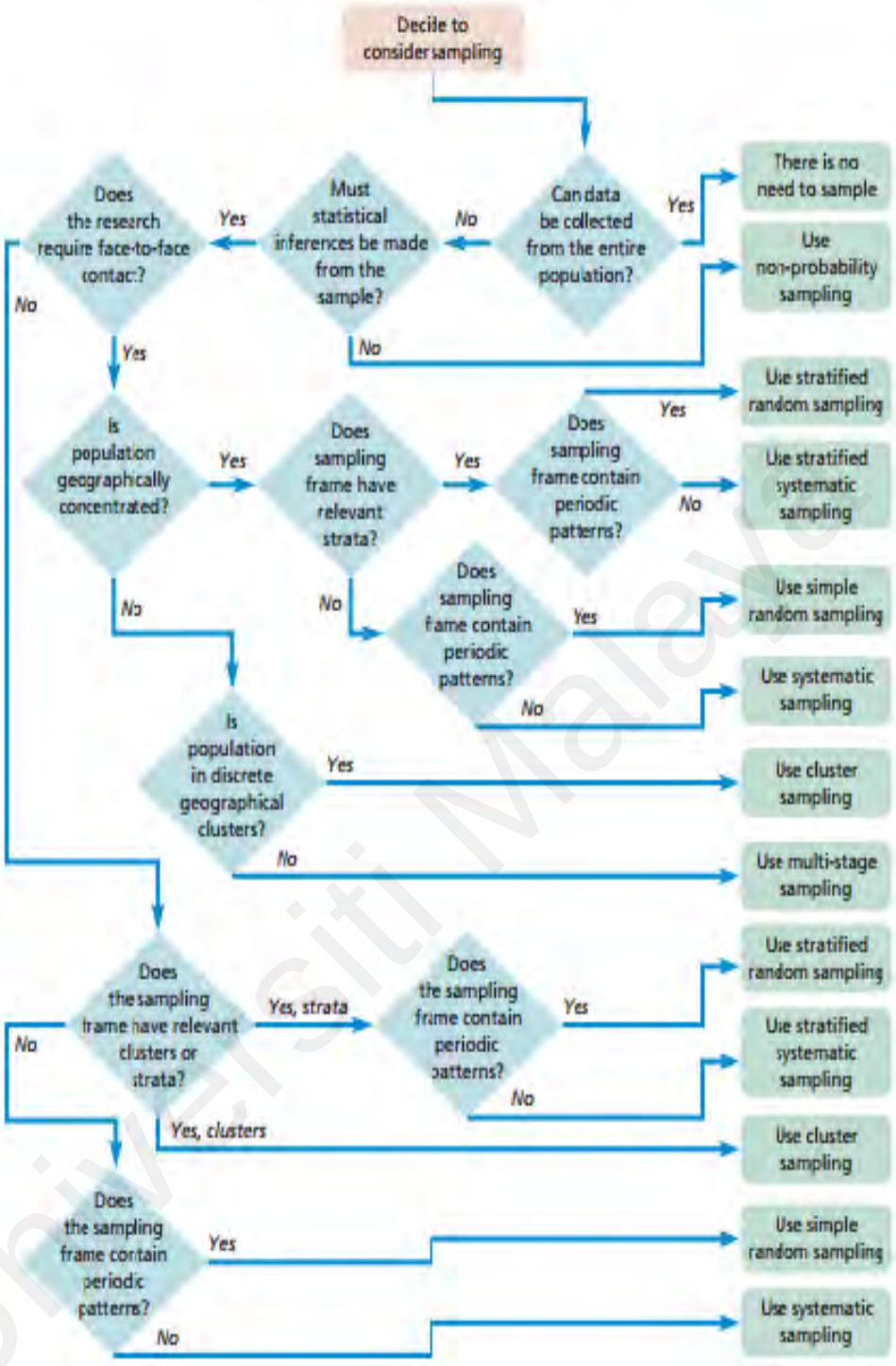


Figure 4.1: Sampling Method

4.8.4 Sample Size

Saunders at al. (2009) maintains that generalization about the population relates directly to the size of the sample. Sampling is the process of selecting a certain number of cases from a set of the population. The selection of these units is based on criteria that produce the outcome by generalizing the sample of the total population. According to Lindner et al. (2001), the minimum sample size can be calculated on the basis of the known

population. Table 4.11 indicates that based on the minimum sample size, the required sample size is related to population size, with a margin of error of 5%, is 370 for Punjab, Pakistan.

Table 4.11: Minimum Sample Size Required

	Margin of Error			
Population	**5%**	**3%**	**2%**	**1%**
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	343	384
500	217	340	414	475
750	254	440	571	696
1,000	278	516	706	906
2,000	322	696	1091	1655
5,000	357	879	1622	3288
10,000	***370***	***964***	***1936***	***4899***
100,000	383	1056	2345	8762
1,000,000	384	1066	2395	9513
10,000,000	384	1067	2400	9595

Samples for this study are selected from SMEDA database, which maintains the SMEs and does the registration of these firms. By following the guidelines of Lindner et al. (2001) about sample size, the size is 417 respondents from Punjab, Pakistan, for manufacturing SMEs. In Pakistan, the major manufacturing industries are textiles, with 21%; leather 14%; sports 12%; food industry19%; metal, machinery, and equipment 8%; wood and furniture 10%; and others 16%. The manufacturing sector makes a significant contribution to the country's exports.

In Pakistan, the textile manufacturing sector has a dominant position in GDP, followed by leather, food, and beverages (Economic Survey of Pakistan, 2013). For this study, 1,200 firms (1,008 from 6 major industries and 192 from other industries such as printing, chemicals, carpet weaving, and electronics) have been selected as samples based on the percentage of firms. Those industries will be under observations that have a large share in exports and IT resources (excluding the micro and small firms).

Keeping in mind that over 65% of manufacturing SMEs are in Punjab and out of 10 major SME city clusters, seven are in Punjab, therefore, manufacturing SMEs in Punjab are the ones targeted for this research. There are total 14,722 medium-size firms registered by SMEDA in Pakistan, out of which 8,623 are registered in seven cities of Punjab. Hence by adopting the approach of cluster sampling (Khurrum S. Bhutta et al., 2008), each SME is selected on the basis of its percentage in the total population.

4.8.5 Summary of Data Collection

Table 4.12 presents the summary of methodology. As the unit of sampling of this study is manufacturing firms and the respondents of the questionnaire are CEOs and top management. The sample of 417 respondents was collected by distributing 1200 questionnaires. In social science studies, the average response rate from the firms/organizations through survey method is 35% (Baruch & Holtom, 2008) therefore, total 1200 questionnaires were distributed among different industries to achieve the minimum sample size requirement of 370. In this study, only those medium-sized manufacturing firms were considered which were registered in SMEDA. The data was collected during the time period of Jan 2017 to May 2017.

Table 4.12: Summary of Data Collection

Unit of Analysis	SMEs in the Manufacturing Sector
Unit of Sampling	Firms
Respondents	CEOs and senior managers in the manufacturing sector (Punjab)
Population	8623 (firms)
Sample Size	417 respondents
Extent	Manufacturing SMEs listed in SMEDA, Pakistan
Time	Jan 2017-May 2017 for 5 months

4.9 Data Analysis: Introduction to Structural Equation Modelling (SEM)

Structural equation modeling (SEM) was employed to test the hypothesis mentioned in Chapter three, by using CFA. It is commonly observed that SEM methodology is useful in behavioral and social sciences where several constructs are unobservable (Sharma, 1996). Thus, to evaluate the reliability, uni-dimensionality, and validity of all constructs, SEM is of considerable use to researchers. In addition, with the help of SEM, the researcher can judge the model fitness and simultaneously assess the test of individual parameter estimates (Hair, Anderson, Tatham, & William, 1998; Kline, 2005). In academic research, scholars commonly use SEM in their analysis, specifically in social sciences (Barjis, Gupta, & Sharda, 2011; Kline, 2005). Additionally, for multivariate data analysis, SEM is considered to be a superlative method (Hershberger, 2003). Furthermore, researchers can simultaneously investigate all the hypothesized associations between variables, including several dependent variables in one piece of research (Byrne, 2001). Researchers have highlighted two important substitutes in using SEM as software for covariance-based techniques such as LISREL, AMOS, EQS,

and software for variance-based techniques are Smart PLS and PLS-Graph (Chin & Newsted, 1999).

4.9.1 SEM Assumptions

There are several assumptions in applying SEM for data analysis, such as adequate sample size and normally distributed data. The assumption of data normality is very important because if data is not normal then it contributes to the violation of other assumptions (Sharma, 1996). Furthermore, the adequate sample size is required in order to apply SEM, as in small sample size estimations, correlation and co-variance are less stable (Kline, 2005; Tabachnick & Fidell, 2001). In addition, with small sample size, it is difficult to identify a significant path coefficient, and also covariance matrix instability is created (sample error), thus resulting in inadmissible solutions and providing the low-level goodness of fit indices (Quintana & Maxwell, 1999).

Hence, according to the rules of thumb as discussed above, PLS-SEM is employed in this study to analyze the theoretical research model on the basis of the following reasons:

1. The emphasis in this study is not to measure model invariance. The current study has been focused to predict factors in relation to members' continuous knowledge sharing intention. Therefore, the scores of latent variables are essential to analyze the underlying connection between the latent variables.

2. This study analyzes a large number of latent variables and complex modeling of a theoretical model. Henseler, Ringle, and Sinkovics (2009) stated that the more appropriate technique for complex models is PLS.

3. This study is an effort to examine the relationships on the basis of knowledge gathered from the previous literature. The PLS-SEM makes an estimation of the

correlations between the residual values of variables and assesses their impact on an integrated theoretical model.

Table 4.13: Rules of Thumb in Selecting between CB-SEM and PLS-SEM

	Criteria to Evaluate	CB-SEM	PLS-SEM
1	**Research goal**		
	i. Predicting key target constructs		✓
	ii. Theory testing, theory confirmation or comparison of alternative theories	✓	
	iii. Exploratory of an extension of an existing structural theory		✓
2	**Measurement model specification**		
	i. If formative constructs are part of the structural model	✓	✓
	ii. If error terms require additional specification such as co-variation		
3	**The structural model**		
	i. If a structural model is complex		✓
	ii. If a structural model is non-recursive	✓	
4	**Data characteristics and algorithm**		
	i. Data meet distributional assumptions	✓	
	ii. Data did not meet distributional assumptions		✓
	iii. Small sample size consideration		✓
	iv. Large sample size consideration	✓	✓
	v. Non-normal distribution		✓
	vi. Normal distribution	✓	✓
5	**Model evaluation**		
	i. Use latent variable scores in subsequent analyses		✓
	ii. Requires global goodness of fit criterion	✓	
	iii. Need to test for measurement model invariance	✓	

Adapted from: Henseler et al. (2009) and Hair et al. (2011)

Table 4.13 presents a summary of the rules of thumb in selecting between CB-SEM and PLS-SEM. The econometrician, Herman Wold made PLS, which is based on the alternate least squares algorithms, which also has the ability in extending principal components and performing canonical analysis of constructs which is based on

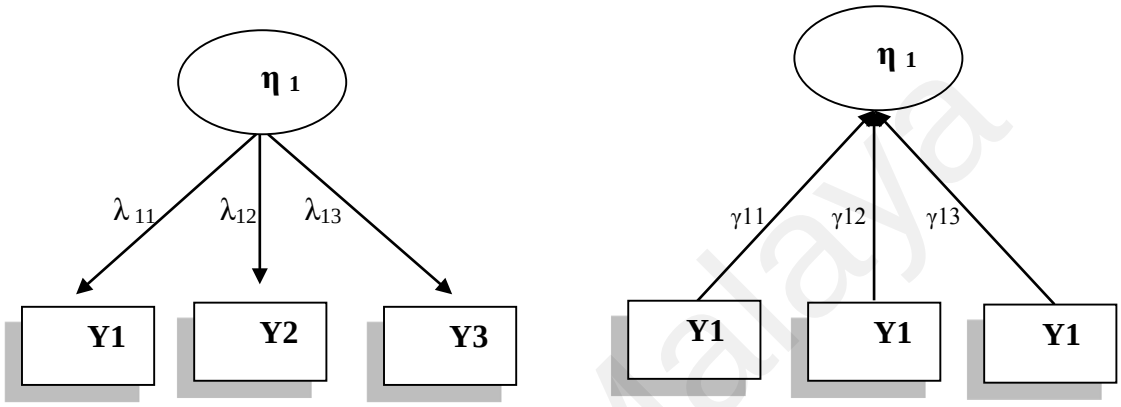
correlation (Henseler et al., 2009). According to Henseler et al. (2009), the model with paths represents the measurement model as well as the structural model. The measurement model postulates the relationships between unobserved, on the other hand, the outer model identifies the relationships between latent variables and the observed variables.

4.9.2 Reflective and Formative Constructs

Based on SEM literature, the modeling of a latent variable can be done by using either formative or reflective indicators. Jarvis, MacKenzie, and Podsakoff (2003) stated that reflective variables can be used as constructs that are affected by another underlying construct, which requires parallel measures that also co-vary and at the same time measure another underlying construct. The arrow direction in the reflective construct is from LV to the reflective indicators. Additionally, the indicators in-case of reflective construct ought to be internally consistent for the reason that all of the measures are considered to be equally valid indicators of the underlying latent variable (Ringle & Sarstedt, 2016). In a reflective construct, the group of indicators joins up to defines the conceptual and empirical meaning of the construct. The direction of causality flows from indicators to a latent variable (Jarvis et al., 2003). The internal consistency has importance for a reflective construct. Therefore, the uses of internal reliability measures require making sure that the measures have reliability. In addition to that, a reflective construct tends to be uni-dimensional and in case if any measures are removed, it will not have an effect on the content validity (Ringle & Sarstedt, 2016).

The formative construct is referred to as the type of construct that has formative indicators that are also combined to attribute some meaning to the latent variable (Petter et al., 2007). Formative indicators are not necessarily correlated, also they are not highly internal consistency and any variations in the formative measures will change the underlying construct (Jarvis et al., 2003). A formative construct causes the latent

construct to represent different dimensions of it (Gefen, Straub, & Boudreau, 2000). These observed variables are not assumed to be correlated with each other or to represent the same underlying dimension (Chin, 1998a). The arrow direction in the formative construct is from the formative indicators to LV. Figure 4.2 shows the diagram of reflective and formative constructs.



Adopted from: Petter et al. (2007)

Figure 4.2: The Diagrams of Reflective and Formative Constructs

When constructs use reflective measures, loadings are also examined as they represent the correlation between the indicators and component scores (Gefen et al., 2000). On the other hand, for the constructs with formative measures, their interpretation should be based on weight because they offer information with respect to the importance of each indicator to form a component (Chin, 1998a). In this study, all LVs are modeled as formative measures. The causality flow of each latent variable is dependent on the previous information collected during the literature review phase. By using prior knowledge is important to determine the causality flow is very important to avoid measurement model misspecification (Henseler et al., 2009).

4.10 Evaluating Measurement Model Using Partial Least Square

In this study, the assessment of a theoretical model is done by using a two-step process. Firstly, by assessing the measurement model and secondly, by assessing the structural model. Generally, the aim of the model validation is to find out whether both models (measurement and structural) justify the quality criteria empirically (Urbach & Ahlemann, 2010). The following sections elaborate on the guidelines used in this study in the assessment of both measurement and the structural model of the current thesis.

4.10.1 Measurement Model

The validation of a reflective measurement model is based on testing its reliability and validity (Lewis et al., 2005; Straub et al., 2004).

4.10.2 Internal Consistency

Reliability is defined as the degree to which methods for gathering data or techniques of evaluation will generate similar outcomes (Saunders & Lewis, 2009), and measurement is considered reliable when the predictions generated are consistent when reflecting unchanging social situations, regardless of differences in techniques and probability of chance. “A reliable measure is stable and devoid of the effects of random errors” (Brewer & Hunter, 1989). Usually, researchers rely on two common approaches to assess the reliability of an instrument, and both approaches require internal consistency of measurement. The first approach is an evaluation based on Cronbach’s Alpha, that determines the extent to which the items in a cluster interrelate positively with each other (Uma & Roger, 2003). Generally, an alpha value below 0.6 is regarded as poor, those in the range of 0.7 to 0.8 are acceptable and those over 0.8 are considered to be good (Sekaran & Bougie, 2016).

The second method involves assessing the composite reliability derived from the SEM analysis. This method measures the internal consistency and thus is equal to

Cronbach's coefficient alpha. However, according to Shook, Ketchen Jr, Hult, and Kacmar (2004), a better choice is composite reliability, as this latter approach considers the standardized loadings and measurements error for each item over the coefficient alpha. The coefficient alpha has limitations; for instance, it assumes that all items have an equal distribution to reliability; in this research, both criteria are used for determining the extent of reliability.

4.10.3 Indicator Reliability

To assess the reliability of indicators, the evaluation is done up to the extent when constructs have consistency with what it is intended to measure (Urbach & Ahlemann, 2010). The reliability construct is independent and is calculated independently from other constructs. According to Chin (1998b), the loading value of an indicator must be significant up to 0.05 level and the loading must be greater than 0.7. According to Hensler et al. (2009), in PLS, one has to be cautious when to eliminate an indicator. The indicator with low reliability is removed as a result it increases CR.

4.10.4 Validity

Researchers are also concerned with the data validity of the research. The validity of a questionnaire is determined by using measurement techniques to compute the selected items (Sekaran & Bougie, 2016). Most studies rely on two types of validity reporting: namely, face or content validity and construct validity.

4.10.4.1 Face or Content Validity

Based on comments and recommendations a final version of questionnaires was established. Content validity ensures that from the initial phase of scale development, the set of units generated are re-elections of the main hypothesis. Content validity measures at the preliminary stage of scale explanations by creating a set of units and subsequent evaluations by laypeople or experts or both (Netemeyer, Bearden, &

Sharma, 2003). This study involves scanning the literature to identify current scales and undertaking interviews with experts in the field, including academic and industrial leaders. In addition, the questionnaire would be submitted to at least three experts in the field of study, to appraise whether the questionnaire is lucid, user-friendly, and conducive to reading and has suitable response formats.

4.10.4.2 Construct Validity

Construct validity explores the magnitude to which a selected measure corresponds to other similar measures with the theoretically based hypothesis constructs that are being assessed (Carmines & Zeller, 1979). It is often necessary to determine to construct validity by conducting three tests: namely, convergent validity, discriminant validity, and nomological validity.

Convergent validity is considered to be present when items used to compute the same construct are interrelated at least in some moderate magnitude (Kane, 2010). It can be determined by verifying the importance and strength of correlations among the items in the same construct (Netemeyer et al., 2003). Convergent and discriminant validity could also be determined by using the statistical method called confirmatory factor analysis. According to Jiang et al., (2009) convergent validity examines factor loading and the average variance extracted (AVE). As an initial step, factor loadings of more than 0.35 are acceptable. In the next step, the AVE is determined. The AVE calculates the overall degree of variance in the indicators, accounted for by the latent construct. A threshold level of 50% normality indicates an acceptable AVE (Bagozzi & Yi, 1988). These general criteria are reliable in order to examine the convergent validity of constructs.

A pool of items assumed to calculate various exhibit discriminant validity if their interrelationships are not significantly high (Kline, 2010). In other words,

discriminant validity requires that a variable should not correspond significantly with other variables from which it is expected to differ (Netemeyer et al., 2003). Discriminant validity is evaluated using a general test as proposed by Bagozzi and Yi (1988). They recommend that the AVE for each individual construct should be more than the squared correlation of that construct with another construct (Hair, Ringle, & Sarstedt, 2013). Table 4.14 provides the validity guidelines.

Table 4.14: Validity Guidelines for Assessing Reflective Measurement Model

	Validity Type	Criterion	Guidelines
1	Internal consistency	CR	CR > 0.7 (for exploratory study) CR > 0.8 (advance research) CR < 0.6—lack of reliability
2	Indicator reliability	Indicator loadings	Item's loading > 0.7 and significant at least at the 0.05 level
3	Convergent validity	AVE	AVE > 0.50
4	Discriminant validity	Cross loading	Item's loading of each indicator is highest for its designated construct.
		Fornell and Larcker	The square root of the AVE of a construct should be greater than the correlations between the construct and other constructs in the mode

Therefore, in the present study the validity of the measurement model is acceptable when:

1. The value of CR is higher than 0.8.

2. The loading of items is higher than 0.7 and the p-value is blown than 0.05 level.

3. The value of average variance extraction is higher than 0.50.

4. The value of the item(s) loading of every indicator is greater for its selected construct.

5. The square root value of the AVE of a construct is higher than the correlations between the construct and other constructs in the model.

4.11 Evaluating Structural Models using Partial Least Square

The structural model validation process assists in evaluating whether the hypotheses of structural model (SM) are supported by the data (Urbach & Ahlemann, 2010). In PLS, the SM is analyzed by using the coefficient of determination (R^2), and path coefficients. To assess the PLS-SEM, the R^2 value of each DV is measured, which explains the latent variable (LV's) variance to its total variance. The value 0.67 of R^2 presents the high variance, while a value near to 0.33 presents the average variance similarly, value around 0.19 shows weak variance Chin (1998b). The strength of the relationship between two latent variables assessed through the value of path coefficient (B), along with the magnitude, algebraic sign, and level of significance. Huber et al. (2007) describe that the value of path coefficients should be higher than 0.100 within the model to account for a significant impact. Table 4.15 summarizes the guidelines to validate the structural model.

Table 4.15: Summarizes to Validate the Structural Model

	Validity Type	Criterion	Guideline
1	Model Validity	The coefficient of determination (R^2)	0.67—substantial 0.333—moderate 0.190—weak
2		Path coefficients	Path coefficient must be at least 0.100 and at significance (at least 0.05)

4.12 Summary

This chapter explains methodology justify the need why the certain paradigm is used for the current research to gather answers to the research questions with the aim of testing the hypotheses in the theoretical model. In addition, the chapter describes the detail of the methods employed in this research, including the research design, constructing and administrating the instruments and the pilot study. Data analyses and results will be discussed in chapter five.

CHAPTER 5: DATA ANALYSIS AND RESULTS

5.1 Introduction

This chapter confers a comprehensive discussion on the research empirical findings. Based on the statistical techniques discussed in chapter four an analysis is conducted by using the survey questionnaire. This chapter is explained in twelve different sections. Following the first section introduction, the second part presents the data preparation process that includes the data editing, coding, screening, missing data handling, analysis of monotone response pattern, demographics analysis, non-response bias evaluation and examination of outliers. Section three presents the analysis of multivariate assumption. This analysis is done by conducting the normality, multicollinearity and common method bias tests. Section four of this chapter presents the descriptive statistics of this study. In the next section five, structural equation modeling is discussed in detailed. Furthermore, this section presents the measurement model. Partial Least Square Structural Equation Modeling (PLS-SEM) helps to examine the measurement model. In addition, PLS-SEM is employed to analyze the data reliability and data validity of reflective measures along with the validity of the formative measure. Section six discusses the analysis of the structural model to test the research hypotheses presented in chapter three. Additionally, this section also presents a comparison between the theoretical model and a full structural model. Since the present study is analyzing the intervening effect of absorptive capacity (ACAP) and corporate entrepreneurship (CE), therefore results of the intervening mechanism are reported in section seven. Additionally, this section also presents the mediating role of innovation performance in the relationship between absorptive capacity and corporate entrepreneurship with firm performance. Next section eight presents the results of blindfolding, after that analysis of effect size and model fitness test are discussed in

section nine and ten respectively. Section eleven discussed the importance-performance analysis in detail. At the end summary of the analysis is presented in section twelve.

5.2 Data Preparation

The process of data preparation includes the data editing, coding, screening, missing data handling, analysis of monotone response pattern, demographics analysis, non-response bias evaluation and examination of outliers. The detail description of the data preparation process is presented in the following subsections.

5.2.1 Data Editing, Coding and Screening

After completing the data collection procedure to ensure data absoluteness, the editing of raw data was conducted. The data edit procedure involves ensuring the forms of data collection have no omissions, are consistent in classification and legible (Zikmund, 1994). Only those questionnaires can be considered for samplings where at least 75 percent of the questions have been answered by the respondents (Sekaran & Bougie, 2016). After collecting, the raw data from the respondents are entered manually into the SPSS (Version 22) data file. There are two main ways to put data into SPSS manually: pre-coding and post-coding (De Vaus & de Vaus, 2001). The pre-coding approach applied in this research, whereby numeric values are allocated to the question items. A questionnaire of 55 items is utilized as the measurement scale of the proposed constructs for this study. To ensure the accurate data entry, a frequency analysis is conducted for all variables, and those values that are out of range are checked again and correction applied where appropriate. Data screening is an essential part of ensuring that data are entered properly. The following section explains the missing data analysis and handling.

5.2.2 Missing Data

In the empirical survey research approach missing information is a common issue. Missing information arises when respondents of survey questionnaire fail to answer one or more items. In this study, the screening of data shows a very low sum of missing information (lower than 3%), and in fact, the missing information up-to 10% does not make any issue in the results reporting (Cohen et al., 2014). The literature proposes the expected maximization (EM) method as the best technique for dealing with missing information in comparison to different other methods like the substitution of mean or list-wise deletion or responses (Graham et al., 1997). However, because of a small number of missing information, this choice may not have a substantial impact on the results, as each method has some limitations (Preacher & Hayes, 2008). So in the present study missing information for each variable was swaps by the variable mean. This method is considered appropriate, as generally, this method employed extensively in different studies (Schwab, 2013). While a lot of useful information may be discarded by utilizing the list-wise deletion leading to lesser efficiency (Temme, Kreis, & Hildebrandt, 2006). After the process of data screening, this study found that 14 responses were higher than 10% of missing information; accordingly, these responses were deleted from the dataset file. Therefore, out of 436 responses, 422 responses were further examined to treat the nonsignificant missing values.

5.2.3 Monotone Response Pattern

To check the pattern of responses screening is performed in this study. In the survey-based research, the issue occurs in the straight-line pattern. When a respondent of the questionnaire replies every question in a similar pattern by selecting the same option it leads to occurring of this issue. For example on the 7 points Likert scale, the respondent has chosen 5 in his answers to all questions. In this scenario, the answer is reflected as biased and it is essential to discard such responses (Hasler, Craiu, & Rivest, 2018).

After one by one responses screening, five responses were found to be falling on the issue of the straight-lining pattern and therefore had to be rejected and deleted from the data file. After that out of 422 responses, a total of 417 responses was completed in all respect and was used for testing the measurement and structural models. The next section presents the demographics analysis of respondents.

5.2.4 Demographics Analysis

The demographic profiles of survey respondents included their gender, age, experience, and education. Furthermore, the characteristic of firms is also discussed as, firms' age and size. The sample of the study consisted of 417 medium-sized firms in Punjab, Pakistan. Table 5.1 presents the responding firm's demographic information. Firms are categorized by the industry as presented in chapter four. About 82% of entrepreneurs were male and 18% were female. The 69% respondents were below 40 years while 31% of respondents were above the age of 40 years. The experience of 30% of respondents was below five years, 27% of respondents have experienced between five years to ten years, while 43% of respondents experience was above 10 years. Total 14% firms were below the age of 3 years, 23% firms were in the range of 3 years to 7 years, 36% firms were in the range of 7 years to 15 years while 27% firms were above the age of 15 years. As this study is just focusing the medium-sized firms due to their high share in the exports, employment and technology adoption and utilization, therefore, all those firms were under consideration that has employees in the range of 50 to 250, based on the definition of medium-sized manufacturing SMEs by SMEDA.

Table 5.1: Demographic Characteristics of Responding Firms

Demographic Profile	Respondents (417)	Valid %
Gender:		
Male	341	82
Female	76	18
Age:		
Less than 40 years	286	69
More than 40 years	131	31
CEO Education Level:		
Metric	48	11
FA/ FSC	108	26
BA/BSC	193	46
Masters or above	68	17
Experience:		
1-5 years	127	30
5 - 10 years	112	27
10 - above years	178	43
Firm Age:		
1-3 years	58	14
3-7 years	96	23
7-15 years	148	36
Above 15 years	115	27

5.2.5 Non-Response Bias Assessment

The real difficulty for the studies utilizing survey method as an information collecting system is non-response bias and inclination. It is an imperative concern in the field of social sciences research. It happens when actual review respondents are not quite the same as sampling respondents which might be the respondents who declined to take an interest in the survey. Generally, researchers do not focus on the nonresponse bias when the response rate is high. Regardless of how low and the high response rate is achieved, statistician and experts (Barriball & While, 1999) propose to assess the non-response bias. Non-response bias can be controlled by different ways, such as (1) comparing

respondents to population, (2) double-dipping non-respondents, (3) ignoring non-respondents, (4) comparison of non-respondents to respondents, and (5) comparison of late respondents to early respondents (Lindner et al., 2001).

The issue of non-response bias happens in studies if the appropriate response of respondents contrasts in significant courses from the individuals who did not reply. The actual issues of non-response errors are derived from the responses to questions and data are given by the respondents being unique in relation to the individuals who denied responding (Armstrong & Overton, 1977).

Table 5.2: Results of Early and Late Response

	N	Mean		SD
	Statistic	**Statistic**	**Std. Error**	**Statistic**
ITINF	300	5.7825	.04433	0.76776
	117	5.8504	.07027	0.76003
ITTS	300	5.6720	.04931	0.85412
	117	5.7094	.07606	0.82274
ITING	300	5.7208	.05053	0.97526
	117	5.6624	.09066	0.98059
ITALI	300	5.4840	.05118	0.88640
	117	5.3863	.08455	0.91453
ACAP	300	5.6791	.04207	0.72869
	117	5.6620	.07038	0.76124
CE	300	5.7077	.03886	0.77310
	117	5.7014	.07047	0.76230
IP	300	5.6561	.04274	0.74034
	117	5.6083	.06367	0.68869
FP	300	5.6700	.04585	0.79415
	117	5.6581	.07259	0.78523

In the present thesis, to check the non-response bias test the respondents have been divided into two different groups, as of late respondents and early respondents. An

independent sample t-test is carried out to test all variables. This study classified early 300 responses and late 117 responses as recommended by (Karahanna et al., 1999). Table 5.2 shows the finding for non-response bias. Based on the results there is not much difference in the group mean and standard deviation (SD) for an early and late response.

5.3 Multivariate Assumptions Assessment

5.3.1 Test for Normality

Normal data distribution considered as the critical assumptions in the multivariate data analysis. The highest frequency of responses shown in the middle of the bell-curved shape, while low scored frequencies are depicted at the right and left extremes of bell-curved shape on the histogram. Normality of data can be analyzed through skewness and kurtosis (Luftman & Brier, 1999). The balance of distribution is referred to as the skewness and if it is found to be unbalanced, then it would be positively or negatively skewed. Skewness represents a lack of symmetry, whereas kurtosis shows whether data is normally distributed or not. The zero value for skewness and kurtosis considered as an ideal point of symmetrical distribution (Hair et al., 2013). The threshold values of normally distributed data are between +2.58 to -2.58 at the level of significance 0.01 or in the range of +1.96 to -1.96 at the level of significance 0.05. The results of multivariate analyses can be affected by the lack of normally distributed data. However, the lack of normality is not strict with the PLS-SEM (Hair et al., 2013). The results show that data is not normally distributed and for the assessment of normality, the skewness and kurtosis values are presented in Table 5.3.

Table 5.3: Descriptive Statistics (Skewness and Kurtosis)

Statistics								
	FP	ITINF	ITTS	ITING	ITALI	ACAP	CE	IP
Valid	417	417	417	417	417	417	417	417
Mean	5.65	5.73	5.62	5.67	5.50	5.63	5.67	5.74
Std. D	0.807	0.802	0.871	0.910	0.859	0.746	0.707	0.781
Skewness	-1.15	-1.52	-1.53	-1.57	-1.44	-1.83	-2.51	-1.71
Kurtosis	2.42	5.18	3.70	3.84	2.97	4.72	8.60	4.88

5.3.2 Common Method Bias

Common method bias (CMB) generally contributes to the systematic measurement error and can be described as "the variance that is attributed to the method of measurement rather than to the construct the measurement represents" (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Like different types of measurement errors, incorrect deductions may be drowned about hypothesized relationships if CMB is adequately high. For reducing the CMB there is a number of suggested process and techniques. These processes comprise, preventive processes intended at decreasing CMB before collecting the data and statistical procedures utilized for recognizing and controlling or decreasing the results biasness during the phase of data analysis (Chin, Thatcher, & Wright, 2012). The present thesis employed the preventive process to address the CMB.

5.3.2.1 Preventive Procedural Technique

Podsakoff et al, (2013) recommended various strategies for decreasing and controlling CMB. (1) attaining indicators of the predictor (IV) and criterion (DV) from various sources, (2) measurements methodological separation, (3) counter-balancing the order of the questions, (4) securing the confidentiality of the respondents, (5) use of reverse source items. These precautionary measures usually take place during the design phase

of the study and during the development phase of the survey instruments. Keeping in the view temporal and measurement separation guidelines this study has the following stepwise procedures (i) biases were also minimized through the careful construction of items themselves (ii) by protecting the respondents anonymity (iii) by using the reversible coded statements (iv) by reducing the items ambiguity (v) explaining ambiguous terms (vi) keeping questions simple and specific (vii) by avoiding the vague and double-barreled statements and (viii) by avoiding the use of jargons. To diminishing the biases these guiding principles were adopted in the designing and development of the survey.

5.4 Descriptive Statistics

5.4.1 Mean and Standard Deviation

Table 5.4 represents the mean scores (MS) and standard deviations (SD) of all scales used by this study. The result of descriptive statistics presents that the MS of ITINF as 5.73 with SD of 0.802. This describes that the dominant parts of feedback fall between the ranges of somewhat agree to agree. The MS of ITTS is 5.62 with SD of 0.871. This describes that the paramount parts of feedback fall between the ranges of somewhat agree to agree. The MS of ITING is 5.67 with SD of 0.910. This describes that the dominant parts of reply fall between the ranges of somewhat agree to agree. The MS of ITALI is 5.50 with SD of 0.859. This describes that the main parts of feedback fall between the ranges of somewhat agree to agree.

The MS of ACAP is 5.63 with an SD of 0.746. This describes that the paramount parts of feedback fall between the ranges of somewhat agree to agree. The MS of CE is 5.67 with SD of 0.707. This describes that the paramount parts of feedback fall between the ranges of somewhat agree to agree. The MS of FP is 5.65 with an SD of 0.807. This describes that the major parts of response fall between the ranges of somewhat agree to

agree. The MS of IP is 5.74 with an SD of 0.781. This describes that the main parts of response fall between the ranges of somewhat agree to agree.

Table 5.4: Mean and Standard Deviation of Variables

	FP	ITINF	ITTS	ITING	ITALI	ACAP	CE	IP
Valid	417	417	417	417	417	417	417	417
Mean	5.65	5.73	5.62	5.67	5.50	5.63	5.67	5.74
Std. D	0.807	0.802	0.871	0.910	0.859	0.746	0.707	0.781

5.4.2 Response Rate

For the data collection, a letter was sent from SMEDA addressed to all SMEs, requesting their cooperation. In this study, to respond to the questionnaire the SMEs' top management was under consideration. The survey questionnaire was attached along with the letter from SMEDA and a cover letter containing the study portrayal and confidentiality assurance of their identity and results. The present thesis adopted the four diverse ways to increase the rate of response: face to face, with a cup of tea; via e-mail; by post; and by using the services of a research-conducting firm. During the data collection process, some respondents return the questionnaire on the spot, while some took more time and returned it within the average of 19 days. Initially, the response rate by post was not satisfactory, and just 9% responded that way, though after several reminders the response rate increased to 11%. Through the services of a survey conducting firm, an 87% response rate was received (173/200). The total data collection time period was Jan-6-2017 to May-12-2017. During the four-month data collection period, we received 436 responses but out of these, 417 questionnaires were complete in every respect. The questionnaire received by e-mail, post, survey firm and self-administrated were 82, 48, 173 and 133 respectively. Table 5.5 represents the response rate received by different sources.

Table 5.5: Response Rate

Source	Response Received
E-mails	82
By post	48
Survey firm	173
Face to face	133
Total	436

Figure 5.1 represents the total percentage received questionnaire through e-mail were 19%, by post 11%, taking the help of the survey firm 40% and self-administrated 30% out of 436 questionnaires.

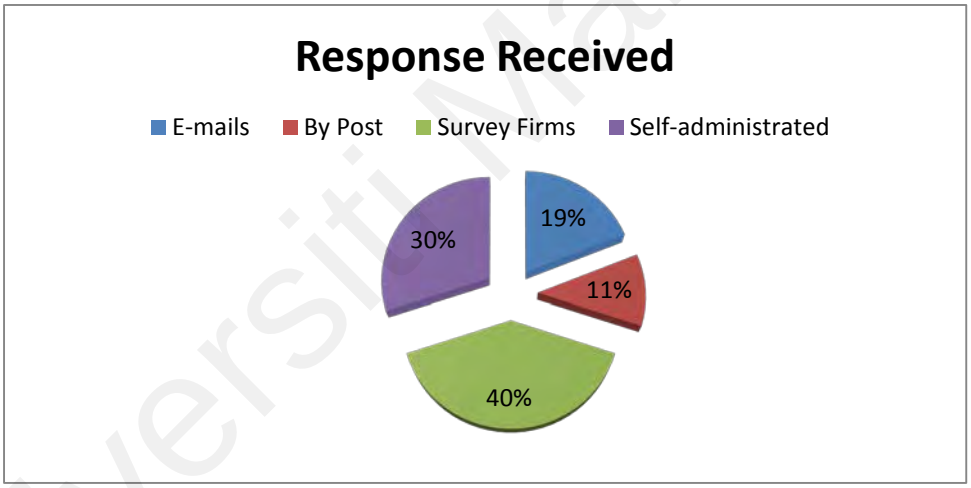


Figure 5.1: Response Rate in Percentage

In Pakistan, the textile manufacturing sector has a dominant position in GDP, followed by leather, sports, food, and beverages (Economic Survey of Pakistan, 2013). So, for this study, 1,200 firms (1,008 from 6 major industries and 192 from other industries such as printing, chemicals, carpet weaving, and electronics) have been selected as samples based on the percentage. Those industries will be under observations that have a large share in exports (excluding the micro and small firms). Table 5.6 presents the questionnaire distribution in the industry according to their

percentage and response rate (based on the valid questionnaires). The response rate based on the total questionnaire distribution of each industry was textile 35%, leather 11%, sports 17%, food & beverages 10%, metal 7%, wood & furniture 5% and others 7%. The overall response rate from the industry was 34.75%. According to Dess et al. (1990), the generalizability of results is much higher when the samples are multi-industry rather than a single industry, as the sample of multi-industry gives a wide range of information.

Table 5.6: Questionnaire Distribution and Response Rate by Industry

Industry	No. of Firms	% of Total Firms	Q.s Distributed	Q.s Received	Response Rate (%)
Textiles	1811	21	252	101	40.07
Leather	1207	14	168	59	31.54
Sports	1034	12	144	48	33.33
Food & beverages	1638	19	228	88	38.68
Metal	690	8	96	31	32.29
Wood & furniture	823	10	120	36	30.00
Others	1380	16	192	56	29.16
Total	**8623**	**100**	**1200**	**417**	**39.25**

Keeping in mind that over 65% of manufacturing SMEs are in Punjab and out of 10 major SME city clusters, seven are in the province of Punjab, therefore, SMEs of manufacturing in Punjab cities are targeted for this research. As shown earlier in chapter four, there are total 14,722 medium-size firms registered by SMEDA in Pakistan, out of which 8623 are registered in seven cities of Punjab. Hence each SME is selected on the basis of its percentage in the total population. Table 5.7 presents the questionnaire distribution and response rate (based on the valid questionnaires) by cities.

Table 5.7: Questionnaire Distribution and Response Rate by Cities

Cities	No. of Firms	% of Total Firms	Questionnaires Distributed	Questionnaires Received	Response Rate (%)
Lahore	2328	27	324	122	37.65
Faisalabad	1526	18	216	91	42.12
Gujranwala	1207	14	168	68	40.47
Sialkot	1121	13	156	48	30.76
Gujarat	949	11	132	30	22.72
Multan	776	9	108	36	33.33
Sheikhupura	690	8	96	24	25.00
Total	**8623**	**100**	**1200**	**417**	**34.75**

5.4.3 Reliability Analysis

Reliability is referred as the extent to which methods for gathering data or techniques of evaluation will generate similar outcomes (Saunders & Lewis, 2009), and measurement is considered reliable when the predictions generated are consistent when reflecting unchanging social conditions, regardless in techniques differences and probability of chance. “A reliable measure is stable and devoid of the effects of random errors” (Brewer & Hunter, 1989). Usually, researchers rely on two common approaches to assess the reliability of an instrument, and both approaches require internal consistency of measurement. The first approach is an evaluation based on Cronbach’s Alpha, that determines the extent to which the items in a cluster interrelate positively with each other (Uma & Roger, 2003). Generally, an alpha value below 0.6 is regarded as weak, values in the range of 0.7 to 0.8 are satisfactory and the values of alpha over 0.8 are considered to be excellent (Sekaran & Bougie, 2016). Table 5.8 presents the reliability coefficients of IT infrastructure flexibility (ITINF), IT technical skills (ITTS), IT integration (ITING), IT alignment (ITALI), absorptive capacity (ACAP), corporate entrepreneurship (CE), innovation performance (IP), and firm performance (FP).

Table 5.8: Reliability Coefficient

Constructs	Cronbach Alpha
IT Infrastructure Flexibility	0.865
IT Technical Skills	0.911
IT Integration	0.896
IT Alignment	0.863
Absorptive Capacity	0.923
Corporate Entrepreneurship	0.941
Innovation Performance	0.913
Firm Performance	0.874

5.5 Structural Equation Modelling – PLS-SEM Analysis

For the evaluation of measurement and structural model, this study has utilized Partial Least Square (PLS) techniques to examine the data using Smart-PLS (Version 3.2.6). The benefit of employing this technique is that it permits to model the latent construct as formative or reflective (Chin, Marcolin, & Newsted, 2003). Jarvis et al. (2003) argued that there are four different kinds of models used depending on the relationship among (I) first-order latent construct and their manifest constructs, and (II) the second-order latent constructs and first-order latent constructs. These four groups are as follows.

- Group (a): Reflective and Reflective
- Group (b): Reflective and Formative
- Group (c): Formative and Reflective
- Group (d): Formative and Formative

There are two sets of linear equations in the PLS path model: (1) the inner model and (2) the outer model. According to Chin (1998) and Henseler et al. (2009), "*the structural or inner model identifies the relationship among unobserved constructs, while the measurement model identifies the relationships among latent variables and*

their observed variables". The measurement model contains two categories of specific models: (I) formative and (II) reflective. The reflective measurement model has a casual relationship form latent constructs to the observed constructs. While the formative model has a casual relationship from observed construct to latent construct. According to Chin (1998), there are three considerations support the decision to employ a particular type of model: (1) knowledge of theory, (2) research objectives, (3) and empirical conditions. In light of these criterions, for this study, the reflective-formative model is considered to be more appropriate. Furthermore, according to Bisbe, Batista-Foguet, and Chenhall (2007), most of the constructs in management survey-based literature based on reflective models. As highlighted by Chin (1998) reliability and validity tests are required for the reflective model, while just the validity test is relevant to the formative model. Henseler et al. (2009) highlighted that in the formative model the tests of reliability are inappropriate and irrelevant because of the assumptions that indicators do not co-vary and error-free measure. Furthermore, the PLS path model does not entail the measures goodness of fit (Henseler et al., 2009; Hulland, 1999). Also, PLS have no much concern with the evaluation of normality.

Another reason for using the PLS technique is that the proposed research model consists of reflective – formative constructs (Type II). This study takes precise steps in a systematic manner utilizing PLS technique to evaluate measurement and structural models. In the first step of the measurement model assessment various reliability and validity measures are examined (Vinzi, Chin, Henseler, & Wang, 2010). For the purpose of examining the limitations of the measurement boundaries, it is important to draw every single significant connection between the constructs and their respective items. In this step, it is essential to differentiate among reflective and formative constructs. These constructs should not be treated as same in the assessment of the outer model. It is essential for the reflective constructs to be evaluated for reliability and

validity employing the analysis confirmatory factor, whereas the formative constructs are not applicable for reliability except validity (Henseler et al, 2009). In line with past studies, all multi-item first-order constructs are conceptualized as reflective in this present study. However, ACAP is conceptualized as a second-order formative variable containing four dimensions: acquisition, assimilation, transformation, and exploitation. Similarly, CE is also conceptualized as a second-order formative variable containing four dimensions: organization innovation, self-renewal, new business venturing, and pro-activeness. While the dimensions of IT capabilities (ITINF, ITTS, ITING, and ITALI), innovation performance, and firm performance are conceptualized as multi-item first-order reflective constructs.

In the second step, research model evaluation will be done along with the validation of the second-order formative construct. The research model will further be analyzed by using uni-dimensional and multi-dimensional constructs and later their results are compared. In the end, based on these steps results the research model will be confirmed and presented.

In the third step, after the final research model development, the structural model will be assessed. To evaluate the structural model this study analyzes the path coefficient (ß), the coefficient of determination (R^2), mediation analysis, effect size (f^2) and examination of model goodness fit. In the next section, the assessment of the measurement model is presented.

5.5.1 Assessment of Measurement Model

In the first step, the outer model (measurement model) is analyzed through the PLS-SEM. It presents how indicators load theoretically on their respective variables. Individual items reliability depends upon the composite reliability. According to Shook et al. (2004), a better choice is composite reliability, as this latter approach considers

the standardized loadings and measurements error for each item over the coefficient alpha. The coefficient alpha has limitations; for instance, it assumes that all items have an equal distribution to reliability; in this research, both criteria are used for determining the extent of reliability. The benchmark value of composite reliability is 0.70 (Nunnally, 1978). Convergent validity of the constructs analyzed through the average variance extracted (AVE), while discriminant validity analyzed by using the Fornell-larger criterion and outer loading. Confirmatory factor analysis (CFA) was employed to examine the measurement model for all constructs in order to explain how measured indicators logically represent the constructs in the model (Hair JR, 2006). There are two types of assessing the models under PLS-SEM: reflective model assessment and formative model assessment. The reflective model assessment is based on internal consistency, convergent validity, and discriminant validity evaluation, while the formative model assessment is based on the evaluation of collinearity testing, the significance of weights and nomological validity. The following subsections present the assessment of measurement model.

5.5.1.1 Reflective Measures Reliability

In the present thesis, the measurement model evaluation is based on the reflective model, the outer model is analyzed to check the reliability and validity of the variable used in this study. Figure 5.2 presents the measurement model with first-order constructs, second-order constructs, and the number of items.

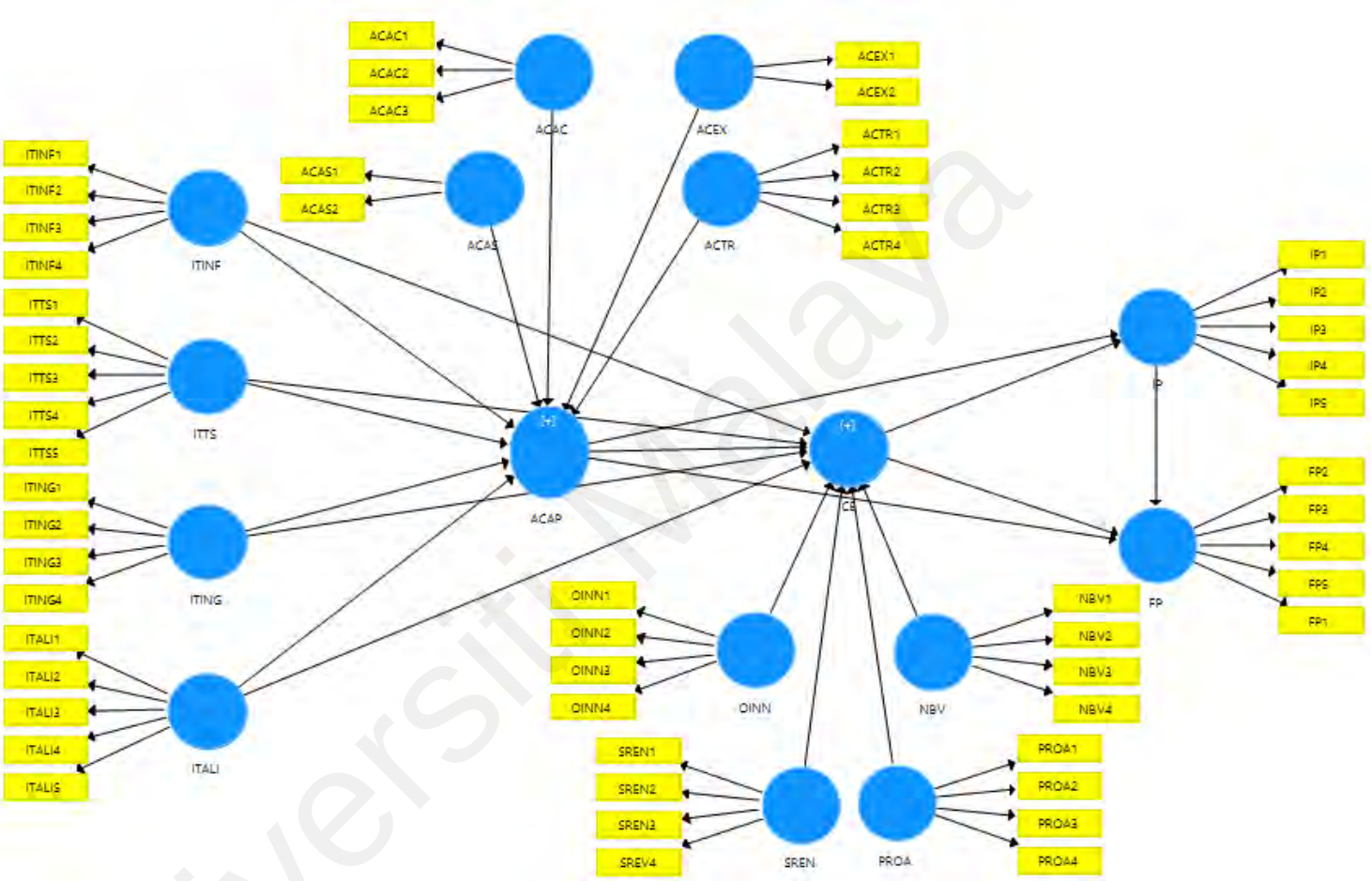


Figure 5.2: Measurement Model with Constructs and Indicators

ITNF = IT Infrastructure Flexibility, ITTS = IT Technical Skills, ITING = IT Integration, ITALI = IT Alignment, ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN Organization Innovation, PROA = Proactiveness, SREV = Self Renewal, IP = Innovation Performance, FP = Firm Performance

Chin (1998b) argued that loadings of the indicator should be higher than 0.70 and the level of significance should be at the level of 0.05. At the value of 0.70 loadings, a latent variable can explain the variance of its indicator at least 50%. A re-sampling technique such as jack-knifing or bootstrapping helps to analyze the loading significance. Hensler et al. (2009) argued that during the process of indicator elimination researchers should follow the characteristics of PLS, and the indicator should be eliminated when its value of reliability is less than 0.70 and its elimination enhances the value of CR. In this study, all the loading values are higher than the benchmark value of 0.707. Therefore no indicator is deleted from the measure. Figure 5.3 presents the measurement model with the constructs outer loadings.

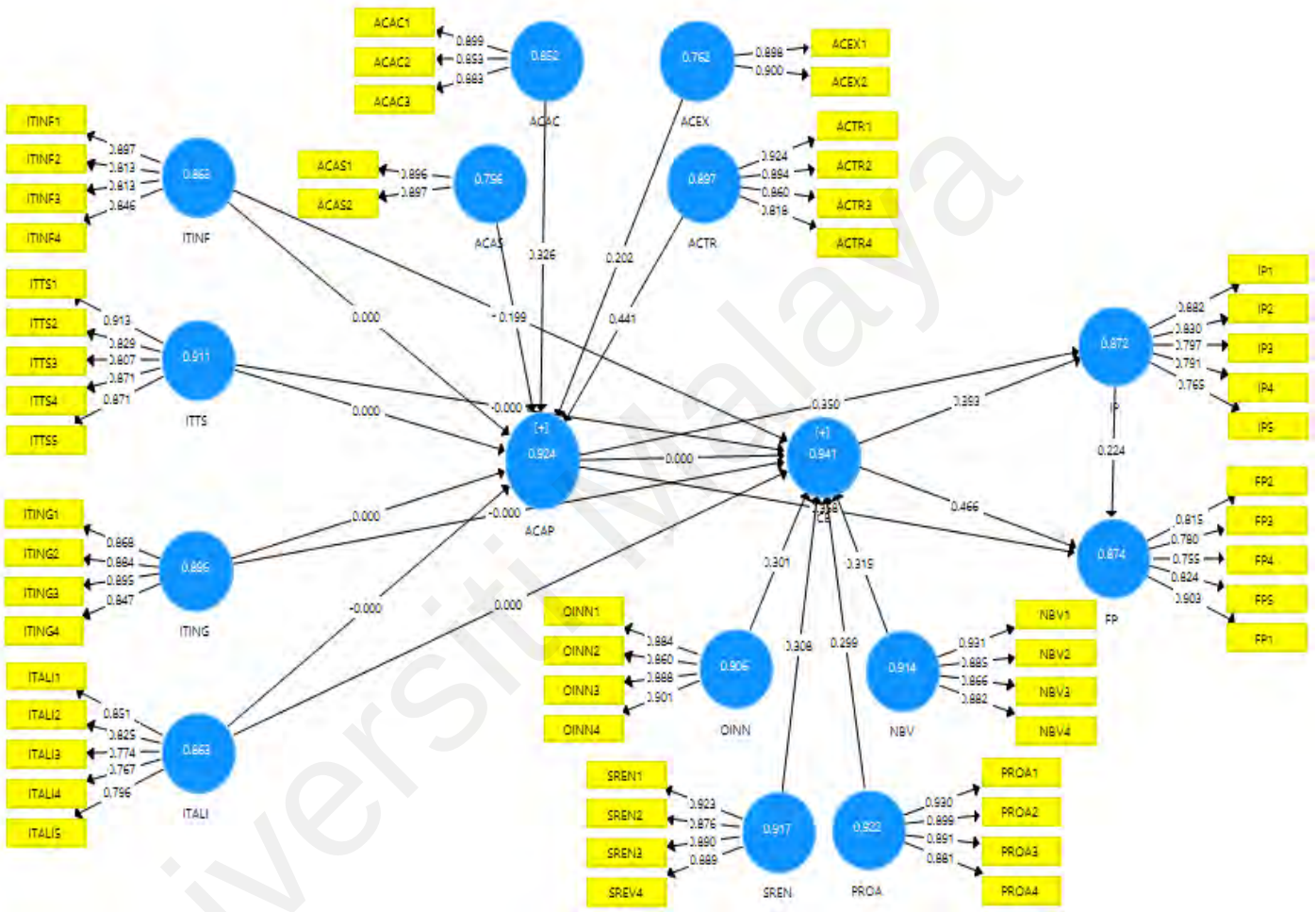


Figure 5.3: Measurement Model with Factor Loading

ITNF = IT Infrastructure Flexibility, ITTS = IT Technical Skills, ITING = IT Integration, ITALI = IT Alignment, ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN Organization Innovation, PROA = Proactiveness, SREV = Self Renewal, IP = Innovation Performance, FP = Firm Performance

In the next step, the reliability of reflective measures was examined. The reliability of reflective measures was assessed through composite reliability. According to Shook et al. (2004), composite reliability is a better choice, as this method considers the standardized loadings and measurements error for each item over the coefficient alpha. The Cronbach alpha (α) has limitations; for instance, it assumes that all items have an equal distribution to reliability; in this research, both criteria are used for determining the extent of reliability. Results present that the Cronbach value of all constructs is higher than 0.70 and the composite reliability value of all measures is also higher than the benchmark value 0.70. Therefore, the results show the internal consistency of measures. Table 5.9 presents the outer loading of all indications.

Table 5.9: Reflective Constructs Reliability

Construct	Types	Cronbach's Alpha	CR
FP	First order Reflective	0.874	0.909
IP	First order Reflective	0.872	0.908
ITALI	First order Reflective	0.863	0.901
ITINF	First order Reflective	0.865	0.907
ITING	First order Reflective	0.896	0.928
ITTS	First order Reflective	0.911	0.934
ACAP	**Second-order Formative**	0.924	0.935
ACAC	First order Reflective	0.852	0.910
ACAS	First order Reflective	0.756	0.891
ACEX	First order Reflective	0.762	0.894
ACTR	First order Reflective	0.897	0.929
CE	**Second-order Formative**	0.941	0.948
NBV	First order Reflective	0.914	0.939
OINN	First order Reflective	0.906	0.934
PROA	First order Reflective	0.922	0.945
SREN	First order Reflective	0.917	0.941

5.5.2 Reflective Measure Validity

According to Phillips & Bagozzi, (1986), discriminant validity and convergent validity helps to measure the validity of reflective measures. The consistency within the multiple-operationalizations assessed through the convergent validity. In the current thesis, the t-statistics values show the significance of the entire factor loading at p< 0.000. Table 5.10 presents the results and highlight that all the measures are fulfilling the criteria of convergent validity (Gefen et al., 2000). The Average Variance Extracted (AVE) is a standard measure of convergent validity, and all AVE values in this table have been recommended a minimum of 0.50 (Hair et al., 2013). Furthermore, it is indicating that at least 50% of the measurement variance was captured by the latent construct (Chin, 1998). All constructs were assessed for their reliability and validity.

Table 5.10: Outer Loading and AVE for Constructs

Variable	Items	Loadings	CR	AVE	p-value
IT Capabilities					
IT Infrastructure Flexibility	ITINF1	0.897	0.907	0.710	0.000
	ITINF2	0.812			
	ITINF3	0.813			
	ITINF4	0.846			
IT Technical Skills	IITS1	0.913	0.934	0.738	0.000
	ITTS2	0.829			
	ITTS3	0.807			
	ITTS4	0.871			
	ITTS5	0.869			
IT Integration	ITING1	0.868	0.928	0.763	0.000
	ITING2	0.884			
	ITING3	0.895			
	ITING4	0.847			
IT Alignment	ITALI1	0.851	0.901	0.645	0.000
	ITALI2	0.825			
	ITALI3	0.774			
	ITALI4	0.767			
	ITALI5	0.796			
Absorptive Capacity					
Acquisition	ACAC1	0.899	0.910	0.772	0.000
	ACAC2	0.853			
	ACAC3	0.883			
Assimilation	ACAS1	0.896	0.891	0.804	0.000

	ACAS2	0.901			
Transformation	ACTR1	0.924	0.929	0.766	0.000
	ACTR2	0.894			
	ACTR3	0.860			
	ACTR4	0.818			
Exploitation	ACEX1	0.898	0.894	0.808	0.000
	ACEX2	0.900			
Corporate Entrepreneurship					
Business Venturing	NBV1	0.931	0.939	0.795	0.000
	NBV2	0.885			
	NBV3	0.866			
	NBV4	0.882			
Innovation	OINN1	0.884	0.934	0.781	0.000
	OINN2	0.860			
	OINN3	0.888			
	OINN4	0.901			
Proactiveness	PROA1	0.930	0.945	0.811	0.000
	PROA2	0.899			
	PROA3	0.891			
	PROA4	0.881			
Self-renewal	SREN1	0.923	0.941	0.800	0.000
	SREN2	0.876			
	SREN3	0.890			
	SREV4	0.889			
Innovation Performance					
	IP1	0.882	0.908	0.663	0.000
	IP2	0.830			
	IP3	0.797			
	IP4	0.791			
	IP5	0.765			
Firm Performance					
	FP1	0.903	0.909	0.667	0.000
	FP2	0.815			
	FP3	0.780			
	FP4	0.755			
	FP5	0.824			

The validity of constructs is assessed through discriminant validity. Discriminant validity refers to the extent to which different constructs diverge from one another (Hair et al., 2006). Discriminant validity can be assessed in different ways: (I) Fornell-Larcker criterion, (II) cross-loadings, and (III) Heterotrait-Monotrait (HTMT) Analysis. In the first way, discriminant validity can be analyzed by evaluating the square root of AVE for each factor with its correlations with another factor (Fornell &

Larcker, 1981). Table 5.11 presents that the square root of AVE for each factor are higher than correlations among factors. This highlights that the variance explained by the relevant factor is higher than the measurement error variance, thus proving the factors discriminant validity. In this research, the correlations between variables were generally low to moderate.

Table 5.11: Constructs Correlation Matrix

	ACAC	ACAS	ACEX	ACTR	FP	IP	ITALI	ITINF	ITING	ITTS	NBV	OINN	PROA	SREN
ACAC	0.878													
ACAS	0.583	0.896												
ACEX	0.615	0.537	0.899											
ACTR	0.676	0.643	0.620	0.875										
FP	0.610	0.514	0.523	0.626	0.817									
IP	0.589	0.458	0.481	0.554	0.639	0.814								
ITALI	0.598	0.500	0.452	0.564	0.577	0.622	0.803							
ITINF	0.435	0.348	0.412	0.408	0.412	0.573	0.426	0.843						
ITING	0.434	0.427	0.374	0.432	0.413	0.455	0.431	0.403	0.873					
ITTS	0.563	0.525	0.494	0.557	0.497	0.548	0.588	0.386	0.452	0.859				
NBV	0.475	0.471	0.480	0.509	0.631	0.555	0.520	0.381	0.391	0.500	0.891			
OINN	0.521	0.506	0.503	0.512	0.578	0.534	0.510	0.409	0.472	0.539	0.577	0.884		
PROA	0.458	0.422	0.445	0.459	0.549	0.480	0.432	0.365	0.377	0.469	0.528	0.532	0.900	
SREN	0.504	0.475	0.458	0.539	0.581	0.515	0.507	0.446	0.384	0.471	0.540	0.585	0.589	0.894

ITNF = IT Infrastructure Flexibility, ITTS = IT Technical Skills, ITING = IT Integration, ITALI = IT Alignment, ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN Organization Innovation, PROA = Proactiveness, SREV = Self Renewal, IP = Innovation Performance, FP = Firm Performance

Furthermore, discriminant validity can also be assessed by analyzing the cross-loadings, where the loading of each indicator should be higher than all of its cross-loadings. The results of all cross-loading are presented (Appendix-6) are matching the criteria of achieving discriminant validity. The highlighted part comprises of loadings for all indicators in each construct. It further involves that each indicator component score in its own set is better than other set or indicators.

In the PLS path model to ensure that a reflective construct has the strongest relationships with its own indicators in comparison with any other construct is the goal of discriminant validity assessment (Hair Jr et al., 2016). According to Henseler et al. (2014), these approaches do consistently identify the lack of discriminant validity in common research situations as shown by means of a simulation study. Therefore, the Hetrotrait-Monotrait ratio of correlation (HTMT) is an alternative method to analyze the discriminant validity. In the variance based-SEM a detail explanation was provided to describe the HTMT by Petter, Straub, and Rai (2007) The value of HTMT should be less than 0.85 (Kline, 2011) or 0.90 (gold et al., 2001). The negative correlation results of HTMT criterion have no issue. Table 5.12 presents the results of Hetrotrait-Monotrait ratio of correlation.

Table 5.12: Hetrotrait-Monotrait Ratio of Correlation (HTMT)

	ACAC	ACAS	ACEX	ACTR	FP	IP	ITALI	ITINF	ITING	ITTS	NBV	OINN	PROA	SREN
ACAC														
ACAS	0.726													
ACEX	0.762	0.706												
ACTR	0.773	0.780	0.748											
FP	0.703	0.631	0.638	0.703										
IP	0.682	0.563	0.589	0.626	0.731									
ITALI	0.690	0.615	0.549	0.636	0.653	0.711								
ITINF	0.504	0.427	0.507	0.465	0.476	0.658	0.481							
ITING	0.494	0.515	0.451	0.479	0.461	0.515	0.485	0.458						
ITTS	0.638	0.631	0.592	0.614	0.554	0.612	0.656	0.434	0.498					
NBV	0.538	0.563	0.575	0.562	0.706	0.622	0.578	0.429	0.430	0.548				
OINN	0.593	0.611	0.605	0.567	0.647	0.600	0.566	0.461	0.521	0.592	0.633			
PROA	0.518	0.503	0.530	0.504	0.610	0.536	0.476	0.409	0.412	0.511	0.575	0.583		
SREN	0.568	0.566	0.545	0.592	0.647	0.575	0.565	0.501	0.421	0.512	0.588	0.639	0.640	

ITNF = IT Infrastructure Flexibility, ITTS = IT Technical Skills, ITING = IT Integration, ITALI = IT Alignment, ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN Organization Innovation, PROA = Proactiveness, SREV = Self Renewal, IP = Innovation Performance, FP = Firm Performance

5.5.3 Formative Measure Validity

The validity of formative measures analyzes in a different way as examined for reflective measures (Ringle & Sarstedt, 2016). According to Hair et al. (2014), the validity of the formative measure can be analyzed in three different ways. The current research employed the multicollinearity to analyze the formative measure validity.

5.5.3.1 Multicollinearity

The weight and level of significance of indicators are influenced by the presence of collinearity between formative indicators (Hair et al., 2014). The value of the variance inflation factor (VIF) helps to examine the level of collinearity. The benchmark value of VIF is five, if there is high value then it shows the collinearity issues. The results show that all values of VIF are less than benchmark value 5.00, therefore multicollinearity issues are not with seconded order constructs. The results of multicollinearity show that all the values are less than the benchmark values 5.00. The results of the second-order formative construct (ACAP, CE) multi-collinearity are presented in table 5.13.

Table 5.13: Formative Constructs Multi-Collinearity

Formative Constructs	Dimensions	Tolerance	VIF
Absorptive Capacity	ACAC	0.514	2.174
	ACAS	0.573	1.869
	ACTR	0.546	2.397
	ACEX	0.607	1.855
Corporate Entrepreneurship	NBV	0.407	1.736
	INNO	0.426	1.837
	PROA	0.471	1.765
	SREV	0.493	1.888

ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN = Organization Innovation, PROA = Proactiveness, SREV = Self Renewal

5.5.4 Second-Order Model Assessment

In this study, ACAP with four dimensions and CE with four dimensions are hypothesized as second-order formative constructs. Such measurement models are appropriate for multidimensional composite constructs because each dimension emphasizes various aspects in term of outcomes. Two individual second-order measurement models for ACAP and CE are developed to analyze the significance of their relative fit. These models are proposed on the basis of their dimensions as; ACAP has four dimensions: knowledge acquisition, assimilation, transformation, and exploitations, while CE has four-dimension new business venturing, organizational innovation, self-renewal, and proactiveness. These models are presented in figure 5.4.

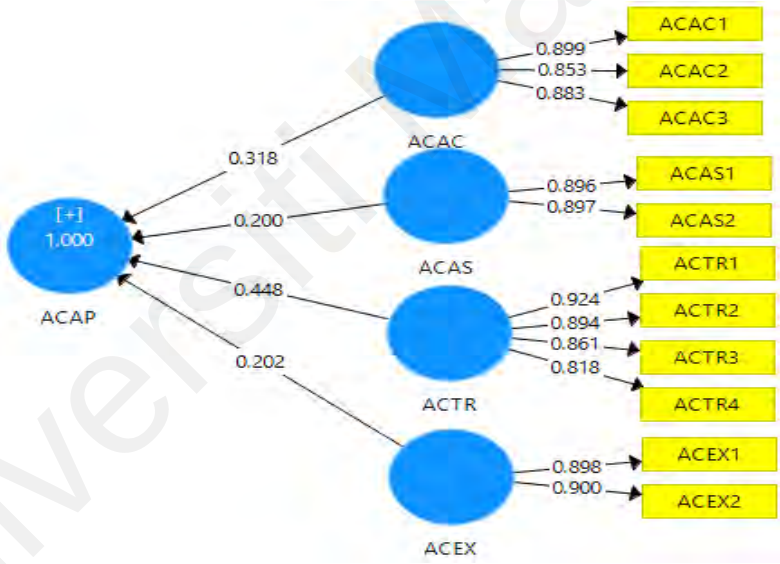


Figure 5.4: Measurement Model A-1: Direct relationship between First-order and Second-order Absorptive Capacity Constructs

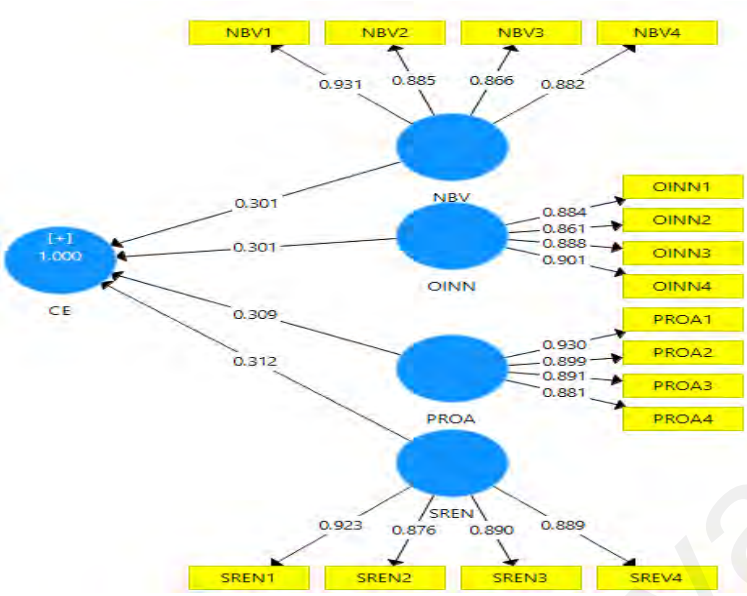


Figure 5.5: Measurement Model A-2: Direct relationship between First-order and Second-order Corporate Entrepreneurship Constructs

Table 5.14 presents the relationship between first-order constructs and second-order constructs. All dimensions have a significant effect on the second-order constructs.

Table 5.14: Relationship between First-Order and Second-Order Constructs

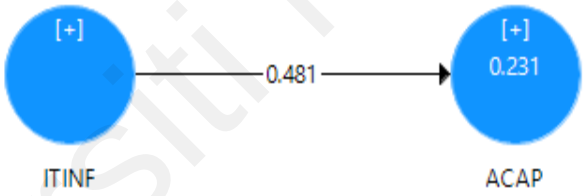
Model	Formative Second-Order (DV)	Reflective First-Order (IV)	No. of Items	Path Coefficient	R^2
Model A-1	Absorptive Capacity	ACAC	3	0.318	1.000
		ACAS	2	0.200	
		ACTR	4	0.448	
		ACEX	2	0.202	
Model A-2	Corporate Entrepreneurship	NBV	4	0.301	1.000
		OINN	4	0.301	
		PROA	4	0.309	
		SREV	4	0.311	

ACAC = Knowledge Acquisition ACAS = Knowledge Assimilation, ACTR = Knowledge Transformation, ACEX = Knowledge Exploitation, NBV = Business Venturing, OINN Organization Innovation, PROA = Proactiveness, SREV = Self Renewal

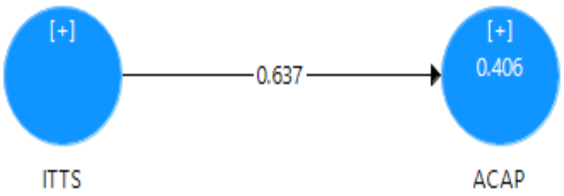
5.5.5 Direct Relationship between Independent and Dependent Constructs

Another thirteen models are established by developing the direct relationship between independent (IV) and dependent (DV) constructs. These eleven models are based on one to one relationship between the constructs investigating the relationship between formative-reflective and reflective-formative constructs. These eleven models are described in the following sub-sections. Table 5.15 presents a summary of the direct relationship between independent and dependent variable results.

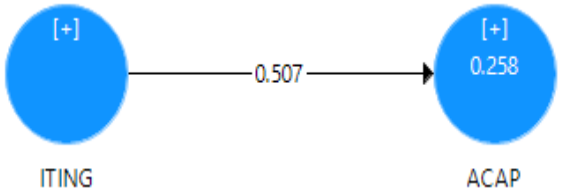
Model-1 presents that there is a direct relationship between first-order reflective ITINF as the independent variable and second-order formative ACAP as the dependent variable. The findings present a significant positive path coefficient of 0.481 between IV and DV. The model reports an R^2 value of 0.231.



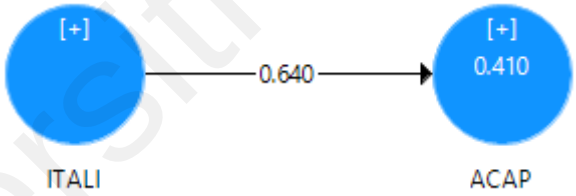
Model-2 presents that there is a direct relationship between first-order reflective IT technical skill as the independent variable and second-order formative ACAP as the dependent variable. The findings present a significant positive path coefficient of 0.637 between IV and DV. The model reports R^2 value 0.406 and in addition, the model demonstrates the significance of outer weights among formative construct and their four indicators.



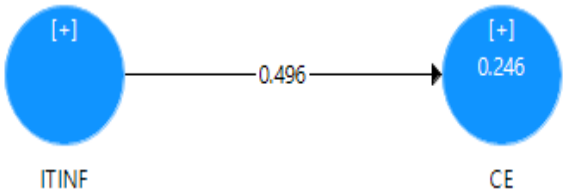
Model-3 presents that there is a direct relationship between first-order reflective ITING as the independent variable and second-order formative ACAP as the dependent variable. The findings present a significant positive path coefficient of 0.507 between IV and DV. The model reports an R^2 value of 0.258.



Model-4 shows that there is a direct relationship between first-order reflective ITALI as the independent variable and second-order formative ACAP as the dependent variable. The findings present a significant positive path coefficient of 0.640 between IV and DV. The model reports an R^2 value of 0.410.

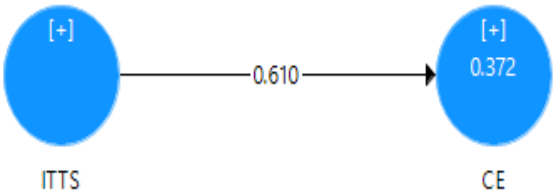


Model-5 presents that there is a direct relationship between first-order reflective ITINF as the independent variable and second-order formative CE as the dependent variable. The results present a significant positive path coefficient of 0.496 between IV and DV. The model reports an R^2 value of 0.246.

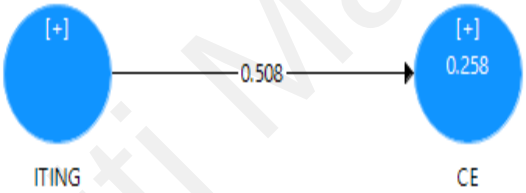


Model-6 presents that there is a direct relationship between first-order reflective ITTS as the independent variable and second-order formative CE as the dependent

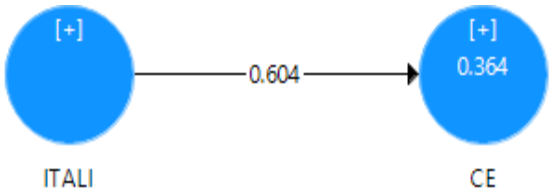
variable. The results present a significant positive path coefficient of 0.610 between IV and DV. The model reports an R^2 value of 0.372.



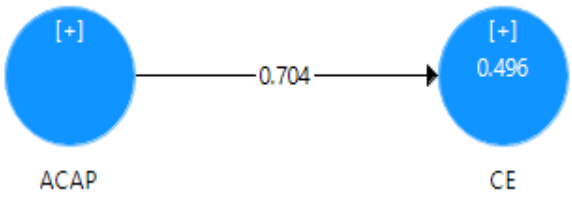
Model-7 represents that there is a direct relationship between first-order reflective ITING as IV and second-order formative CE as DV. The findings present a significant positive path coefficient of 0.508 between IV and DV. The model reports an R^2 value of 0.258.



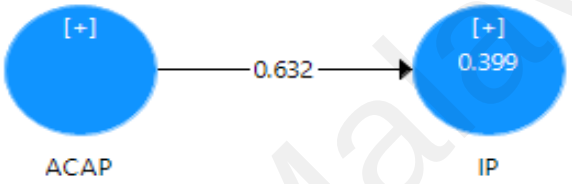
Model-8 represents that there is a direct relationship between first-order reflective ITALI as IV and second-order formative CE as DV. The findings present a significant positive path coefficient of 0.604 between independent variable IV and DV. The model reports an R^2 value of 0.364.



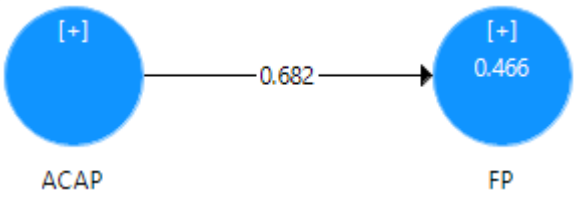
Model-9 shows that there is a direct relationship between second-order formative ACAP as IV and second-order formative CE as DV. The findings present a significant positive path coefficient of 0.704 between IV and DV. The model reports an R^2 value of 0.496.



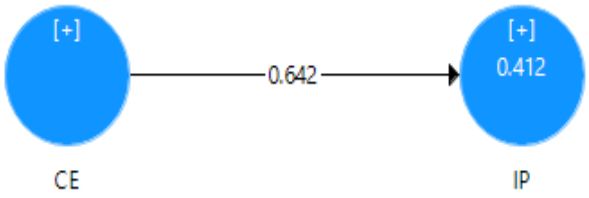
Model-10 shows that there is a significant direct relationship between second-order formative ACAP as the independent variable and first-order reflective IP as the dependent variable. The findings present a significant positive path coefficient of 0.632 between IV and DV. The model reports an R^2 value of 0.399.



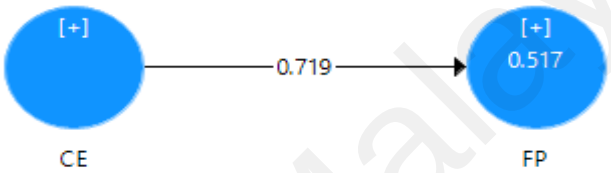
Model-11 shows that there is a significant direct relationship between second-order formative ACAP as the independent variable and first-order reflective FP as the dependent variable. The findings present a significant positive path coefficient of 0.682 between IV and DV. The model reports an R^2 value of 0.466.



Model-12 presents that there is a direct relationship between second-order formative CE as the independent variable and first-order reflective IP as the dependent variable. The findings present a significant positive path coefficient of 0.642 between IV and DV. The model reports an R^2 value of 0.412.



Model-13 presents that there is a direct relationship between second-order formative CE as the independent variable and first-order reflective FP as the dependent variable. The findings present a significant positive path coefficient of 0.717 between IV and DV. The model reports an R^2 value of 0.517.



Model-14 presents that there is a direct relationship between first-order reflective IP as the independent variable and first-order reflective FP as the dependent variable. The findings present a significant positive path coefficient of 0.639 between IV and DV. The model reports an R^2 value of 0.408.

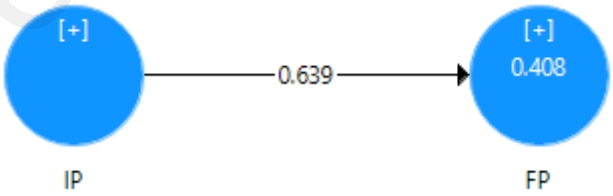


Table 5.15: Direct Relationship between Independent and Dependent Variables

Model	Independent Variable	Dependent Variable	Path Coefficient	R^2
Model B-1	**ITINF**	ACAP	0.481	0.231
Model B-2	**ITTS**	ACAP	0.637	0.406
Model B-3	**ITING**	ACAP	0.507	0.258
Model B-4	**ITALI**	ACAP	0.640	0.410
Model B-5	**ITINF**	CE	0.496	0.246
Model B-6	**ITTS**	CE	0.610	0.372
Model B-7	**ITING**	CE	0.508	0.258
Model B-8	**ITALI**	CE	0.604	0.364
Model B-9	**ACAP**	CE	0.704	0.496
Model B-10	**ACAP**	IP	0.632	0.399
Model B-11	**ACAP**	FP	0.682	0.466
Model B-12	**CE**	IP	0.642	0.412
Model B-13	**CE**	FP	0.719	0.515
Model B-14	**IP**	FP	0.639	0.408

5.6 Analysis Structural Model Estimation

To answer the research questions by testing the proposed research hypotheses is the main objective of the structural model. Once the variables have achieved sufficient reliability and validity then inner model or structural model can be analyzed. The examination of the inner model shows how empirical data sports the underlying theories used in the present thesis. Furthermore, it also permits to study the model's predictive abilities and relationships between hypothesized variables. The main purpose of PLS is to minimize error or maximize the variance explained in all dependent variables, thus the degree to which the PLS model achieves its objectives can be determined by analyzing the coefficient of determination (R^2) values for the dependent variables. Therefore, the validity of the structural model is assessed using the coefficient of determination (R^2) and path coefficients. In addition, this study also

assesses the mediation relationships that are being proposed in the research model. Table 5.16 presents the eight direct relation research hypotheses that analyzed in the structural model.

Table 5.16: List of Hypotheses

Hypotheses	
IT Capabilities and Absorptive Capacity	
H1a	IT infrastructure flexibility has a significant positive effect on absorptive capacity.
H1b	IT technical skills have a significant positive effect on absorptive capacity.
H1c	IT integration has a significant positive effect on absorptive capacity.
H1d	IT alignment has a significant positive effect on absorptive capacity.
IT Capabilities and Corporate Entrepreneurship	
H2a	IT infrastructure flexibility has a significant positive effect on corporate entrepreneurship.
H2b	IT technical skills have a significant positive effect on corporate entrepreneurship.
H2c	IT integration has a significant positive effect on corporate entrepreneurship.
H2d	IT alignment has a significant positive effect on corporate entrepreneurship.
Effect of Absorptive Capacity on Corporate Entrepreneurship	
H3	Absorptive capacity has a significant positive effect on corporate entrepreneurship.
Effect of Absorptive Capacity on Innovation Performance and Firm Performance	
H4	Absorptive capacity has a significant positive effect on innovation performance.
H5	Absorptive capacity has a significant positive effect on firm performance.
Effect of Corporate Entrepreneurship on Innovation Performance and Firm Performance	
H6	Corporate entrepreneurship has a significant positive effect on innovation performance.
H7	Corporate entrepreneurship has a significant positive effect on firm performance.
Effect of Innovation Performance and Firm Performance	

H8	Innovation performance has a significant positive effect on firm performance.
Mediating Effect of Absorptive Capacity	
H9a	Absorptive capacity significantly mediates the relationship between IT capabilities and corporate entrepreneurship.
H9b	Absorptive capacity significantly mediates the relationship between IT capabilities and performance outcomes.
Mediating Effect of Corporate Entrepreneurship	
H10a	Corporate entrepreneurship significantly mediates the relationship between IT capabilities and performance outcomes.
H10b	Corporate entrepreneurship significantly mediates the relationship between IT capabilities and absorptive capacity.

Based on the research hypotheses, a hypothesized model is presented in figure 5.6. There are a total of eight direct relation research hypotheses, H1 and H2 divided into sub-hypotheses. H1 shows the direct relationship between IT capability dimensions and ACAP, and H2 shows the direct relationship between IT capability dimensions and CE. H3 provides the direct relation of ACAP with CE. H4 and H5 present the direct relationship hypotheses between ACAP and IP and FP, and H6 and H7 present the direct relationship between CE and IP and FP. Finally, H8 present the direct relationship between innovation performance and firm performance. While H9 and H10 presents the mediating effects of ACAP and CE

5.6.1 Coefficient of Determination (R^2)

The value of R^2 shows the total variance by the independent variable (IV) in the dependent variable (DV). Therefore, a higher value of R^2 enhances the structural model's predictive ability. In the present study, the value of R^2 is attained by employing the Smart-PLS algorithm function, while to produce the value of t-statistics Smart-PLS bootstrapping function is utilized. For the present study, the bootstrapping produced 2000 samples from 417 cases.

ITINF, ITTS, ITING, ITALI, ACAP, CE, and IP are explaining 60.3% variance in firm performance, while ITINF, ITTS, ITING, ITALI, ACAP, and CE are explaining 47.5% variance in the innovation performance of the firm. Furthermore, ITINF, ITTS, ITING, and ITALI explain 55.4% variance in ACAP and 58.1% of the variance in CE.

5.6.2 Path Coefficients

The connection of two latent variables (LV) in a structural model represents a hypothesis. The relationship between the LV in the structural model is called path coefficients. Path coefficients are considered as the summary of all results. In the structured model that is labeled as "p" is also initially unknown and estimated as part of solving the PLS-SEM algorithm. Subsequently, the algorithm calculated the constructs scores are used to evaluate the regression model. Also, the p-value (probability value) should be less than 0.05 which shows that the results are positive. It is also known as the significance level. On the other hand, the t-value should be higher than 1.96 that also presents the level of significance.

5.6.3 Relevance and Significance of Path Coefficient

The evaluation of the magnitude and significance level of path coefficients is permitted by the structural model. However, the execution of bootstrapping is required for evaluation of the structural model in PLS-SEM. Using the PLS, the developed hypotheses were tested by examining the path coefficient, path significance, and variance explained. To ensure that the model obtains adequate validity and reliability test of convergent validity, discriminant validity, and reliability are done prior to test hypotheses. After running the bootstrapping procedure, the structural model with results is shown in figure 5.6. The results of path coefficient, significance level, and t-statistics are presented in table 5.17.

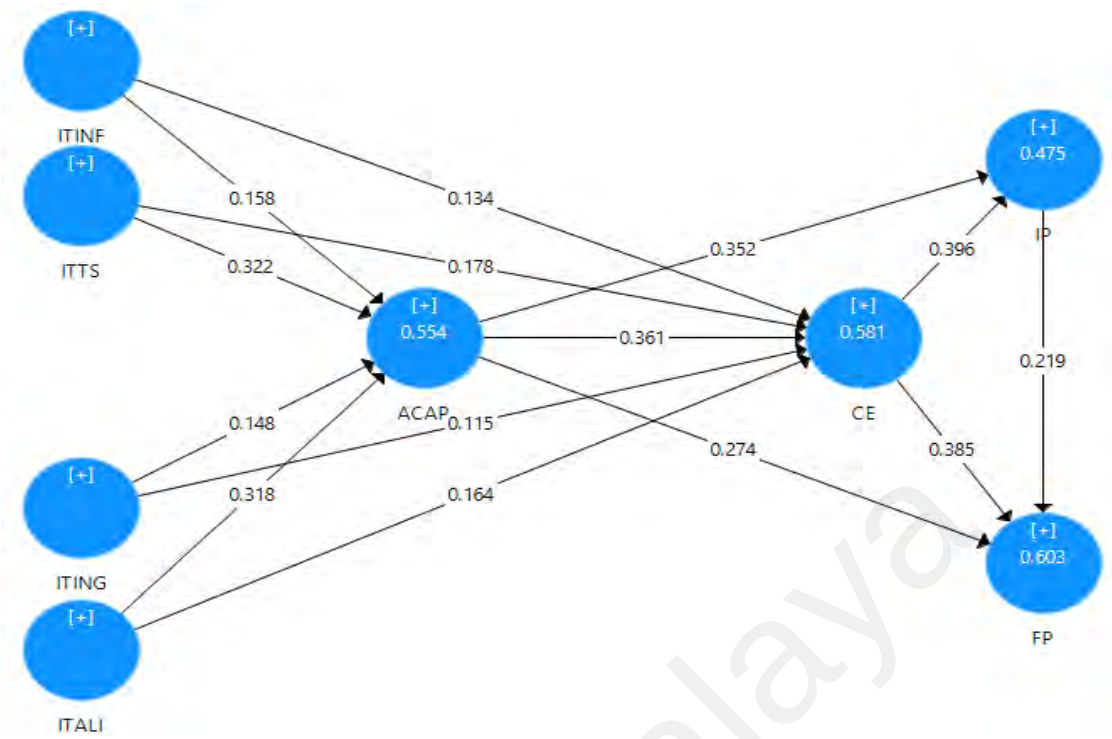


Figure 5.6: Structural Model with Path Coefficient

Table 5.17: Path Coefficients

Hypotheses	Relationship	Path Coefficient	T-Statistics	P-Value	Significance Level	Direction
H1a	ITINF→ACAP	0.158	3.113	0.002	**	Supported
H1b	ITTS→ACAP	0.322	5.958	0.000	***	Supported
H1c	ITING→ACAP	0.148	3.076	0.002	**	Supported
H1d	ITALI→ACAP	0.318	6.541	0.000	***	Supported
H2a	ITINF→CE	0.134	2.558	0.011	*	Supported
H2b	ITTS→CE	0.178	3.613	0.000	***	Supported
H2c	ITING→CE	0.115	2.628	0.009	**	Supported
H2d	ITALI→CE	0.164	3.602	0.000	***	Supported
H3	ACAP→CE	0.361	6.502	0.000	***	Supported
H4	ACAP→IP	0.352	6.399	0.000	***	Supported
H5	ACAP→FP	0.274	5.034	0.000	***	Supported
H6	CE→IP	0.396	6.291	0.000	***	Supported
H7	CE→FP	0.385	7.056	0.000	***	Supported
H8	IP → FP	0.219	4.215	0.000	***	Supported

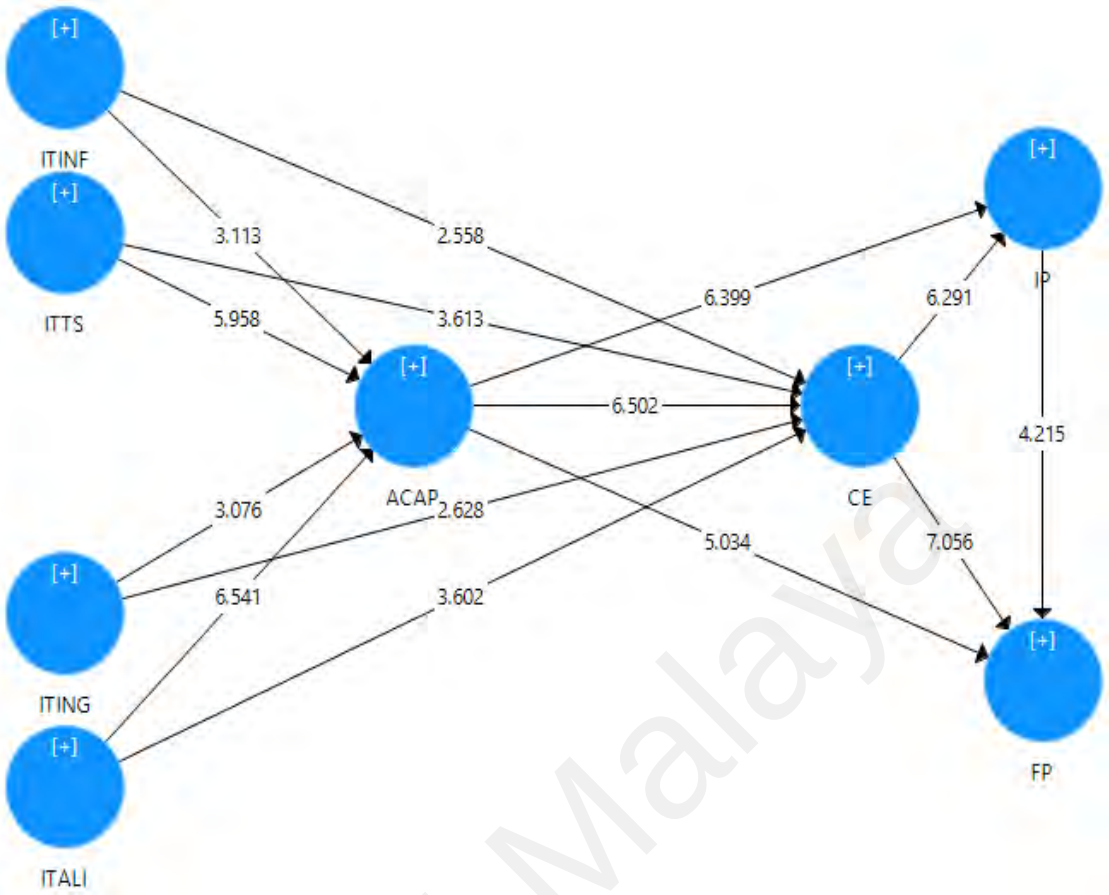


Figure 5.7: Structural Model with T-Values

There are fourteen direct relationship research hypotheses and the result of the structural model presents that all hypotheses of this research are supported. Moreover, the ACAP is significantly influenced by ITINF (β=0.158, p < 0.002), ITTS (β=0.322, p < 0.000), ITING (β=0.148, p < 0.002), ITALI (β=0.318, p < 0.000), which support the H1 (a,b,c,d). The results show that dimensions of IT capability have a significant positive effect on ACAP. However, IT integration has the least significant positive relationship with ACAP. Similarly, CE is significantly influenced by ITINF (β=0.135, p < 0.011), ITTS (β=0.178, p < 0.000), ITING (β=0.115, p < 0.009), ITALI (β=0.164, p < 0.000) which support the H2 (a,b,c,d). The results demonstrate that dimensions of IT capability have a significant positive effect on CE. However, IT infrastructure flexibility has the least significant positive relationship with CE. The results of H3 present that ACAP has a significant positive effect on CE (β=0.361, p < 0.000). In addition, ACAP has a significant positive

effect on IP (β=0.352, p < 0.000) and FP (β=0.274, p < 0.000) and results support the H4 and H5. Furthermore, CE also has a significant positive direct relationship with IP (β=0.396, p < 0.000) and FP (β=0.485, p < 0.000) and support the hypotheses H6 and H7. Finally, the results of H8 present that IP has a significant positive effect on FP (β=0.219, p < 0.000).

5.7 Mediating Effect

In the PLS path model, a situation in which a mediating variable to some extent absorb the effect of an exogenous on an endogenous construct represents the mediation (Hair et al., 2014). Instead of traditional Sobal (1982) test, this study has utilized Preacher and Hayes (2008) process for the analysis of mediation because it does not have a strict assumption of distribution (Hair et al., 2013). Preacher & Hayes (2008) process utilize the bootstrapping technique in two steps. First of all the significance level of a direct relationship is checked by employing the bootstrapping, in which mediating variable is not present in the model. After that, utilizing the path coefficient when the mediator is included in the model, the significance of the indirect effect and associated T-values are checked. Mediation models are presented in appendix-5. The results of mediation analysis are presented in Table 5.18.

The results of mediation analysis presents that ACAP significantly mediated the relationship between IT capability dimensions and CE. Such as, **ITALI → ACAP → CE** (β=0.115, p < 0.000), **ITINF → ACAP → CE** (β=0.057, p < 0.001), **ITING → ACAP → CE** (β=0.053 p < 0.006), **ITTS → ACAP → CE** (β=0.116, p < 0.000). Similarly, the results of mediation analysis show that ACAP significantly mediated the relationship between IT capability dimensions and IP. Such as, **ITALI → ACAP → IP** (β=0.112, p < 0.000), **ITINF → ACAP → IP** (β=0.056, p < 0.008), **ITING → ACAP → IP** (β=0.052 p < 0.006), **ITTS → ACAP → IP** (β=0.113, p < 0.000). In addition, the results of mediation

analysis show that ACAP significantly mediated the relationship between IT capability dimensions and FP. Such as, **ITALI → ACAP → FP** (β=0.087, p < 0.000), **ITINF → ACAP → FP** (β=0.043, p < 0.002), **ITING → ACAP → FP** (β=0.041 p < 0.011), **ITTS → ACAP → FP** (β=0.088, p < 0.000). All the results of mediations paths are significant, thus supported the hypotheses H9a and H9b.

Table 5.18: Mediation Path Model Values

Path	Path Coefficient	T-Value	P-Value	Significance Level	Decisions
ITALI → ACAP → CE	0.115	4.711	0.000	***	Supported
ITINF → ACAP → CE	0.057	3.197	0.001	**	Supported
ITING → ACAP → CE	0.053	2.784	0.006	**	Supported
ITTS → ACAP → CE	0.116	3.707	0.000	***	Supported
ITALI → ACAP → FP	0.087	3.888	0.000	***	Supported
ITINF → ACAP → FP	0.043	3.073	0.002	**	Supported
ITING → ACAP → FP	0.041	2.563	0.011	*	Supported
ITTS → ACAP → FP	0.088	3.560	0.000	***	Supported
ITALI → CE → FP	0.063	3.094	0.002	**	Supported
ITINF → CE → FP	0.052	2.434	0.015	*	Supported
ITING → CE → FP	0.044	2.339	0.020	*	Supported
ITTS → CE → FP	0.069	3.439	0.001	**	Supported
ITALI → ACAP → IP	0.112	4.439	0.000	***	Supported
ITINF → ACAP → IP	0.056	2.676	0.008	**	Supported
ITING → ACAP → IP	0.052	2.748	0.006	**	Supported
ITTS → ACAP → IP	0.113	4.335	0.000	***	Supported
ITALI → CE → IP	0.065	3.105	0.002	**	Supported
ITINF → CE → IP	0.053	2.132	0.033	*	Supported
ITING → CE → IP	0.045	2.336	0.020	*	Supported
ITTS → CE → IP	0.070	2.867	0.004	**	Supported
ACAP→CE→FP	0.269	5.598	0.000	***	Supported
ACAP→CE→IP	0.276	5.391	0.000	***	Supported
ACAP→IP→FP	0.077	3.303	0.001	**	Supported
CE→IP→FP	0.194	4.701	0.000	***	Supported

Furthermore, this study analyzes the mediation path of CE between IT capability dimensions and performance outcomes, and the mediation path of CE between ACAP and performance outcomes. The results of the mediation analysis present that CE significantly mediated the relationship between IT capability dimensions and IP. Such as, **ITALI → CE → IP** (β=0.065, p < 0.002), **ITINF → CE → IP** (β=0.053, p < 0.033), **ITING → CE → IP** (β=0.045 p < 0.020), **ITTS → CE → IP** (β=0.070, p < 0.004). Similarly, the results of mediation analyses show that CE significantly mediated the relationship between IT capability dimensions and FP. Such as, **ITALI → CE → FP** (β=0.063, p < 0.002), **ITINF → CE → FP** (β=0.052, p < 0.015), **ITING → CE → FP** (β=0.044 p < 0.020), **ITTS → CE → FP** (β=0.069, p < 0.001). In addition, the results of mediation analysis show that CE significantly mediated the relationship between ACAP and performance outcomes. Such as, **ACAP→CE→IP** (β=0.269, p < 0.000) and **ACAP→CE→IP** (β=0.276, p < 0.000). All the results of mediations paths through CE are significant, thus supported the hypotheses H10a and H10b.

5.7.1 Specific Indirect Effect

Finally, this study also analyzes the intervening role of ACAP, CE, and IP. The results of the analysis show that intervening variables mediate the relationship between IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) and performance outcomes, innovation performance and firm performance (DV). First, this study analyzes the sequential role of ACAP and CE between IT capability dimensions and innovation performance. The result are showing that IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on innovation performance (0.023, t=2.887, p=0.004), (0.046, t=3.324, p=0.001), (0.021, t=2.572, p=0.010), (0.045, t=4.273, p=0.000) respectively, through ACAP and CE. Therefore the presence of both mediators ACAP and CE, significantly mediate the relationship between IT capability

dimensions and innovation performance. Similarly, this study also analyzes the sequential role of ACAP and CE between IT capability dimensions and firm performance. The result are showing that IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on firm performance (0.022, t=2.664, p=0.008), (0.045, t=3.237, p=0.001), (0.021, t=2.584, p=0.010), (0.044, t=3.686, p=0.000) respectively, through ACAP and CE. Therefore the presence of both mediators ACAP and CE, significantly mediate the relationship between IT capability dimensions and firm performance.

Furthermore, this study analyzes the specific path of IT capability dimensions towards firm performance through ACAP and IP. The result are demonstrating that IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on firm performance (0.012, t=2.013, p=0.045), (0.025, t=2.907, p=0.004), (0.011, t=2.187, p=0.029), (0.025, t=3.102, p=0.002) respectively, through ACAP and IP. Therefore the presence of both mediators ACAP and IP, significantly mediate the relationship between IT capability dimensions and firm performance. Similarly, this study analyzes the specific path of IT capability dimensions towards firm performance through CE and IP. The result is demonstrating that IT capability dimensions (ITTS, and ITALI) have a significant positive effect on firm performance (0.015, t=2.219, p=0.027), and (0.014, t=2.470, p=0.014) respectively, through CE and IP. However, ITINF and ITING did not reach significantly towards FP (0.012, t=1.811, p=0.071) and (0.010, t=2.021, p=0.052) respectively, through CE and IP. Therefore the presence of both mediators CE and IP, significantly mediate the relationship between IT capability dimensions and firm performance, except two dimensions of IT capability ITINF and ITING. Additionally, this study analyzes the specific path between ACAP and FP through CE and IP. The result is explaining that ACAP has a significant positive effect on firm performance (0.060, t=3.135, p=0.000), through CE and IP.

Table 5.19: Specific Indirect Effect Estimates

	Path Coefficient	T-Value	P-Value	Significance Level	Decisions
ITALI → ACAP → CE → IP	0.045	4.273	0.000	***	Supported
ITINF → ACAP → CE → IP	0.023	2.887	0.004	**	Supported
ITING → ACAP → CE → IP	0.021	2.572	0.010	*	Supported
ITTS →ACAP → CE → IP	0.046	3.324	0.001	**	Supported
ITALI → ACAP → CE → FP	0.044	3.686	0.000	***	Supported
ITINF → ACAP → CE → FP	0.022	2.664	0.008	**	Supported
ITING → ACAP → CE → FP	0.021	2.584	0.010	*	Supported
ITTS → ACAP → CE → FP	0.045	3.237	0.001	**	Supported
ITALI → ACAP → IP → FP	0.025	3.102	0.002	**	Supported
ITINF → ACAP → IP → FP	0.012	2.013	0.057	NS	Not Supported
ITING → ACAP → IP → FP	0.011	2.187	0.029	*	Supported
ITTS → ACAP → IP → FP	0.025	2.907	0.004	**	Supported
ITALI → CE → IP → FP	0.014	2.470	0.014	*	Supported
ITINF → CE → IP → FP	0.012	1.811	0.071	NS	Not Supported
ITING → CE → IP → FP	0.010	2.041	0.052	NS	Not Supported
ITTS → CE → IP →FP	0.015	2.219	0.027	*	Supported
ACAP→CE→ IP → FP	0.060	3.135	0.002	**	Supported
ITALI → ACAP → CE → IP →FP	0.010	3.175	0.002	**	Supported
ITINF → ACAP → CE → IP →FP	0.005	2.223	0.027	*	Supported
ITING → ACAP → CE → IP →FP	0.005	2.117	0.035	*	Supported
ITTS → ACAP → CE → IP →FP	0.010	2.588	0.010	*	Supported

Lastly, this study analyzes the specific indirect path between IT capability dimensions and FP through all three mediating variables (ACAP, CE, IP). The result are demonstrating that IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on firm performance (0.005, t=2.223, p=0.027), (0.010,

t=2.588, p=0.010), (0.005, t=2.117, p=0.035), (0.010, t=3.175, p=0.002) respectively, through ACAP, CE and IP. Therefore the presence of ACAP, CE, and IP, significantly mediate the relationship between IT capability dimensions and firm performance. Surprisingly, the results present that the insignificant relationship of ITINF with firm performance through ACAP and IP, become significant with the addition of CE in the model. Similarly, the results demonstrate that the insignificant relationship of ITINF and ITING with firm performance through CE and IP, become significant with the addition of ACAP in the model. Therefore, CE has a critical role after the ACAP, in order to explain the relationship between IT capability dimensions and FP. In addition, ACAP capacity has an important role before CE, in order to explain the relationship between IT capability dimensions and FP. Thereby, this study presents the importance of the sequential role of ACAP, and CE between IT capability dimension and performance outcomes. Table 5.19 presents the results of specific indirect estimations results.

5.8 Blindfolding

Blindfolding known as the technique of sample reuses, which analytically deletes the data points and gives original values projection (Hair Jr et al., 2016). It helps to calculate the value of Q^2 (Stone-Geisser's) (Geisser, 1974; Stone, 1974), which presents an estimation condition for the cross-validated predictive relevance of the PLS path model. Furthermore, Q^2 value also helps the researchers as a basis of predictive relevance other than computing the value of R^2 magnitude as a standard of predictive accurateness. By employing the procedure of blindfolding the value of Q^2 of the latent construct in the PLS path model is attained. The values of Q^2 should be more than zero either positive or negative. Table 5.20 shows the results of blindfolding.

Table 5.20: Model Predictive Relevance

	SSO	SSE	Q^2 (=1-SSE/SSO)
ACAP	1,668.000	1,070.230	0.358
CE	1,668.000	1,074.121	0.356
FP	417.000	173.486	0.584
IP	417.000	227.343	0.455
ITALI	417.000	417.000	
ITINF	417.000	417.000	
ITING	417.000	417.000	
ITTS	417.000	417.000	

The values Q^2 of all endogenous latent constructs are higher the zero that signifies the predictive relevance of PLS path model.

5.9 Analysis of the Effect Size -f^2

According to the Hair et al. (2013) the effect size f^2 is the evaluation of R^2 in a case where a particular independent variable is removed from the research model, subsequently, it examines the effect size of the removed independent variable on the dependent variable. The effect size is computed based on the following formula.

$$f^2 = R^2 \text{ included} - R^2 \text{ excluded} / 1 - R^2 \text{ included}$$

According to Chin (1998), the values of f^2 can be compared to 0.02, 0.15, and 0.35 to identify whether the independent variable has small, medium or large effect respectively. The results reveal that the f^2 values of ITINF on ACAP and CE are 0.042 and 0.031 respectively. Furthermore, the f^2 values of ITTS on ACAP and CE are 0.140 and 0.040 respectively, which shows the medium size effect on respective variables. The f^2 values of ITING on ACAP and CE are 0.035 and 0.022 respectively. In addition, the f^2 values of ITALI on ACAP, and CE are 0.136 and 0.034 respectively.

Furthermore, the f^2 values of ACAP on CE, IP and FP are 0.138, 0.121 and 0.087 respectively, which shows the medium size effect on respective variables. Similarly, the f^2 values of CE on IP and FP are 0.153, 0.166 respectively, which shows the medium size effect on respective variables. In the end, this study analyzes the effect size of IP on FP which is 0.063 that shows a small effect of IP on firm performance.

5.10 Model Fitness Test

According to Hair et al., (2013), PLS-SEM is evaluated according to the heuristic, for the prediction capabilities of the theoretical/conceptual model. Evaluation of goodness of fit is the starting point to assess the model. The modeling of the PLS path does not optimize any global scalar function so that it normally lacks an index that can provide the user with a global validation of the model. The goodness of fit shows an operational solution to this problem it may be meant as an index for validation the PLS model globally. The goodness of fit can be calculated by the computing the geometric mean of average commonalities and the average R^2 by following the equation,

$$\text{GoF} = \sqrt{Average\ communalities} * R^2$$

The indices for R^2 and commonalities are presented in Table 5.21. The value of R^2 cannot be calculated for the independent variables. The calculation of goodness of fit is as follows.

Table 5.21: **Goodness of Fit**

Constructs	AVE	R^2
ITINF	0.710	
ITTS	0.738	
ITING	0.763	
ITALI	0.645	
ACAP	0.570	0.554
CE	0.532	0.581
IP	0.663	0.475
FP	0.667	0.603
Average	**0.661**	**0.553**

GoF= $\sqrt{0.661} * 0.553 = \sqrt{0.365} = 0.604$

Based on the guidelines of Wetzel, Odekerken and Van open (2009), the values of goodness of fit less than 0.1 shows not fitness of model, while values between 0.1 to 0.25 presents the small fitness of model, values between 0.25 to 0.36 presents the medium fit of model and the value of goodness of fit higher than 0.36 present large global validity for PLS models. The values of the goodness of fit in this study are 0.604 which shows the PLS model. It presents that the theoretical model is able to take into account 60.40% of the achievable fit and it is indicative of the fact that the model is satisfactory.

5.11 Importance-Performance Map

PLS-SEM analyses deliver information on the relative importance of constructs in explaining other constructs in the structural model. The importance-performance map analysis (IPMA) extends the results of PLS-SEM by also taking the performance of each construct into account.

In this study, the IPMA which is also known as importance-performance matrix analysis or priority map analysis has been performed. Also, it is a very worthwhile systematic instrument in PLS-SEM; which fully spreads the standard path coefficient estimations in a more practical approach (Ringle & Sarstedt, 2016). Importance-performance map analysis demonstrates a contrast of importance constructs. Furthermore, the ultimate purpose of importance-performance map analysis is to point out the predecessors who have a comparatively low performance but high importance for the target constructs. Moreover, the Importance-Performance map provides an extraordinary opportunity for researchers to enhance their PLS-SEM analysis and, thereby, expand the results and findings of the study. All values in total effects (importance) higher than 0.10 are significant at the $\alpha \leq 0.10$ level. The bold values specify the highest importance (total effect) and highest performance value.

First, this study employing the IPMA analysis by targeting the IP as the dependent variable, which is predicted by six predecessors, for instance, ITINF, ITTS, ITING, ITALI, ACAP and, CE. The results are presented in Table 5.22. Considering at importance-performance map; it is cleared that ACAP has maximum importance 0.495 in relation to IP, while ITING has the least importance value 0.119 in the relation of IP. While, ITING has the highest performance score as 74.843, while ITALI has the least performance score as 68.865 in the relation of IP. Figure 5.8 presents the graphical representation of the construct IP importance-performance map.

Table 5.22: Importance Performance Map Analysis for Innovation Performance

	Importance	Performances
ACAP	**0.495**	73.439
CE	0.396	71.209
ITALI	0.223	68.865
ITINF	0.131	73.369
ITING	0.119	**74.843**
ITTS	0.230	71.413

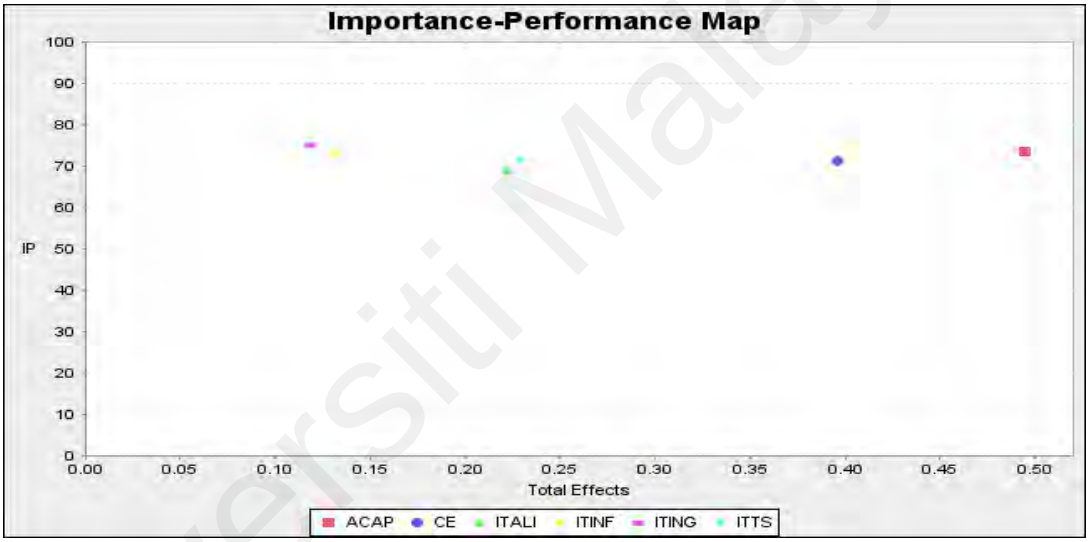


Figure 5.8: Importance Performance Map Analysis for Innovation Performance

Furthermore, this study employing the IPMA analysis by targeting the FP as the dependent variable, which is predicted by six predecessors, for instance, ITINF, ITTS, ITING, ITALI, ACAP and, CE. The results are presented in Table 5.23. Considering at importance-performance map; the results show that ACAP has the highest importance in relation to FP with the value of 0.522, while ITING has least importance value in the relation of FP with the value of 0.131. While, innovation performance has the highest performance score as 75.890, while ITALI has the least

performance score as 68.865 in the relation of FP. Figure 5.9 presents the graphical representation of the construct FP importance-performance map.

Table 5.23: Importance Performance Map Analysis for Firm Performance

	Importance	Performances
ACAP	**0.522**	73.439
CE	0.472	71.209
IP	0.219	**75.890**
ITALI	0.244	68.865
ITINF	0.146	73.369
ITING	0.131	74.843
ITTS	0.252	71.413

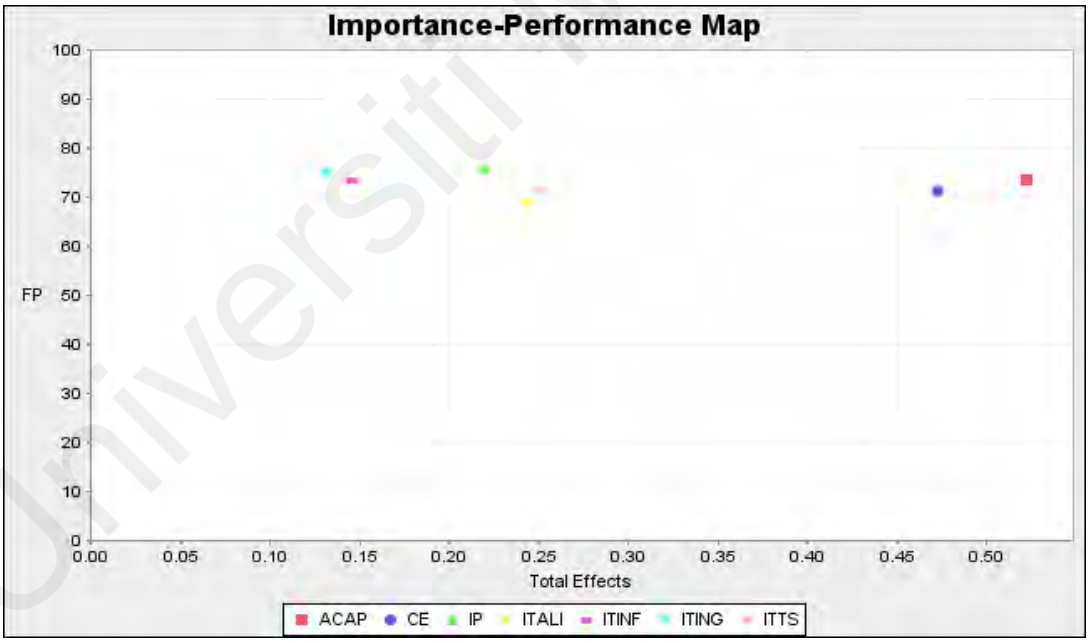


Figure 5.9: Importance Performance Map Analysis for Firm Performance

5.12 Summary

This chapter explains the data presentation and data analysis. The data presentation was done by employing the SPSS (Version 22) that includes the data editing, coding, screening, missing data handling, analysis of monotone response pattern, demographics analysis, non-response bias evaluation. After the data presentation, the analysis of multivariate analysis was done by conducting the normality, multicollinearity and common method bias tests. In the next section, Partial Least Square Structural Equation Modeling (PLS-SEM) helps to examine the measurement model. Furthermore, PLS-SEM is employed to analyze the data reliability and data validity of reflective and formative measures validity. Then the proposed structural research model was tested by utilizing the PLS-SEM to analyze the research hypotheses. Additionally, this section also presents a comparison between the theoretical model and a full structural model. Mediation analysis was also done to check the indirect effect of independent variables on the dependent variable through ACAP and CE. The goodness of fit of the model was also tested in order to assess the models PLS global fit validity. The results of the analyses show that all the direct relation hypothesis has a significant effect and ACAP and CE significantly mediate the relationship between IT capability dimension and performance outcomes (IP and FP), also ACAP has a mediating role between IT capability dimensions and CE, in addition, CE mediates the relationship between ACAP, IP, and FP. Importance-performance test was also conducted to test the importance of all exogenous variables for the endogenous variable. The following chapter six presents the discussions of results, contributions of research and limitation of the research.

CHAPTER 6: DISCUSSION AND CONCLUSION

6.1 Introduction

In this chapter, the findings of the current study, on the basis of research hypotheses and proposed framework, are discussed. This chapter includes research contributions, more importantly; it explains practical implications and provides a road map that guides the scholars and academicians for a better understanding of the relationships between the variables of the current framework. It will also be proved very helpful for the managers and administrators of an organization as it may improve their vision and ability of judgment towards the evaluation and exploitation of new business opportunities. The present chapter is divided into seven sections; the first section includes the introduction, the second section presents the doctoral research overview and discussion on research findings, the third section explains the research contribution, section four presents the practical implications. In section five and six, the research limitations and recommendations for future researched have been discussed. The last section is about the conclusion of this study.

6.2 An Overview of the Doctoral Research

The importance of information technology (IT) is manifested in today's business world. The dynamic business environment and technological advancements are turning businesses into progressively complex entities. Therefore, the researchers are focusing to analyze how IT provides benefit to various businesses and to what extent it contributes to enhancing the different performance outcomes (Fink, 2011; Schryen, 2010). Nowadays, the competition between firms has been increasing as they have been seriously involved in making the decisions like the adoption of new technologies, improve technical skills, create links with other businesses and align IT strategies with their business vision. In this regard, the resource-based view explains that IT capabilities are valuable, rare, inimitable

and non-substitutable in nature (Bharadwaj, 2000) and these IT capabilities have a positive role in increasing different performance outcomes (Chen et al., 2015; Teece, 2014; Uma & Roger, 2003). Although the relationship between IT capabilities and performance outcomes is an extensively researched area the underlying mechanisms are still not clear. Particularly, a dearth of the knowledge exists on the relationship between information technology and SMEs performance outcomes. In the field of management sciences, the researchers have mainly focused on large firms in their studies but on the other hand, very limited research studies have analyzed the effect of IT on SMEs performance outcomes and where ever some work was done, it was done without consideration of the actual sphere of issues in SMEs (Neirotti & Raguseo, 2017; Soto-Acosta et al., 2018). These studies on SMEs performance were characteristically based on the models and theories that were actually developed for large firms. On the other hand, the characteristics of IT utilization in SMEs are way different when compared to the larger firms. Therefore, the understanding that how IT assists SMEs to achieve a competitive advantage remains somewhat inscrutable. The scholars have emphasized that there is a need to conduct more studies on the relationship between IT capability dimensions and performance outcomes by introducing intervening mechanisms (Mikalef & Pateli, 2017). It has been suggested that the IT capabilities act as antecedents of dynamic capabilities that tend to enhance SMEs performance (Chen et al., 2015; Martín-Rojas et al., 2011; Teece, 2014; Uma & Roger, 2003).

The literature highlights the prominence of the dynamic capability approach and analyzing the paths through which IT capabilities improve the performance of SMEs in a rapidly changing business environment conditions (Kohli & Grover, 2008; Soto-Acosta et al., 2018). This study specifically aims to analyze two dynamic mechanisms; absorptive capacity and corporate entrepreneurship (Teece, 2014; Teece et al., 1997; Zahra & George, 2002; Zahra et al., 2006) as an intervening mechanism between IT capability

dimensions and SMEs performance outcomes such as, innovation performance and the firm's (overall) performance. The theoretical framework, formulated in this study, presents the dimensions of IT capabilities (IT infrastructure flexibility, IT technical skills, IT integration, and IT alignment) as independent variables, absorptive capacity, and corporate entrepreneurship are two-second order mediators and the dependent variables are innovation performance and firm performance. The theoretical model is tested on the basis of ten hypotheses to answers research questions:

RQ1: To examine the effect of IT capabilities on absorptive capacity.

- RQ1a: What is the effect of IT infrastructure flexibility on absorptive capacity?
- RQ1b: What the effect of IT technical skills on absorptive capacity?
- RQ1c: What is the effect of IT integration on absorptive capacity?
- RQ1d: What is the effect of IT alignment on absorptive capacity?

RQ2: What is the effect of IT capabilities on corporate entrepreneurship?

- RQ2a: What is the effect of IT infrastructure flexibility on corporate entrepreneurship?
- RQ2b: What is the effect of IT technical skills on corporate entrepreneurship?
- RQ2c: What is the effect of IT integration on corporate entrepreneurship?
- RQ2d: What is the effect of IT alignment on corporate entrepreneurship?

RQ3: What is the effect of absorptive capacity on corporate entrepreneurship?

RQ4: What is the effect of absorptive capacity on innovation performance?

RQ5: What is the effect of absorptive capacity on firm performance?

RQ6: What is the effect of corporate entrepreneurship on innovation performance?

RQ7: What is the effect of corporate entrepreneurship on firm performance?

RQ8: What is the effect of innovation performance on firm performance?

RQ9: Do absorptive capacity mediate the relationships?

- RQ9a: Do absorptive capacity mediate the relationship between IT capabilities and corporate entrepreneurship?
- RQ9b: Do absorptive capacity mediate the relationship between IT capabilities and SMEs performance outcomes?

RQ10: Do corporate entrepreneurship mediate the relationship?

- RQ10a: Do corporate entrepreneurship mediate the relationship between IT capabilities and SMEs performance outcomes?
- RQ10b: Do corporate entrepreneurship mediate the relationship between absorptive capacity and SMEs performance outcomes?

These research questions are based on the objectives of this study. To analyze the research hypotheses, the quantitative approach was followed and a survey was conducted to collect the data from medium-sized manufacturing SMEs of Pakistan. The structured questionnaires were distributed among the 1200 firms based on cluster sampling and the respondents of the questionnaire were CEOs/top management. Out of 1200 respondents, 417 respondents returned the questionnaires that were complete in all respect. The quantitative analysis is based on the Partial Least Square Structural Equation Modeling (PLS-SEM) that was employed to analyze the indirect effect of IT capability dimensions on SMEs performance via absorptive capacity and corporate entrepreneurship.

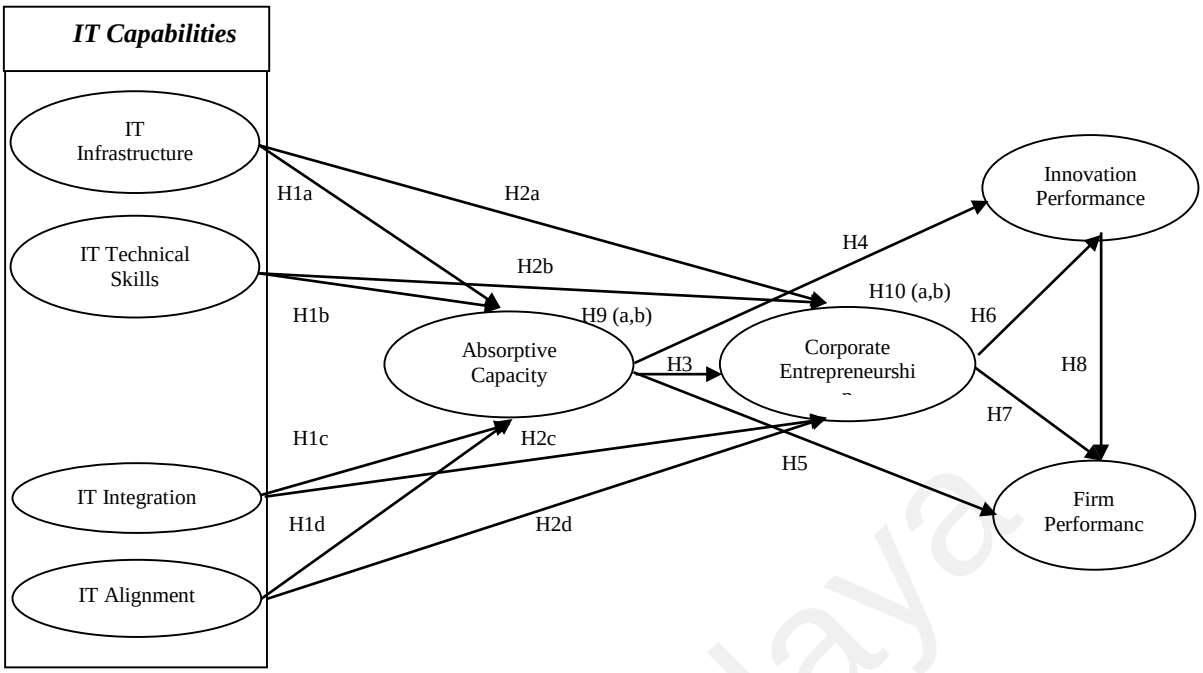


Figure 6.1: Theoretical Framework and Hypotheses

Table 6.1 represents the hypotheses of this study and the summary of findings, which indicates that IT infrastructure flexibility, IT technical skills, IT integration and IT alignment have a significant positive effect on absorptive capacity. In the relationship of IT capabilities and absorptive capacity; IT technical skills and IT alignment have highly significant value ($p < .000$) as compared to the significant value of IT infrastructure flexibility and IT integration. Similarly, IT infrastructure flexibility, IT technical skills, IT integration and IT alignment have a significant association with corporate entrepreneurship. The results demonstrate that in the relationship of IT capabilities and corporate entrepreneurship, IT infrastructure flexibility have least significant value ($p < .011$) as compared to the significant value of IT technical skills, IT integration and IT alignment. Furthermore, the results reveal that the absorptive capacity has a positive effect on corporate entrepreneurship and performance outcomes. In addition, corporate entrepreneurship also has a significant effect on performance outcomes. Lastly, the results of the structural model present that innovation performance also has a significant positive effect on firm performance.

There are a number of significant findings, which are conferred with respect to the two research questions posed in the first chapter.

Table 6.1: Summary of Hypotheses Results

H1a	IT infrastructure flexibility has a positive effect on absorptive capacity.	**Supported**
H1b	IT technical skills have a positive effect on absorptive capacity.	**Supported**
H1c	IT integration has a positive effect on absorptive capacity.	**Supported**
H1d	IT alignment has a positive effect on absorptive capacity.	**Supported**
H2a	IT infrastructure flexibility has a positive effect on corporate entrepreneurship.	**Supported**
H2b	IT technical skills have a positive effect on corporate entrepreneurship.	**Supported**
H2c	IT integration has a positive effect on corporate entrepreneurship.	**Supported**
H2d	IT alignment has a positive effect on corporate entrepreneurship	**Supported**
H3	Absorptive capacity has a positive effect on corporate entrepreneurship	**Supported**
H4	Absorptive capacity has a positive effect on innovation performance	**Supported**
H5	Absorptive capacity has a positive effect on firm performance	**Supported**
H6	Corporate entrepreneurship has a positive effect on innovation performance	**Supported**
H7	Corporate entrepreneurship has a positive effect on firm performance	**Supported**
H8	Innovation performance has a positive effect on firm performance	**Supported**
H9a	Absorptive capacity significantly mediates the relationship between IT capabilities and corporate entrepreneurship.	**Supported**
H9b	Absorptive capacity significantly mediates the relationship between IT capabilities and performance outcomes.	**Supported**

H10a	Corporate entrepreneurship significantly mediates the relationship between IT capabilities and performance outcomes.	**Supported**
H10b	Corporate entrepreneurship significantly mediates the relationship between IT capabilities and absorptive capacity.	**Supported**

Lastly, this study analyzes the specific indirect path between IT capability dimensions and FP through all three mediating variables (ACAP, CE, IP). The results demonstrate that the IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on firm performance, through ACAP, CE, and IP. Furthermore, the results show that ITINF has an insignificant relationship with firm performance through ACAP and IP but with the introduction of CE in the model it becomes significant. Similarly, the results reveal that the insignificant relationship of ITINF and ITING with the performance of the firm through CE and IP becomes significant with the introduction of ACAP in the model. Therefore, CE has a critical role after the ACAP, in order to explain the relationship between IT capability dimensions and FP. Moreover, the addition of ACAP capacity has an important role before CE, as with the presence of ACAP before CE, an insignificant relationship between IT capability dimensions and firm performance becomes significant. Thereby, this study presents the importance of the sequential role of ACAP, and CE between IT capability dimension and performance outcomes. The next section presents a detailed discussion of the research questions and empirical findings of this study.

6.2.1 Research Questions Discussion

6.2.1.1 Research Question One:

RQ1: To examine the effect of IT capabilities on absorptive capacity.

- RQ1a: What is the effect of IT infrastructure flexibility on absorptive capacity?
- RQ1b: What the effect of IT technical skills on absorptive capacity?
- RQ1c: What is the effect of IT integration on absorptive capacity?
- RQ1d: What is the effect of IT alignment on absorptive capacity?

The resource-based view (RBV) is a commonly applied theory in strategic management and information system studies. According to RBV, it is difficult for firms to acquire and utilize IT capabilities as they are scarcely available. The presence of these capabilities provides benefit to a firm in order to compete in a competitive business environment and allow the firms to perform well (Bharadwaj, 2000; Nguyen et al., 2015). The IT capabilities are essential elements are have been proved helpful for the businesses in attaining high level of innovation performance (Chen et al., 2015; Lyver & Lu, 2018; Raymond & Uduafemhe, 2018) and business performance (Byrd & Turner, 2001; Uma & Roger, 2003).

Furthermore, IT capabilities tend to enhance absorptive capacity through the increase of knowledge exchange and quickly accessing the firm's database to make important decisions (Alavi & Leidner, 2001; Fabrizio, 2009). The IT capabilities enable the firms to acquire, assimilate, transfer and exploit knowledge resources from within as well as across the boundaries of the firm (Iyengar, Sweeney, & Montealegre, 2015; Kumar & Singh, 2004; Ray et al., 2005). The IT facilitates the use of codified knowledge and increases the knowledge transfer capability of the firms (Fayard, Lee, Leitch, & Kettinger, 2012) and enhance the ability of the firms to acquire and manage

new external knowledge (Gold et al., 2001). In addition, it has also been emphasized that IT increases the problem-solving ability of the firms by exploiting knowledge in order to achieve performance goals (Pavlou & El Sawy, 2006). The investment in IT-based capabilities allows the firms to acquire and manage advanced learning mechanisms that greatly help in attaining the competitive advantage (Sambamurthy & Subramani, 2005).

IT infrastructure with high flexibility makes it possible for an organization to enhance its communication and coordination in inter-linked processes which ultimately increase the situation interpretation and problem-solving competencies. The results of the present study indicate that ITINF has a significant direct effect on absorptive capacity. These findings show the consistency with the earlier studies (Uma & Roger, 2003), as ITINF provides a technology platform to enhance absorptive capacity (Aydiner et al., 2019; Mikalef, Pateli, & van de Wetering, 2016; Pérez-López & Alegre, 2012).

Information technology technical skill (ITTS) is an important antecedent of the firm's absorptive capacity and is an essential element for knowledge acquisition from external resources (Byrd & Davidson, 2003). The development of technical IT skills covers the depth and breadth of IT technical specialties (database management systems, networks, etc.) within the organization that foster the creation of knowledge directories and knowledge networks (Alavi & Leidner, 2001) which in turn increases the organization's ability to capture and assimilate knowledge. Since IT applications help a firm in gaining the knowledge from external sources quickly and rather easily (Corso et al., 2003), hence advanced ITTS helps the firm to develop and enhance its absorptive capacity (Daghfous, 2004; García-Sánchez et al., 2018; Jones & Grimshaw, 2016). The results of this study are consistent with the literature and present that ITTS

is positively associated with the absorptive capacity (Bolívar-Ramos et al., 2013). ITTS foster problem-solving competency and expertise in building and using advanced IT applications through higher quality information exchange in the context of knowledge communication, coordination, and exploitation within the firm (Kotabe et al., 2011).

Integration of IT is beneficial for strengthening the linkages between partner firms which make knowledge transfer more effective and reliable. The Firms can develop an environment of effective and efficient information and communication exchange within and outside of their boundaries with the help of information technology integration (ITING) thereby resulting in the improved absorptive capacity. The results indicate that ITING has a significant direct effect on absorptive capacity. These findings show the consistency with the earlier studies (Roberts, 2015; Roberts et al., 2012). Francalanci and Morabito (2008) argued that ITING enhances communication networking across the firms which in turn enhances operational coordination and as a result, the high level of absorptive capacity can be achieved.

Information technology alignment (ITALI) plays a fundamental role in influencing the other firm's capabilities positively, for instance, absorptive capacity (Kearns & Sabherwal, 2006; Rai & Sambamurthy, 2006). ITALI capabilities help firms to exchange knowledge by aligning various business processes and in this way, they manage to achieve a high operational alliance along with other partner firms. As a result, the efficiency and effectiveness of these business processes are enhanced across firm's boundaries through aligning the IT resources and increasing absorptive capacity (Rai & Sambamurthy, 2006; Saraf et al., 2007). The firms with ITALI capability tend to align IT resources to match their information needs, which is important for the enhancement of absorptive capacity.

6.2.1.2 Research Question Two:

RQ2: What is the effect of IT capabilities on corporate entrepreneurship?

- RQ2a: What is the effect of IT infrastructure flexibility on corporate entrepreneurship?
- RQ2b: What is the effect of IT technical skills on corporate entrepreneurship?
- RQ2c: What is the effect of IT integration on corporate entrepreneurship?
- RQ2d: What is the effect of IT alignment on corporate entrepreneurship?

IT capabilities are considered to be one of the most important antecedents of corporate entrepreneurship activities. IT capabilities support a technological environment that is conducive to a firm's corporate entrepreneurship activities (Lyver & Lu, 2018). The strategic use of IT allows proactive alertness to conduct desired entrepreneurial activities (Simsek et al., 2009). Therefore, the firms need to adopt an aggressive approach while utilizing these IT capabilities in response to the changing trends of the market, so the firm can make effective entrepreneurial decisions and also becomes capable of exploring new opportunities efficiently. For a firm to take entrepreneurial initiatives, it needs to adopt a proactive approach and for that purpose, the IT resources greatly compliment by helping the firm in accessing accurate data and developing the advanced networking channels for improved inter-firm as well as intra-firm coordination.

The IT infrastructure (ITINF) of any firm helps to boost the initiatives relating to corporate entrepreneurship (Chen et al., 2015). The ITINF offers a platform for the organization that ensures effectiveness and efficiency in new product development and product placement in the market thereof and hence, supporting the entrepreneurial activities of the organization (Chaudhuri et al., 2011). This ITINF helps in the

utilization and sharing of data amongst different working clusters, plays a crucial role in identifying the potential business opportunities and supports the organization in making sound business decisions (Audretsch, Heger, & Veith, 2015; Bhatt & Emdad, 2010). The ITINF supports the firm in its development projects that create a market equilibrium accordingly, by introducing innovative products and services. Hence, this has been an essentially needed capability to initiate business venturing activities successfully. With reference to these studies, the results of this study are consistent and establish the positive relationship of ITINF in uplifting the corporate entrepreneurship activities.

ITTS allow the firms to develop products and deliver services with more ease by handling technical issues that usually arise during the product development process (Pérez-López & Alegre, 2012) which in turn increased the profitability (Martín-Rojas et al., 2011). These skills enable the businesses to innovate and respond to existing opportunities in accordance with the rapidly changing demand of customers in today's dynamic environment and foster corporate entrepreneurship. ITTS are considered an important source of discovering diverse technological opportunities and allow the firms to achieve success by resolving technical dilemmas during entrepreneurial activities (D'Este et al., 2012). The success in corporate entrepreneurship activities resides in the employees with technical expertise who can take part in promoting corporate entrepreneurship (Antoncic & Hisrich, 2001; Lapide, 2007). Furthermore, the firms tend to have successful business ventures by incorporating ITTS along with the entrepreneurial processes (Lapide, 2007). In relation to these studies, the results are consistent with the findings of the aforementioned literature (García-Sánchez et al., 2018; Martín-Rojas, García-Morales, & Bolívar-Ramos, 2013).

ITING plays a pivotal role in cross-functional and collaborative development. IT promotes venturing activities in firms (Bharadwaj, 2000) by focusing on collecting and interpreting data about the firm's competitors and changes in industry trends. Such information may be useful for introducing or launching a new business venture by the firm. The result shows the consistency with the studies on ITING which establishes that ITING enhances promptness, the efficiency of business processes and acts as a significant antecedent to assist firm's corporate entrepreneurship activities (Chen et al., 2015; Kuratko, 2016; Lyver & Lu, 2018).

ITALI capability promotes the coordination of advanced communication channels through data-sharing across the firm's boundaries. Such excellence in coordination that is achieved by aligning IT resources with business routine processes facilitates collaborative efforts and help the firms to understand the changing demand of the customers (Pavlou & El Sawy, 2010). This enhances a collaborative spirit along with sound communication amongst the working units of a firm, hence it promotes the R&D, for the better design and development of new products and services for the customers that meet their requirements (García-Morales et al., 2014). The results are consistent with the studies which suggest that ITALI is proved to be helpful in research and development activities of a firm which encourage new product developments and business venturing activities (Chaudhuri et al., 2011; Chen et al., 2015; García-Morales et al., 2014).

6.2.1.3 Research Question Three:

RQ3: What is the effect of absorptive capacity on corporate entrepreneurship?

Absorptive capacity is considered vital in acquiring knowledge through exploring alternative knowledge channels (Zahra & George, 2002) because these channels support firms to minimize the risks associated with emerging opportunities

and time constraints in the development of new products, technologies, and systems (Chesbrough & Schwartz, 2007; Gregor, 2006). Absorptive capacity in firms allows the influx of rich processes, bridges knowledge gaps and ensures the avenues to new knowledge for corporate entrepreneurship (Lane et al., 2006). These findings indicate that the absorptive capacity is positively associated with corporate entrepreneurship and validate the results of previous studies that refer that the absorptive capacity contributes positively to innovative activities (Chen et al., 2009). Moreover, it was established by Zahra et al. (2009) that corporate entrepreneurship extracts diverse knowledge from multiple resources and by investing in absorptive capacity, corporate entrepreneurship activities can get a boost so, it gets rather easy for the firm to compete in an efficient way in meeting the upcoming challenges.

6.2.1.4 Research Questions Four and Five

RQ4: What is the effect of absorptive capacity on innovation performance?

RQ5: What is the effect of absorptive capacity on firm performance?

Absorptive capacity allows the firms in gaining and sustaining a competitive position (Malhotra et al., 2005; Pavlou & El Sawy, 2006; Zahra & George, 2002). It brings improvement in the knowledge-based assets of firms by redefining and processing knowledge skillfully, that helps a firm to manage its business activities with respect to its operations and other domains. Thus the firm's innovativeness and financial standings are enhanced (Fabrizio, 2009; Murovec & Prodan, 2009; Pavlou & El Sawy, 2006). Absorptive capacity integrates a vast amount of new external knowledge and applies this knowledge from a commercial standpoint so as to generate profitable opportunities, in all business domains, that may increase firm performance. With the help of absorptive capacity, an organization can successfully attain externally available new knowledge regarding customer inclinations, innovation in technology

and emergent marker places, etc. (Cohen & Levinthal, 1990; Tsai, 2001). Such acquisition assists a firm to gauge against an uncertain environment and the tendency of the marketplace by seizing opportunities and effective handling of currently available internal knowledge (Camisón & Forés, 2010; Tsai, 2001). In view of dynamic capabilities, absorptive capacity is an imperative basis for innovation and firm performance (Malhotra et al., 2005; Pavlou & El Sawy, 2006; Scuotto et al., 2017; Swafford et al., 2008) and these findings have consistency with the results of this study**.**

6.2.1.5 Research Questions Six and Seven

RQ6: What is the effect of corporate entrepreneurship on innovation performance?

RQ7: What is the effect of corporate entrepreneurship on firm performance?

Corporate entrepreneurship is an important antecedent of innovation performance and firm performance as it helps the firms, in their battle for survival in the market, by initiating entrepreneurial activities (Chen et al., 2015; Zahra, 1996; Zahra et al., 2009). Langerak, Jan Hultink, and Robben (2004) stated that innovative activities allow firms to perform well through expertise in the launching of innovative products and services. Corporate entrepreneurship in technological companies tends to bring innovation in the existing products, routine processes, services, and systems which helps to exploit business opportunities, thereby results in a superior firm performance (Antoncic & Prodan, 2008; Bierwerth et al., 2015; Langerak et al., 2004; Vanacker et al., 2017). Corporate entrepreneurship involves intentions and actions at all levels to promote business value (Zampetakis, Beldekos, & Moustakis, 2009) therefore, corporate entrepreneurship increases organizational growth and profitability by taking initiatives of business renewal activities and promoting innovativeness in overall firm products, services, and processes (Miles et al., 2003). So, the firms engage themselves in corporate entrepreneurship activities in order to enhance

competitiveness (Goodale et al., 2011). Firm performance increases due to corporate entrepreneurship activities like innovation, pro-activeness, self-renewal, and business venturing (Del Giudice & Straub, 2011; Simsek & Heavey, 2011). These findings validate the results and show consistency with prior literature studies of the direct relationship between corporate entrepreneurship and performance outcomes (Arend, 2014; García-Sánchez et al., 2018; Lyver & Lu, 2018; Martín-Rojas et al., 2011).

6.2.1.6 Research Question Eight:

RQ8: What is the effect of innovation performance on firm performance?

Innovation performance positively associated with firm performance. Such as, the study of (Damanpour et al., 1989) highlights the importance and significance of technical innovations for organizational performance and states that administrative innovations are necessary for facilitating technical innovations over time. In a similar way, the empirical study of Jimenez-Jimenez and Sanz-Valle (2011) verified that innovation performance influences directly and positively organizational performance.

Akgun et al. (2009) explored the impact of some innovation types over organizational performance, concluding that product innovations and process innovations have a strong and significant influence on organizational performance. Similarly, Jansen et al. (2006) found that exploratory innovations are likely to increase financial performance when organizational units operate in more dynamic environments. On the other hand, organizations in competitive environments improve their performance by pursuing exploitative innovations. The results of this study are supported by other recent empirical studies (e.g., Huang et al., 2016; Jurksiene and Giniuniene, 2015; Luis Leal-Rodriguez et al., 2015), which shows the positive relationship between innovation performance and firm performance.

6.2.1.7 Research Question Nine and Ten

In order to answer research question nine and ten, the present thesis analyzes the mediating effect of absorptive capacity and corporate entrepreneurship between IT capability dimensions and performance outcomes such as innovation performance and firm performance. Findings of mediating effect present that IT infrastructure flexibility, IT technical skills, IT integration, and IT alignment have significant positive indirect effects on performance outcomes of the firm through the intervening sequential linkages of absorptive capacity and corporate entrepreneurship.

RQ9: Do absorptive capacity mediate the relationships?

- RQ9a: Do absorptive capacity mediate the relationship between IT capabilities and corporate entrepreneurship?
- RQ9b: Do absorptive capacity mediate the relationship between IT capabilities and SMEs performance outcomes?

First, this study analyzes the mediating role of ACAP between IT capability dimensions and CE. Based on the dynamic capability view, dimensions of IT capability helps the firms to enhance the knowledge capabilities of firms which show the consistency with prior studies that proposed that IT capabilities can support the firms in developing the dynamic capabilities (Bolívar-Ramos et al., 2013; Pavlou & El Sawy, 2006; Uma & Roger, 2003). IT capabilities tend to enhance absorptive capacity through increasing knowledge exchange and its flow across a firm by quickly accessing the firm's database to make important decisions. Furthermore, IT capabilities enhance the ability of firms to acquire and manage new external knowledge. These capabilities enable firms to acquire, assimilate, transfer and exploit knowledge resources within and across the boundaries of the firm.

Furthermore, the firm's absorptive capacity also shapes this entrepreneurial behavior, which permits the company to develop learning processes that may help achieve a complex knowledge structure affected by the nature of initial experience and the cognitive attributes of entrepreneurs (BolíVar-Ramos et al., 2012; Camisón & Forés, 2010). The results of this study present that absorptive capacity mediates the relationship between IT capability dimensions and CE. Furthermore, IT increases the problem-solving ability of firms by exploiting knowledge to achieve performance goals. Firms invest in IT-based capabilities to manage advanced learning mechanisms that can lead a firm to attain competitive advantage (Mikalef & Pateli, 2017; Sambamurthy & Subramani, 2005). In addition, absorptive capacity acts as a key factor in determining the effectiveness of innovation (Sciascia et al., 2014). Thereby, absorptive capacity also mediates the relationship between IT capability dimensions and performance outcomes.

RQ10: Do corporate entrepreneurship mediate the relationship?

- RQ10a: Do corporate entrepreneurship mediate the relationship between IT capabilities and SMEs performance outcomes?
- RQ10b: Do corporate entrepreneurship mediate the relationship between absorptive capacity and SMEs performance outcomes?

Furthermore, this study analyzes the mediating role of CE between IT capability dimensions and performance outcomes. The role of IT is presumed to be essential for entrepreneurial activities. IT capabilities ensure the efficiency of the firm’s operational capabilities and are considered as an integral antecedent of initiating and promoting corporate entrepreneurship activities. IT capabilities support in the creation and sharing of relevant information, hence ensures smoothness in various business processes. Furthermore, effective communication with stakeholders across

firms is a necessary source of corporate entrepreneurship activities. In addition, IT capabilities help to anticipate exploring and taking opportunities that arise by bringing integration among several business processes and focusing on innovation activities.

Corporate entrepreneurship helps to explain the variations in performance indicators of the firm (Zahra & Covin, 1995). For instance, high corporate entrepreneurship leverages the managerial expertise and the financial resources to develop a new product or services (Zahra & Covin, 1995). A high level of firms entrepreneurial venture considered a proactive attitude in observing the business environment and leverage the competitions and market insights to support take better decisions regarding new product innovation (Dess & Lumpkin, 2005). In addition, by focusing the innovation performance, firm with high of level corporate entrepreneurship try to find novel ideas, improve the operational processes and engage in the thinking of innovation that direct the firm to creation of new technologies and insights (García-Sánchez et al., 2018; Laursen & Salter, 2006), which are essential for gaining high level of returns from the efforts of innovation outcomes. Additionally, a high level of self-renewal abilities of firms frequently embraces and strives the combinations of a new resource. Therefore, Firms with high levels of IT capabilities could engage in corporate entrepreneurship in a manner that develops new products, ventures in new business, and renews the existing operation with efficiency and effectiveness. Organizations that engage in entrepreneurial activities achieve higher levels of innovation performance and the overall performance of the firm (Chen et al., 2015). The results of the mediation analysis demonstrate that CE mediates the relationship between IT capability dimensions and performance outcomes.

In addition, this study also analyzes the mediating role of CE between ACAP and performance outcomes. Absorptive capacity is an important channel in capturing

business opportunities because emerging opportunities are fundamental considerations of corporate entrepreneurship (García-Sánchez et al., 2018; Kuratko & Audretsch, 2009; Simsek & Heavey, 2011). As, these channels support firms to minimize the risks associated with emerging opportunities and time constraints in the development of novel products and advanced technologies (Chesbrough & Bogers, 2014; Gregor, 2006). Absorptive capacity allows the influx of rich processes, bridges gaps in knowledge sharing processes and ensure to access the avenues to new knowledge for corporate entrepreneurship (Lane et al., 2006). In return, CE improves the different performance indicators of the firm. The results of the mediation analysis present that the relationship between ACAP and performance outcomes is mediated by CE.

6.2.2 Specific Indirect Paths

In addition, absorptive capacity and corporate entrepreneurship also able to contribute to firm performance through innovation performance. As such, the assimilation and exploitation of new knowledge help in the effective introduction of the new process, products or services (Zahra & George, 2002), in turn, this lead to performance benefits for the firm over time (Kostopoulos et al., 2011). Similarly, firms with the high level of CE embrace and try new resource combinations, search for novel ideas, engage in innovative thinking, improve operational processes and actively leverage the insights about the market, which improve the innovation outcomes (Dess & Lumpkin, 2005; Laursen & Salter, 2006) that in return helps the firms to achieve high level of sales, growth and profitability (Roberts & Amit, 2003; Srinivasan et al., 2009). The results of this study reveal that the relationship between ACAP and CE with firm performance is significantly mediated by innovation performance.

In addition, this study also analyzes the specific path of IT capability dimension toward firm performance outcomes by using both mediating variables ACAP, and CE.

The results of the analysis show that intervening variables mediate the relationship between IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) and performance outcomes, innovation performance and firm performance (DV). First, this study analyzes the sequential role of ACAP and CE between IT capability dimensions and innovation performance. The result is showing that IT capability dimensions (ITINF, ITTS, ITIN, and ITALI) have a significant positive effect on innovation performance. Therefore the presence of both mediators ACAP and CE, significantly mediate the relationship between IT capability dimensions and innovation performance. Similarly, this study also analyzes the sequential role of ACAP and CE between IT capability dimensions and firm performance. The results are showing that IT capability dimensions have a significant positive effect on firm performance through ACAP and CE. Therefore the presence of both mediators ACAP and CE, significantly mediate the relationship between IT capability dimensions and firm performance.

Furthermore, this study analyzes the specific path of IT capability dimensions towards firm performance through ACAP and IP. The results are demonstrating that IT capability dimensions have a significant positive effect on firm performance through ACAP and IP, except one dimension of IT capability ITINF. Therefore, the presence of both mediators ACAP and IP, significantly mediate the relationship between IT capability dimensions and firm performance. Similarly, this study analyzes the specific path of IT capability dimensions towards firm performance through CE and IP. The result is demonstrating that IT capability dimensions (ITTS, and ITALI) have a significant positive effect on firm performance through CE and IP. However, ITINF and ITING did not reach significantly towards FP through CE and IP. Therefore the presence of both mediators CE and IP, significantly mediate the relationship between IT capability dimensions and firm performance, except two dimensions of IT capability ITINF and ITING. Additionally, this study analyzes the specific path

between ACAP and FP through CE and IP. The result is explaining that ACAP has a significant positive effect on firm performance through CE and IP.

Lastly, this study analyzes the specific indirect path between IT capability dimensions and FP through all three mediating variables (ACAP, CE, and IP). The result is demonstrating that IT capability dimensions have a significant positive effect on firm performance through ACAP, CE, and IP. Therefore the presence of ACAP, CE, and IP, significantly mediate the relationship between IT capability dimensions and firm performance. Surprisingly, the results present that the insignificant relationship of ITINF with firm performance through ACAP and IP, become significant with the addition of CE in the model. Similarly, the results demonstrate that the insignificant relationship of ITINF and ITING with firm performance through CE and IP, become significant with the addition of ACAP in the model. Therefore, CE has a critical role after the ACAP, in order to explain the relationship between IT capability dimensions and FP. In addition, ACAP capacity has an important role before CE, in order to explain the relationship between IT capability dimensions and FP. Thereby, this study presents the importance of the sequential role of ACAP, and CE between IT capability dimension and performance outcomes.

This study highlights the importance of firm's IT capabilities (Iyengar et al., 2015), enrich its knowledge base and improve its ability to assimilate and exploit (related and diverse) external knowledge through absorptive capacity and strength. All of these findings jointly engage entrepreneurial acts. Those variables impact corporate entrepreneurship, increasing variety and expanding the search for technological opportunities (Rerup, 2005). The use of IT capabilities promote a technologically proactive attitude in the firm's employees (García-Morales et al., 2007), thus strengthens corporate entrepreneurship. The firm's absorptive capacity also shapes this entrepreneurial behavior, which permits the company to develop learning processes that may achieve a complex knowledge

structure affected by both the nature of initial experience and the cognitive attributes of entrepreneurs (Camisón & Forés, 2010; García-Sánchez et al., 2018). In return, these activities improve innovation performance and firm performance.

6.3 Research Contributions

6.3.1 Introduction

The research contributions of this study reflect the importance of framework analyzed in this research and extend existing knowledge in several salient ways. This section presents the theoretical contributions of IT capability dimensions' impact on performance outcomes of SMEs through the intervening role of absorptive capacity and corporate entrepreneurship. This section also includes methodological and contextual contributions.

6.3.2 Theoretical Contribution

First, this study mainly contributes by developing, theorizing and validating a theoretical integrative model. It bridges separate studies on IT capability dimensions, absorptive capacity, corporate entrepreneurship, and performance outcomes of SMEs. As, ex-ante literature (Fichman, 2000; Wheeler, 2002) highlighted that the main issue in the field of strategic management and information system is the need of a theoretically related framework to conduct empirical researches. This study empirically analyzes the synchronized application of two theories RBV, and DCV, by providing a theoretical view to understand the intricate phenomena in the context of IT and SMEs performance outcomes. In the light of an integrative theoretical model, the current thesis may guide researchers to examine and validate previous theories (DiMaggio, 1995), to increase the power of explanation (Kuhn, 1970), in understanding a complex phenomena (Oh & Pinsonneault, 2007), and theory extension (Gregor, 2006) in SME.

Second, this study contributes to the literature of information system by examining the effect of IT capability dimensions (i.e., IT infrastructure flexibility, IT technical skills, IT integration and IT alignment) on performance outcomes of SMEs such as, innovation performance and firm performance. Earlier, most of these studies were conducted by considering a single dimension of IT capabilities such as IT infrastructure flexibility (Ajamieh et al., 2016), IT integration (Francalanci & Morabito, 2008; Setia, Setia, Venkatesh, & Joglekar, 2013), IT technical skills (Bolívar-Ramos et al., 2013), and IT alignment (Luftman et al., 2017) or using IT capabilities at an aggregate level in the relationship with SMEs performance (Chen et al., 2015; Del Giudice & Straub, 2011). The current work has a fundamental role in investigating each dimension of IT capabilities, as each dimension have a distinctive role.

Third, despite the extensive work done in this domain, the underlying mechanisms through which IT capabilities impact the competitive performance of the firm remain limited (Kim et al., 2011). According to Roberts et al. (2012); Mithas and Rust (2016) and Melville et al. (2004) the relationship between IT capabilities and performance outcomes is likely to be enhanced by introducing intervening mechanism. The studies with inconclusive results suggested investigating the missing paths in the relationship between IT capabilities and firm performance outcomes. Thus, this study fills the gap by explaining how absorptive capacity and corporate entrepreneurship enabled by IT capabilities.

Limited studies have analyzed the effect of absorptive capacity and corporate entrepreneurship simultaneously. By developing the theoretically grounded framework, this study traces the path from IT capability dimensions to the SMEs performance outcomes (innovation performance and firm performance) through the intervening role of

absorptive capacity and corporate entrepreneurship. This study contributes to the existing literature of knowledge management by extending our understanding of how IT enables knowledge capabilities (absorptive capacity), which in turn improve the innovation performance and firm performance. This study also contributes to the literature of entrepreneurship by examining how individual dimensions of IT capabilities enable corporate entrepreneurship activities, which in return enhance the performance outcomes of SMEs. Furthermore, it contributes by examining how IT capability dimensions affect corporate entrepreneurship directly and indirectly by shaping absorptive capacity (Cepeda & Vera, 2007; Pavlou & El Sawy, 2006). A dearth of the literature analyzed the mediating effect of absorptive capacity between IT capabilities and corporate entrepreneurship.

Fourth, this study contributes to the literature by developing the underscoring how absorptive capacity encourages the development of internal processes to obtain tacit knowledge from internal and external sources that may be extremely difficult to imitate, thereby enabling innovation and firm performance. Furthermore, observing the simultaneous direct and indirect relationship of absorptive capacity to firm performance through corporate entrepreneurship and innovation performance. In addition, contributes by advancing knowledge of the impact of corporate entrepreneurship on firm performance outcomes. Moreover, analyzing the indirect effect of corporate entrepreneurship of firm performance through innovation performance of a firm.

Fifth, this study contributes to the literature by explaining the sequential role of absorptive capacity and corporate entrepreneurship. As IT capability dimensions' facilitate knowledge resource (absorptive capacity) which helps the firms to engage in entrepreneurial activities successfully, in return it improves the performance of SMEs. This order of sequence is highlighted in this study which is not explicitly studied in the

previous studies. The results present that the insignificant relationship of ITINF with firm performance through ACAP and IP (ITINF→ACAP→FP), become significant with the addition of CE in the model (ITINF→ACAP→CE→FP). Similarly, the results demonstrate that the insignificant relationship of ITINF and ITING with firm performance through CE and IP (ITINF→CE→IP) and (ITING→CE→IP), become significant with the addition of ACAP in the model (ITINF→ACAP→CE→IP) and (ITING→ACAP→CE→IP). Thereby, this study presents the importance of the sequential role of ACAP, and CE between IT capability dimensions and performance outcomes.

Lastly, this study contributes to the existing literature of SMEs by unscrambling the measures of SMEs performance into innovation performance and firm (overall) performance. Particularly, this study analyzes the innovation performance in the context of SMEs as, the innovation performance research is fragmented, poorly grounded theoretically, and not fully tested in all areas (Crossan & Apaydin, 2010). Furthermore, this study explores the interrelation between innovation performance and firm performance. Thereby, this study enhances the understanding of how IT capability dimension influence the performance indicators (innovation performance and firm performance) through the sequential role of absorptive capacity and corporate entrepreneurship in the context of SMEs.

6.3.3 Methodological Contribution

A significant methodological implication involves the choice of statistical analysis; as the current research applied structural equation modeling (SEM) to generate results. By applying SEM, this research validates the individual and combined impact of IT capability dimensions, absorptive capacity, corporate entrepreneurship, and performance. It also considers the measurement error variances by ensuring the accuracy of the relationships among the variables in the postulated model. In addition to it, SEM tests simultaneous relationships of the hypothesized model and checks for

the measurement errors in the given scales. Additionally, importance-performance map analysis (IPMA) provides a clear picture, which factor has maximum importance and performance value for innovation performance and firm performance.

6.3.4 Contextual Contribution

The contextual insights of this study cannot be ignored to infer useful results. Contribution in terms of context is manifested by the study as it has been carried out in a developing country like Pakistan, whereas the business environment of Pakistan (a developing country) has few similarities with India, Bangladesh, etc. Therefore, the SMEs sector of various developing and emerging economies would also benefit from the findings of this study. Cripps, Salo, and Standing (2009) focused on large firms only and proposed that studies should be carried out in the industrial sector SMEs. Hence, another important contextual contribution of the study is that IT capability dimensions, absorptive capacity, and corporate entrepreneurship have been investigated in the context of SMEs in the manufacturing sector of Pakistan. SME can get a benefit from utilizing IT capabilities in a better way through incorporating dynamic capabilities absorptive capacity and corporate entrepreneurship in the competitive environment by drawing the attention of firms towards an outburst of knowledge while relying on internal resources in the context of corporate entrepreneurship.

CEO's in the manufacturing sector SMEs in Pakistan can better identify the business environment where the investments in IT capabilities and corporate entrepreneurship activities tend to be most observable, through informed decision making by the utilization and development of IT resources. This study also helps them to identify, through which path they can enhance their innovation performance and firm performance. Furthermore, by utilizing this model, SMEs of Pakistan and other

developing economies can enhance their knowledge capabilities and entrepreneurial activities through their IT capabilities.

6.4 Practical Implication

This study has provided several managerial implications, mainly for entrepreneurial oriented SMEs. To achieve high innovation performance and firm performance, firms spend millions of dollars on IT-related activities, particularly in manufacturing SMEs. However, if firms lack the focus of enhancing their IT capabilities to leverage dynamic capabilities, then investments in IT may not enable these SMEs to reap the benefits from IT capabilities. The utilization of IT capabilities to develop dynamic capabilities, such as absorptive capacity and corporate entrepreneurship improves the performance outcomes of the firm. In this regard, this study presents the necessary knowledge and guidance for managers.

First, the framework analyzed in this study intends to serve as a roadmap for CEOs/owners/managers to better identify and assess the business environment while developing policies and strategies related to manufacturing sector SMEs. The hypothesized framework encourages the development of such channels through which the essential dynamic capabilities tend to flourish inside the firm. To exploit the firms' resources, proactive steps should be taken by managers to improve the business competitiveness which helps firms to increase performance (Martín-de Castro, Delgado-Verde, Navas-López, & Cruz-González, 2013), specifically from the perspective of technological advancements goals in manufacturing SMEs. In this regard, utilization of the technological capabilities by business executives may enable firms to attain a leading advantage over competitors.

Second, this research present a helpful integrative framework for top management to understand the ways in which IT investments support firms to create strategic advantage

and attain performance. Only IT capabilities may not provide a source of advantage for firms unless firms combine these capabilities with dynamic capabilities to achieve high business advantages. This study reveals that dynamic capabilities are critical for firms in the face of dynamic business environments. In relation to this, top management has to comprehend that justifying IT investments on the basis of the direct impacts of IT capabilities on performance outcomes is not suitable. On the other hand, top management should be consciously aware of the interrelationships between IT capability dimensions, absorptive capacity, corporate entrepreneurship, and performance outcomes. Therefore, top management should focus on the effects of IT capabilities on information effectiveness and efficiency, knowledge-intensive processes, and entrepreneurial activities, rather than on directly improving SMEs performance outcomes. There is a need to concentrate on the different effects of IT capability dimensions on absorptive capacity and corporate entrepreneurship.

Third, this study helps the top management to understand the mechanism through which IT capabilities affect the performance of SMEs by considering the sequence of variables. The sequential role of variables is important, as ACAP helps to explain the relationship between IT capabilities and performance outcomes, which explains that the absence of CE, CEOs/managers cannot achieve the desired benefits effectively. The way IT capabilities help to improve the entrepreneurial activities, likewise, the knowledge resources (ACAP) are vital to developing the entrepreneurial activities, which in return affect the performance of SMEs. Considering this framework, top management can devise business strategies to enhance SMEs performance effectively.

Furthermore, the relationship between the variables of this study implies that this framework is critical for manufacturing firms because it offers avenues for

managers how to develop knowledge domains and avail entrepreneurial opportunities which can lead to increase the performance of firms by affecting all processes for instance budgeting process, strategic decision making and product launching activities (Acur et al., 2010; Newbert, 2008). Additionally, the results of the importance-performance map indicate that absorptive capacity and CE both have high importance impact on innovation performance and firm performance. Regarding the individual impact of IT capabilities, IT integration has the least impact on innovation performance and firm performance, while IT alignment has the least performance impact in innovation performance and firm performance. However, managers of the firm should maintain the knowledge and entrepreneurial activities to achieve high performance by implementing all the IT capabilities to enhance their innovation performance and firm performance.

6.5 Limitations

6.5.1 Sample Size

In this study, the data collection was done solely from manufacturing sector medium-sized SMEs in Punjab, Pakistan. This tends to reduce the generalizability of the research with respect to other developing countries because business conditions in other countries might differ than the prevailing condition in Pakistan. Furthermore, this study takes all manufacturing sectors SMEs as population, the specific industry was not under consideration, which provides the least information regarding the individual behavior of utilization of IT capabilities in particular industry.

6.5.2 Survey Administration

Another inadequacy of this research is that that survey administration was done on the basis of geographical representation of one province with area clusters of such cities where majority of SMEs are established, whereas the data from other clusters could

affect results significantly where the number of SMEs are few as compared to those areas where SMEs are more are established.

6.5.3 Longitudinal Study

In addition to other mentioned limitations, this study was collected cross-sectional data instead of collecting data from the time-series perspective. This approach has inadequacies as it analyzes a situation or an event at one point in time. We have collected data from one respondent at a particular point in time which is cross-sectional, although the respondents in our study were adequately well-informed about the business, as generally CEO's/managers/top management are more aware of IT-related issues. Hence, a qualitative method may be adapted to collect data in the form of interviews.

6.5.4 Selection of Variables

This study is limited to examine the four IT capability dimensions, two dynamic capabilities as intervening mechanisms, and two firm performance outcomes. The other concepts related to IT as IT recourses within the TOE framework have not been considered in this study. Furthermore, other dynamic capabilities can also be considered as, learning orientation, e-business capabilities, etc. in future studies. Finally, this study focuses on the impact of IT capability dimensions on SMEs performance through mediating mechanism whereas the impact of these intervening variables on another type of performance has not been studied for instance market, and customer's related performance can be considered to analyze the impact of IT capabilities more comprehensively. Furthermore, this study is not using control variables like other studies in a similar context (Ashrafi & Mueller, 2015; Lyver & Lu, 2018; Martín-Rojas, Fernández-Pérez, & García-Sánchez, 2017).

6.6 Future Research Directions

The current research work provides avenues to carry out further research by scholars interested in the same domain, focusing their interest in IT capability dimensions and dynamic capabilities.

6.6.1 Investigating Dimensions of Absorptive Capacity

Despite research on absorptive capacity, the current studies still lack the understanding from the empirical perspective on the relationship between IT capability dimensions and absorptive capacity dimensions. Future research may consider investigating the role of absorptive capacity dimensions in the relationship between IT capability dimensions and performance outcomes.

6.6.2 Investigating Dimensions of Corporate Entrepreneurship

Studies may be conducted to investigate the dimension wise role of absorptive capacity with the dimensions of corporate entrepreneurship to enhance the understanding between these interrelationships, as the in-depth dimension wise relationship between these variables need to be studied.

6.6.3 Comparison between Industries

Future research can compare the results between industries to see in which industry IT capability have more effective for SMEs performance outcomes. It will provide an in-depth understanding of IT capability dimensions and its outcomes through absorptive capacity and corporate entrepreneurship.

6.6.4 Contextual Perspective

This research ought to be extended to the SMEs in other Asian regions in order to have more generalizable results and to analyze differences in cultural and location-based institutional specificities that can affect SMEs' performance in relation to how much

business value can be obtained from the use of IT capabilities with absorptive capacity and corporate entrepreneurship. However, SMEs in other regions may not seemingly exhibit any distinctive element in the culture, institutional setting, and managerial practices, they follow; hence extending research on the basis of regions is imperative to empirically validate our findings.

6.7 Conclusion

Aiming to address the ongoing debate about the business value of IT among academics and practitioners, and to understand a number of the determinants of SMEs performance, the present thesis develops and empirically tests an integrative multi-theoretical model incorporating information technology capability dimensions to assess the absorptive capacity, corporate entrepreneurship and performance outcomes of SMEs. The RBV and DC, theories underpin this research.

In general, this doctoral study has provided, perhaps for the first time, the indirect empirical analysis of the relationship between IT capability dimensions (infrastructure flexibility, technical skills, integration, and alignment) and performance outcomes (innovation performance and firm performance) in an extensive framework. In addition, it has investigated the role of absorptive capacity and corporate entrepreneurship between IT capability dimensions and SMEs performance. The results show that all four dimensions of IT capacities have a significant effect on SMEs performance, absorptive capacity, and corporate entrepreneurship. Furthermore, tests of mediation confirm a resource-based theory, that both absorptive capacity and corporate entrepreneurship mediate the relationship between IT capability dimensions and performance outcomes. The results also present that absorptive capacity mediates the relationship between IT capabilities and corporate entrepreneurship. In addition,

corporate entrepreneurship mediates the relationship between absorptive capacity and performance outcomes.

The CEOs/managers of SMEs must employ the underlying mechanisms presented in this study, which tends to offer both opportunities and challenges for entrepreneurs to take the full advantage of IT capabilities in accelerating the firm performance. In this regard, absorptive capability and corporate entrepreneurship are considered to be important dynamic resources in providing a propitious environment to achieve maximum benefits from IT capability dimensions. The utilization of these capabilities in leveraging different processes and systems allow firms to increase the pace of business activities as established entities by focusing on knowledge avenues and capturing various business opportunities (Del Giudice & Straub, 2011; Goodale et al., 2011), as a result, firm performance increases (Antoncic & Prodan, 2008). Top managers should design strategies to improve IT capabilities and as these capabilities leverage other dynamic capabilities (ACAP & CE) in a unique way to attain performance targets. The findings of this study may stimulate managers to utilize IT-resources and develop IT capabilities to enhance SMEs performance through dynamic capabilities. Finally, the present thesis provides a useful integrative framework for managers to understand the ways in which IT investments help firms to create strategic advantage and ultimately achieve high innovation and firm performance.

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