



## Determinants of Innovation Capability and Nexus between Innovation Capability and Performance of SMEs

Muhammad Kamran Khan<sup>1</sup>, Kausar Takrim<sup>2</sup>, Muhammad Haseeb<sup>3</sup>, Amir Khan<sup>4</sup>

<sup>1</sup> Assistant Professor, Institute of Management Sciences, University of Haripur, Khyber Pakhtunkhwa, Pakistan.  
Email: [mkamran.khan@uoh.edu.pk](mailto:mkamran.khan@uoh.edu.pk)

<sup>2</sup> Professor, Department of Management Studies, College of Home Economics, University of Peshawar, Pakistan.

<sup>3</sup> MBA Graduate, Institute of Management Studies, University of Peshawar, Pakistan.

<sup>4</sup> MS Scholar, Comsats University Islamabad, Abbottabad Campus, Pakistan.

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### ABSTRACT

Small and medium-sized businesses (SMEs) are essential for the expansion of any economy, and innovation is what ensures their continued success and improved performance. The main objectives of this study are to identify the key factors that influence innovation capability, to ascertain the effect of innovation capability on SMEs' performance, and to examine the role of innovation capability as a mediator between its key determinants and SMEs' performance. Partial least squares structural equation modelling (Smart PLS-SEM) was used in the study to accomplish this purpose, and data from 249 manufacturing SMEs registered at the Hattar Industrialist Association (HIA), Industrial Estate, Khyber Pakhtunkhwa, Pakistan, were used to collect the data. All of the constructs used in the study are valid and trustworthy according to Cronbach's alpha, which measures structural stability. The results show that operational and managerial capabilities are not statistically significant drivers of SMEs' innovation potential, while technological and transactional capabilities are statistically significant predictors of SMEs' innovation capabilities. The results also show that innovative competency has a positive effect on SMEs' success. The study also found that innovation capability plays a statistically significant role in mediating the relationship between technological capabilities and performance as well as the relationship between transactional capacities and performance. But neither the role of innovation capabilities in mediating the link between operational capabilities and performance nor the function of innovation capabilities in mediating the relationship between managerial capabilities and performance are statistically significant. It indicates that in order to improve the performance of SMEs, it is necessary to investigate the attitudes and behaviour of SMEs in order to identify the causes of their lack of management and operational competencies.

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Corresponding Author's Email: [mkamran.khan@uoh.edu.pk](mailto:mkamran.khan@uoh.edu.pk)

## 1. Introduction

Small and medium-sized enterprises (SMEs) play significant and important role in all emerging, developing, as well as developed economies (Karadag, 2015; Maziriri & Chivandi, 2020). They are fundamental to the modern economy and are main contributors to national economic development, accounting for almost forty-five percent of employment and one-third of gross domestic product (GDP) globally (Dragomir, Tureac, & Turtureanu, 2009; Seo, 2017). In Pakistan, SMEs are approximately ninety percent of all businesses, contributing around forty percent to the GDP, and roughly thirty percent of the country's total exports (Zafar & Mustafa, 2017). Innovation capability of an organization determines the success that it can achieve in short as well as long term. Although there are studies on antecedents of innovation capacity but mainly the focus has been on multi-national companies and large firms. SMEs have to compete

with these large firms for their market share and in order to succeed, innovation capability is critical. Although there is a lot of empirical evidence on the antecedents as well as outcomes of innovation capability but they are largely based on larger firms. SMEs are different from larger firms; therefore, it is important to examine the factors that contribute to innovation capability with special focus on SMEs. Identifying critical success factors of innovation capability is crucial to SMEs. The present study is an effort to highlight the importance of SME sector while studying innovation capabilities and performance of SMEs.

Organizations cannot survive without continuous innovation (Hyland & Boer, 2006; Jiménez-Jiménez & Sanz-Valle, 2011; Khan, Ali, Kirikkaleli, Wahab, & Jiao, 2020; VU, 2020). Pakistan presents a dire picture in terms of innovativeness; the Global Innovation Index (GII) has ranked the country 105<sup>th</sup> among 129 countries and is considered backward in terms of innovation capabilities (Cañez Jr, 2022). Hence there is a need to analyze innovation capabilities in context of SMEs of Pakistan and their subsequent impact on performance of SMEs. The Resource Based View (RBV) of businesses suggests that a firm which has the innovation capabilities is the ones that survive because they can take advantage from their resources and capabilities (Nada & Ali, 2015; Peteraf, 1993; Wernerfelt, 1984). Similarly, the view that the performance of SMEs is also intrinsically linked to their innovation capabilities while innovation capability is termed as vital for their success. This applies to every type of organization e.g., multi-national companies, government organizations, not for profit organizations, manufacturing sector companies, service organizations and SMEs (Barney, 2001; Khanra, Kaur, Joseph, Malik, & Dhir, 2022).

In order to ensure success and market share, researchers have tried to explore different variables that could improve innovation capability of organizations. Vu (2020) suggests that SMEs just like any other type of organization can only survive if it has greater innovation capability. Therefore, this research study is an effort to examine factors that may enhance innovation capability of SMEs and the role of innovation capability in making the performance of SMEs better. SMEs have to compete with large firms in terms of capability of innovation and transformation of innovation capability into organizational performance while looking the complexities of market. It's also important to create effective solutions for small and medium-sized businesses to enhance their innovation capability in order to attain organizational performance and competitive advantage. In spite of prior research highlighting the innovation capability and performance nexus, a major number of studies were conducted in large corporations and there was no single study in context of SME sector.

SMEs require different competitive strategies than bigger businesses when pursuing innovation, therefore identifying important determinants for innovation capability is critical for them (Ferreras-Méndez, Llopis, & Alegre, 2022). According to Zawislak et al. (2012) and Paulo et al. (2022), despite the growing importance of innovation capability, research studies on innovation capability are limited as previous studies mostly examined innovation cycle, new product development, product quality, project process flexibility and project radicalness. There is a need to research further on the determinants of innovation capability and its impact on performance of SMEs. Earlier studies have examined the direct correlations between innovation and financial (e.g. non-financial SME performance), new product performance and operational performance (Ferreras-Méndez et al., 2022). This study focuses on determinants of innovation capability by empirically testing the innovation capability framework in context of SMEs as proposed by Zawislak et al. (2012) and Paulo et al. (2022), its impact on performance of SMEs as well as mediating role of innovation capability between its key determinants and performance of SMEs. This study examines the role of managerial, technological, operational and transactional capabilities in enhancing innovation capabilities of SMEs, how innovation capability is related to SMEs' performance. It further tests the validity of resource based view theory in context of SMEs while focusing on managerial, technological, operational and transactional capabilities of SMEs as well as performance.

## **2. Literature Review**

Innovation is the lifeline for SMEs' growth and survival (Zahra & Covin, 1994). It is the primary catalyst for long-term success, especially for small and medium-sized businesses because they operate in intensely competitive global markets with extreme rivalry (Bayarçelik, Taşel, & Apak, 2014).

The process of innovation is diverse because it is based on an organization's resources, capabilities, strategies, and requirements (Baregheh, Rowley, & Sambrook, 2009). All industries either small or large have focused mainly on strengthening their innovation to ensure long-term success in the market. There has been an emphasis on the concept of innovation capability in the discussions surrounding this phenomenon (Calantone, Cavusgil, & Zhao, 2002; Lawson & Samson, 2001; Lin, 2007; Romijn & Albaladejo, 2002). Additionally, there are a lot of studies that take all commonly accepted innovation types into consideration, meaning any kind of innovation with regards to products, processes, organization, and marketing (Cañez Jr, 2022). The literature on small business identifies two innovation strategies, the ones focused on experimenting with new ideas and the ones aimed at increasing profits (Kittilaksanawong & Ren, 2013; Saunila, 2020; Wang, Lu, Zhao, Gong, & Li, 2013). In some studies, the findings indicate that mass-divergence cannot be found between the innovation capabilities of service and manufacturing industries (Forsman, 2011; Saunila & Ukko, 2014). However, in the review, it was found that only a limited number of businesses could be counted as "service-oriented" or "manufacturing-oriented."

### **2.1. SMEs Innovation Capability in Pakistan**

In recent years, the relationship between small and medium enterprises and innovation has been a topic of great interest amongst researchers. Researchers are interested in finding an association between the "smallness" of a firm and its capability for innovation. Researchers have argued that small firms are capable of innovation more so than their large counterparts because of their flexible structures and lack of bureaucracy, greater ability to exploit the technological and commercial opportunities provided by external networks, enhanced ability to create strategic alliances, apt understanding of customer needs and operational expertise, and their penchant of developing disruptive technologies which promote discontinuous innovation (Ahern, 1993; Anwar, 2018; Audretsch, 1995; Bell & Loane, 2010; Bocquet, Le Bas, Mothe, & Poussing, 2019; Leckel, Veilleux, & Dana, 2020; Massa & Testa, 2008; Rosenbusch, Brinckmann, & Bausch, 2011; Salavou, Baltas, & Lioukas, 2004; Sivadas & Dwyer, 2000; Van Dijk, Den Hertog, Menkveld, & Thurik, 1997). Whatever the determinants or drivers of SMEs innovation are, a great volume of researchers agree that SMEs are major sources of efficient innovation (Owalla, Gherhes, Vorley, & Brooks, 2021).

Small and Medium Enterprises are credited for being incubators and initiators of innovation. Research found that SMEs have small, open and flexible organizational structures along with entrepreneurial intent of the founders which allows them to be more open towards new ideas and innovations (Rosenbusch et al., 2011). The authors further elaborated that SMEs are more likely to pursue an innovation strategy because they want to create a niche for themselves and establish a monopoly in that market (Rosenbusch et al., 2011). Moreover, SMEs are able to pursue continuous innovation because of their adaptive organizational structure which allows them to gain more value from innovation. SMEs use an innovation strategy to differentiate themselves from their competition. They offer innovative products and services or innovative business processes or business models which are often targeted at a specific market segment (Rajapathirana & Hui, 2018). In doing so, the small and medium businesses are able to create a high brand loyalty among the target market as the users come to value the uniqueness of their innovation (Rosenbusch et al., 2011). The uniqueness of their innovation and the resultant high brand loyalty also reduces price sensitivity towards the product (Acs & Audretsch, 1988; Baregheh et al., 2009).

SMEs are able to compete with larger firms which have more budget, organizational experience, and market size than SMEs. They are able to attract and retain customers who value the uniqueness of their innovation over price and accessibility. Another advantage of these innovations is that they create demand for the innovative product, service, process or model which the SME has developed. This demand means more business for the SMEs and it allows the SMEs to expand its operations and facilitate firm growth (Rosenbusch et al., 2011). The reduced sensitivity towards price, high brand loyalty and the growth of the business strengthens the position of the SMEs in the market, allowing it to earn higher returns. Hence, existing research observes that SMEs not only strengthen their own business through an innovation strategy but also contribute significantly towards the economy in general (Jasra, Hunjra, Rehman, Azam, & Khan, 2011).

Innovation capability is also defined as an ability of firm to integrate, manage and mold managerial, technological, operational and transactional capabilities for the purpose of maintaining and sustaining competitive advantage (Fuchs-Frohnhofen, Nett, & Wulf, 2000). Furthermore, firms which have innovation capability are better able to translate the capabilities into viable innovations which ultimately led the firm to maintain and sustain competitive advantage (Fuchs-Frohnhofen et al., 2000; Lawson & Samson, 2001). As innovation capability has been defined as a capacity and ability so we can assume that this overall ability will ultimately drive the performance of an organization. The relationship between innovation capabilities and SME performance must be investigated in the context of Pakistani small and medium-sized manufacturing businesses.

The classic reason for the positive association between innovation and company success is that when new innovative products or services are launched into the market, they encounter very little direct competition, allowing SMEs to gain relatively greatly. These high profits will most likely decline over time as a result of imitation and competition, but SMEs that continue to improve their innovation capabilities and introduce innovative new products or services, or lead to process innovation, marketing, and organizational innovation, can achieve high profits over a long period of time. (Sharma, Govindan, Lai, Chen, & Kumar, 2021).

The ultimate reason for SMEs to engage in innovation activities and strive to improve their innovation capabilities is to improve SMEs performance and succeed in maintaining and sustaining their competitive advantage (Varis & Littunen, 2010). The research study of 721 manufacturing firms in UK found that the number of innovations that firms have achieved had a positive effect on their operating profit margin, which considers operating profit margin as a measure of the manufacturing company's performance (Triguero, Moreno-Mondéjar, & Davia, 2016). They also found that while the impact of specific innovation on company profits was only small in size, innovative companies are generally more profitable than non-innovative companies. There is a positive impact of corporate performance on the relationship between market orientation, innovation and technical innovation (Rue & Ibrahim, 1998).

In order to look at how product innovation affects long-term profitability, longitudinal research has been carried out in US pharmaceutical businesses. He backed the theory that improved long-term profitability is correlated with a strong propensity for product innovation.. (Roberts & Muralidharan, 2020). The study found a connection between innovation, quality, growth, profitability, and market value in the US banking industry using the structural equation modelling methodology. While innovation mediates the link between quality and growth, quality mediates the relationship between innovation and profitability (Cho & Pucik, 2005). The study found a connection between innovation, quality, growth, profitability, and market value in the US banking industry using the structural equation modelling methodology. While innovation mediates the link between quality and growth, quality mediates the relationship between innovation and profitability (Arzt, Haugk, & Gebauer, 2020). They found that the performance of businesses is significantly impacted by product innovation. To enhance sales from innovations, businesses must either join the market first or create brand-new products with a high degree of innovation.

An empirical research of Turkish manufacturers in several fields found the impacts of product, process, organizational, and marketing innovations on a number of elements of corporate performance, including production, marketing, and financial accomplishments (Phan, 2019). They showed how changes in products, organisations, and marketing had a positive effect on the performance of manufacturing businesses. There are a few literature reviews on the connection between innovation and company success, but no one research has looked at how innovation capabilities affect the performance of SMEs.

The study's goal is to fill this knowledge gap by investigating the association between manufacturing SMEs' innovation skills and performance. Based on the theoretical and empirical data in the literature discussed above, the following hypothesis is proposed:

H<sub>1</sub>: Innovation capability has a significant positive effect on SME performance.

## **2.2. Drivers/Determinants of Innovation Capability**

There are additional studies that look at the elements that contribute to well-known innovation categories such as new product innovations, manufacturing process innovations, and corporate organizational innovations. Based on the analysis, it appears that numerous factors influence the amount of innovation capability. Top management leadership is an important factor to consider while analyzing these factors (Park & Kim, 2018), knowledge development (Branzei & Vertinsky, 2006; Saunila & Ukko, 2014), entrepreneurial orientation (Mohd Noor, Muhammad, & Aljanabi, 2017), and the company's network of external partners (Jørgensen & Ulhøi, 2010; X. Liu, Shou, & Xie, 2013; Park & Kim, 2018). In particular, when it comes to external networks, research suggests that intermediary organizations can provide more innovative resources for small businesses, whereas another study suggests that important relationships formed in the early stages of a company's lifecycle are absolutely critical for increasing a firm's ability to innovate as well as its ability to sustain market share in the long run (Jørgensen & Ulhøi, 2010; Lei, Leungkhamma, & Le, 2020).

In terms of the ability to innovate, both internal sources (such as previous work experience and education) and external sources (such as suppliers and customers) can be helpful in establishing product innovation potential (Romijn & Albaladejo, 2002). Furthermore, technological intensity was revealed to be positively related to product innovation (Arboretti, Ceccato, Pegoraro, & Salmaso, 2022). Uncertainty avoidance, on the other hand, has a detrimental impact on product innovation capability (Çakar & Ertürk, 2010). The study discovered that the exploitative learning technique improves both product and process innovation capability (Valaei, Rezaei, & Emami, 2016). According to research, the presence of external ties is related to organizational creativity (Arboretti et al., 2022).

Additionally, another research study concluded that participation in research facilities aids in the development of both exploratory and exploitative innovation capabilities (Kittilaksanawong & Ren, 2013). The findings of another study concluded that organizational learning has a significant impact on incremental innovation, while organizational learning has an indirect influence on radical innovation via organizational flexibility (Wang et al., 2013). On the other hand, the inflexibility of the organization and a shortage of resources can constrain an organization's ability to innovate (Kim & Shim, 2018).

Empirical researches on innovation in context of small and medium enterprises has been divided into two dimensions of research: first one is studying the determinants or drivers of innovation, and second one is studying the consequences of innovation, hereby considering innovation as process as well as outcome. Prior literature has empirical evidence for both dimensions of innovation. For instance, one side revealed research on organizational innovation, whereas, on the other side revealed research on incremental and radical innovation and portrayed several aspects that have significant impact on product and processes development decisions of firms (Ali, 1994; Wolfe, 1994). Research further revealed insights on technological innovation in context of literature from engineering, new products or services development and marketing and operations (Garcia & Calantone, 2002).

In order to assess the level of innovation activities in firms, a framework was constructed by focusing on measurement perspective of innovation management (Adams, Bessant, & Phelps, 2006). Multi-dimensional framework has been explored by researchers for firm's innovation that integrates leadership with innovation as a process as well as innovation as an outcome (Apaydin & Bouri, 2020). Research focused on open innovation provided insights about only one specific innovation type (Bogers, Chesbrough, & Strand, 2020), however, innovation capability differs among small and medium enterprises (SMEs) and large firms. SME Policy 2007 of Govt of Pakistan highlighted the key pillars of SME Policy and considered the lack of access to business development services including lack of access to information technology (IT) services, lack of human resource development, lack of operational efficiency, lack of initiatives that enhance productivity, lack of access to suitable markets for selling of goods or services and lack of other allied marketing and promotional services for SMEs as major constraints for SMEs. There is no research study in literature that has studied the concept of innovation capabilities, its drivers and its consequences by empirically testing the innovation capability framework in context of SMEs as proposed by Zawislak et al. (2012) and Zawislak, Reichert, Barbieux, Avila, and Pufal (2022).

The goal of this research is to investigate the factors of innovation capabilities and their impact on the performance of SMEs. A study that investigates the drivers of SMEs' innovation potential and their subsequent impact on SMEs' performance should be conducted as a preview of SME Policy 2007 and literature. The Innovation Capability Framework divides SMEs' innovation capabilities into four primary categories: technological capabilities, operational capabilities, managerial capabilities, and transactional capabilities (Paulo Antônio Zawislak, Cherubini Alves, Tello-Gamarra, Barbieux, & Reichert, 2012).

Study under consideration is an effort towards studying the drivers of innovation capability in context of Zawislak et al. (2012) and their potential effect on innovation capability. Four major drivers of innovation capability as per innovation capability framework are explained here.

### **2.3. Technological Capability**

Technological capabilities include the ability to imagine and create new market value solutions. These new-value solutions can be converted into new technology or products. Technological capability is in charge of directing the technological development process, which is defined as a comprehensive process of knowledge that is purposefully applied to answer a specific market challenge. It is based on the classical definition of technological competence, which includes the knowledge, skills, and experiences required to develop and manage technological advances (Schot & Steinmueller, 2018). Technical capability produces, adapts, and develops new technologies that allow a company to differentiate itself from competitors. It is usually (but not always) distinct from the abilities required to operate technical systems. (Fontes, Bento, & Andersen, 2021). Technological capability is directly related to the ability to innovate. Firms with stronger technological capabilities are thought to be more innovative (Urbinati, Chiaroni, Chiesa, & Frattini, 2020). However, small firms are generally believed not to be technologically sound and hence they take longer time to adopt new technologies to bring innovation in their production, operations and processes, whereas, firms with advance technological capabilities are more prone towards innovation and are able to adopt the changes prevailing in markets easily (Urbinati et al., 2020). Technological capability is critical for the survival of an organization because it allows firm's to produce products and services commercially while remaining profitable (H.-M. Liu, 2020). As a result, the firm's technology capabilities are essential variables in its innovation capability. Similarly, technical aptitude transfers to a firm's ability to innovate and so has an impact on performance. As a result, we can formulate the following two hypotheses:

- H<sub>2</sub>: Technological Capabilities are significant determinant of innovation capability and it has a significant positive effect on Innovation Capabilities.
- H<sub>3</sub>: Innovation capability mediates the relationship between Technological Capabilities and SME performance.

### **2.4. Operational Capability**

The firm's operational capability is defined as its ability to efficiently generate products or services in accordance with the firm's plan (Meissner, Burton, Galvin, Sarpong, & Bach, 2020). They further stated that operational capability of the firm is to integrate the firms learning behavior and new technologies into their production systems in order to develop better products as per exact needs of customers. Operational capability is critical for the survival of an organization because it allows firm's to produce products and services commercially while remaining profitable (H.-M. Liu, 2020). Firms must imagine and produce new items in order to survive in the market. Any corporation, however, must be able to translate the technological outcome into a series of transactions for commercial manufacturing. This is accomplished through operational capabilities (OC). Understanding the firm's operational capacities is critical if decisions on production technologies, plant capacity and systems, planning, and control are to be made (Ferreira, Benini, Neto, & da Silva, 2021). Although technology capabilities are continually developing, operational capabilities are primarily concerned with routines, stability, efficiency, and uniformity, as they are required attributes for product production. This capacity evolves mostly through "learning by doing." This signifies that operational capacity is insufficient to generate technical improvements that are developed and managed by technological capabilities (Jie, Harms, Groen, & Jones, 2021). Similarly, a company that has the ability and incentive to meet the requirements of its consumers will always seek to do so in a better and more efficient manner, expanding its capacity for innovation. The performance of such firms will

also be significantly better than that of firms that do not have such an ideology-reason being efficiency in serving consumer wants, thus we develop the following two hypotheses:

- H<sub>4</sub>: Operational Capabilities are significant determinant of innovation capability and it has a significant positive effect on Innovation Capabilities.
- H<sub>5</sub>: Innovation capability mediates the relationship between Operational Capabilities and SME performance.

## **2.5 Managerial Capability**

The essence of managerial capabilities resides in the human capital or the human resource of the organization. The technological and operational capabilities of the firm are limited by their routines and set-patterns. The managerial capability of the firm, on the other hand, is ever-evolving and takes action through choice and critical decision making (Paulo Antônio Zawislak et al., 2012). Because business situations and demands are always changing, managers frequently have to make quick strategic decisions. For this reason, a company's managerial capacity is of utmost importance. Since profitability is regarded as an indicator of performance, an organization's managerial competency is thus indicated by the wide variety of talents, resources, and experiences that its management possesses (Langlois, 2003; Nasiri, Ukko, Saunila, & Rantala, 2020). Moreover, authors further explain that the managerial capability of a firm is also shown by the standardization and formalization of managerial practices and routines within an organization. Hence, managerial capability integrates and coordinates the technological and operational capability of the firm. Furthermore, it ensures that the company's products and goods are ready to be transacted in the commercial market and for that the transactional capability of a firm is vital.

In addition to technological capabilities and operational capabilities, any firm needs a set of skills that enables all internal capacity to be integrated consistently. Study suggests that the management capacities are formed by the development of human, social and cognitive capital, with which the managers build, integrate and restructure tangible and intangible (technical and operational) resources. It is worth noting that, unlike operational capacity which is incorporated in routine technical knowledge, the management capability requires the flexibility of a wide variety of capabilities when solving problems and to perform better (Hemple, 2018).

In conclusion, this study concentrated on how managerial capabilities contribute to the growth of innovation skills in the setting of small and medium enterprises (SMEs). Similarly, firms that have capable and experienced management teams outperform those without such teams, as the experience and resourcefulness of their capable managers are instrumental in enhancing their innovation capabilities as well as performance on various measures. So we can claim that through integrating a firm's technological and operational capabilities, managerial capabilities contribute towards the innovation capability of a firm as well as its performance. Thus we form the following two hypotheses:

- H<sub>6</sub>: Managerial Capabilities are significant determinant of innovation capability and it has a significant positive effect on Innovation Capabilities.
- H<sub>7</sub>: Innovation capability mediates the relationship between Managerial Capabilities and SME performance.

## **2.6. Transactional Capability**

An organization's goal is to generate revenue by marketing the goods and services it has created utilizing its technological, operational, and managerial capabilities. The term "transactional capability" refers to an organization's capability to offer its goods and services on the open market while making sizable profits (Mayer & Salomon, 2006). The firm's ability to enable the transaction of its products in a way that reduces marketing, distribution, and negotiation costs is known as its transaction capability (Schreiber, Tometich, Zen, & Engelman, 2020). It is the organization's understanding of its customers, markets, delivery routes, supply chains, and procedures in order to minimize transaction costs and enhance firm utility (Paulo Antônio Zawislak et al., 2012). Organizational learning is related to high transactional capabilities; organizations which are able to integrate their knowledge into the transaction

process are able to yield better profits, increase their bargaining power and reduce transaction costs (Partanen, Kohtamäki, Patel, & Parida, 2020).

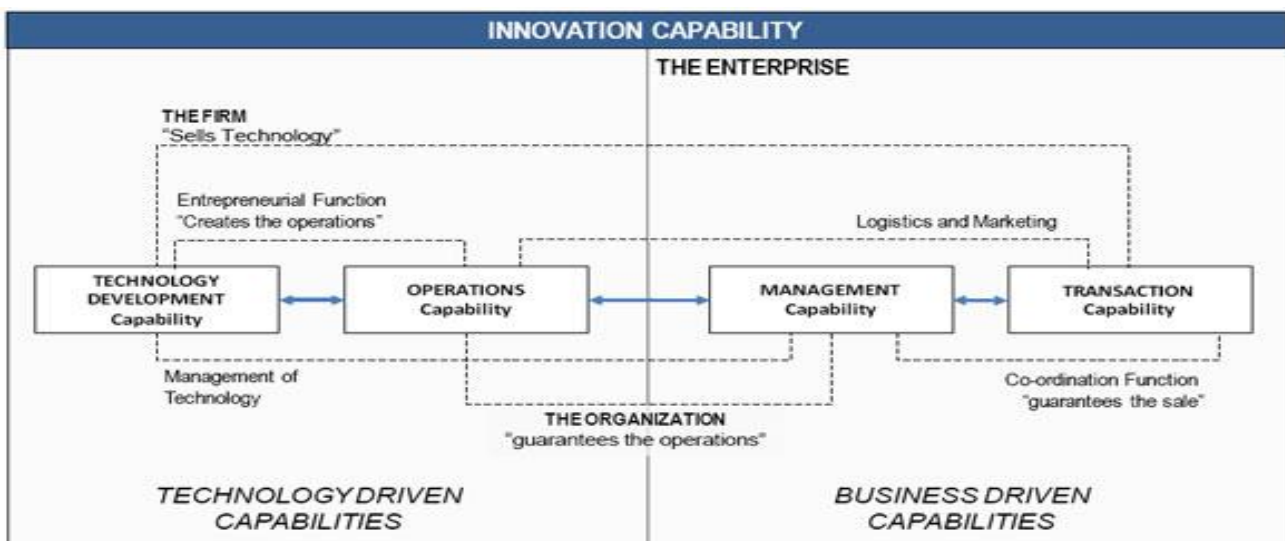
Transactional capabilities are critical in the sense that each company must promote its products in order to survive. As a result, regardless of how well a corporation performs in the three preceding capacities, the firm does not justify itself as an economic actor if it does not operate in the market. The firm's operational capability is reflected in the skills, knowledge, and procedures created in order to cut marketing, trading, logistics, and distribution expenses (Paulo Antônio Zawislak et al., 2012). Thus, transactional competence connects the firm to its external environment by allowing it to buy or sell. Furthermore, this capability is critical in assessing market signals and matching the firm's offers with consumer requirements and expectations.

To be profitable, a business must have strong transactional capabilities (Teixeira, Puffal, & Ferrazza, 2020). Some businesses develop cutting-edge technologies well in advance of their rivals, yet the items ultimately fail on the market because to a lack of transactional skills. Employees in these companies will quickly become discouraged; management and staff will believe innovation is futile since it hurts the bottom line. They will thus learn to be less innovative, and their capabilities to innovate will thus get blunted due to disuse. Research is needed in order to fulfill the gap that exists in literature with reference to finding the role of transactional capabilities in enhancing overall innovation capabilities of SMEs and to determine that weather transactional capabilities are considered as statistically significant determinant of innovation capability and weather it has positive association with innovation capability of SMEs. Thus we can deduce the following two hypotheses:

- H<sub>8</sub>: Transactional Capabilities are significant determinant of innovation capability and it has a significant positive effect on Innovation Capabilities.
- H<sub>9</sub>: Innovation capability mediates the relationship between Transactional Capabilities and SME performance.

These four firms' capabilities—technological, operational, managerial, and transactional—are combined to indicate the firm's capability for innovation. These four talents exist in some combination in all types of organizations, and innovation results from their effective application. Additionally, according to research, having these four capabilities is a requirement for innovation in any organization. SMEs with these capabilities are able to develop, manage, and produce innovative processes, products, and services across the board, which improves firm performance (Hock-Doepgen, Clauss, Kraus, & Cheng, 2020; Paulo Antônio Zawislak et al., 2012). Figure illustrates how the innovation capability is composed in relation to this framework.

**Figure 1: The Innovation Capability Framework**



Source: (Paulo Antônio Zawislak et al., 2012; Paulo Antonio Zawislak, Reichert, Barbieux, Avila, & Pufal, 2022)

While some studies categorize innovation capability as either radical innovation capability or incremental innovation capability, previous studies have defined it as a specific type of

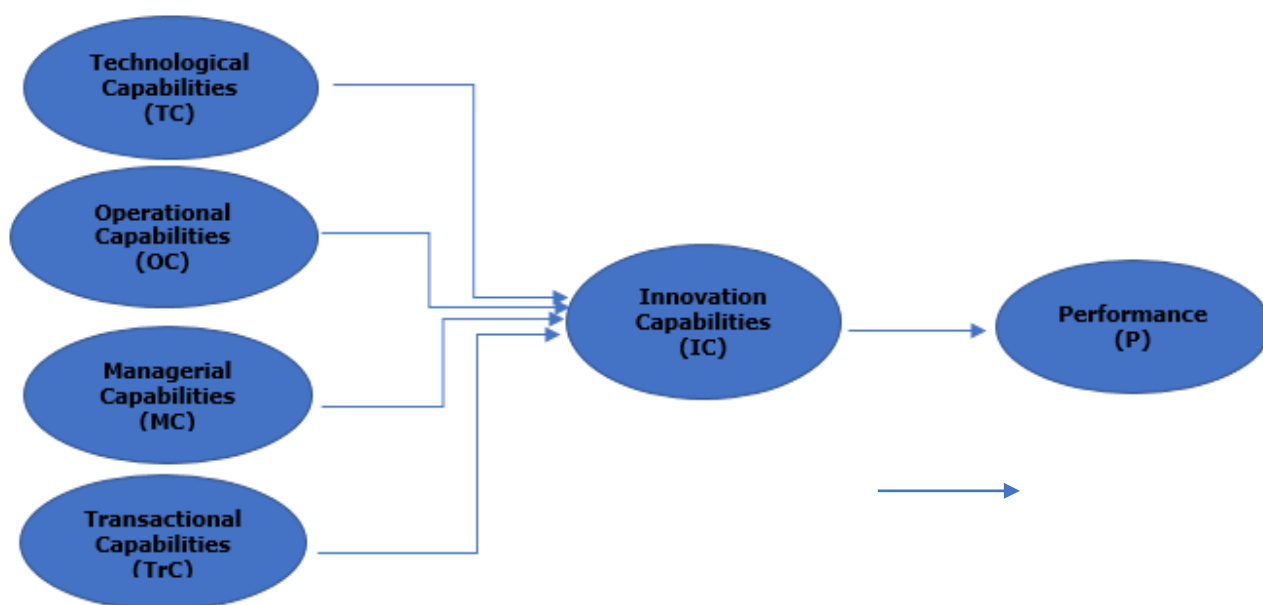


innovation, such as process and product innovation. The majority of businesses attempt to find suitable sources of innovation, but they are still in the early stages of trying to become effective innovators. (Le, Lei, Le, Gong, & Ha, 2020). The impact of innovation capability on SMEs' performance, the mediating role of innovation capability between technological capabilities and SMEs' performance, the mediating role of operational capabilities and SMEs' performance, the mediating role of managerial capabilities and SMEs' performance, and other topics are all urgently in need of study in this context.

## 2.7. Performance of SMEs

The word "performance of SMEs" has numerous definitions, and there is no agreement on what constitutes its outcomes or what constitutes its ramifications and dimensions (Leitão & Franco, 2020). It can range from subjective and all-encompassing to specific and limited. Taking a subjective and comprehensive approach, performance is primarily focused on profitability, growth, customer happiness, employee satisfaction, social performance, and environmental performance for measuring firm performance, and the same are called performance outcomes (Santos & Brito, 2012). They looked at financial performance as a result of these factors. On the other hand, there are extremely objective measurements such as revenues, profitability, return on investment (ROI), and so on that may be used to measure the success of SMEs and are regarded as their results. Based on the entire aforesaid literature, following is the conceptual framework for the study;

**Figure 2**



Source: Adopted from Zawislak et al. (2012), Paulo et al. (2020) and Hock-Doepgen et al. (2020)

Based on aforesaid conceptual framework, it will result in getting answer of the following key questions;

- To determine the key determinants of innovation capability.
- To study the possibility of positive association between technological capabilities and innovation capabilities.
- To study the possibility of positive association between operational capabilities and innovation capabilities.
- To study the possibility of positive association between managerial capabilities innovation capabilities.
- To study the possibility of positive association between transactional capabilities and innovation capability.
- To study the impact of innovation capability on performance of SMEs.
- To study the mediating effect of innovation capability between technological capabilities and performance of SMEs.

- To study the mediating effect of innovation capability between operational capabilities and performance of SMEs.
- To study the mediating effect of innovation capability between managerial capabilities and performance of SMEs.
- To study the mediating effect of innovation capability between transactional capabilities and performance of SMEs.

### 2.8. Operationalization of the Constructs

Variables taken under study are operationalized in table 1.

**Table 1**

S. No	Title of the Constructs/Concepts	No. of items in the scale	Source of Constructs/Concepts
1	Performance	4	(Hudson, Bennett, Smart, & Bourne, 1999).
2	Innovation Capability	27	(Calik, Calisir, & Cetinguc, 2017)
3	Technological Capability	4	(Zhou & Wu, 2010)
4	Operational Capability	5	(Wu, Melnyk, & Flynn, 2010)
5	Managerial Capability	5	(Sirmon & Hitt, 2009)
6	Transactional Capability	6	(Tello-Gamarra & Zawislak, 2013)

### 3. Research Methodology

Research methodology section elaborates the key actions taken by researchers to dig out the possible answers of research questions and the logic for use of certain procedures or techniques used for identification, selection, processing and analysis of research data to understand the research problem and allowing the readers to assess the overall validity and reliability of research.

**Table 2**

<b>1</b>	<b>Time Horizon</b>		
	It refers to the duration of time needed for the completion of the research project.		
1.1	Cross-Sectional Time Horizon	It is a snapshot study, which means a particular group of people is studied at a given point in time. Cross sectional time horizon means the collection of data is at certain pint of time.	In our study, cross sectional data of several SMEs were taken to study the variables of research study.
1.2	Longitudinal Time Horizon	A longitudinal time horizon is a technique for collection of data in which data is collected again and again over extended time period.	In our research, this type of time horizon for collection of data is not applicable.
<b>2</b>	<b>Data Collection Technique</b>		
	In this section of research approach, researcher highlights the data collection technique and the method for the analysis of data collected.		
2.1	Primary Data	Primary data refers to the data which is collected for the first time. The data can be first-hand in term of historical or the data collected for the first time by using survey or interview,	Our research has used the method of collection of primary cross-sectional data through survey approach by research questionnaire.
2.2	Secondary Data	Secondary data refers to the data set which originates from the work or research of the other researchers and can be used again by others for data analysis.	In our research study, this type of data has not been used.
<b>3</b>	<b>Research Design</b>		
	The research design refers to the detail about the process of research that how it is going to complete. It is the framework that contains reasonable and applicable methodology for particular research study, selection of respondent for particular research study and detail about the analysis of data and the statistical tools used for the particular research study.		
<b>4</b>	<b>Population &amp; Sample</b>		
	The primary data for the study were collected utilizing a standardized questionnaire in a survey format. We sought the 346 registered industrial manufacturing SMEs in Khyber Pakhtunkhwa, Pakistan, Hattar Industrial Estate, and the Hattar Industrialist Association (HIA) in order to choose the participants.		

4.1	Sample Size	The sample size refers to the number of people or respondents which are selected from population to be used for research study.	All registered manufacturing firms were kept as a sample under this study. The number of registered manufacturing SMEs is 346.
4.2	Sampling Technique	Sampling technique refers to the selection of respondents from whom the data is to be collected.	Convenient probability sampling has been used to collect the data from SMEs.
<b>5</b>	<b>Tools of Data Analysis</b>		
	The study used descriptive statistics, reliability and validity testing via Cronbach's alpha and partial least square (PLS) for the purpose of data analysis. Details of data analysis tools are explained below.		

## 4. Data Analysis & Discussion

### 4.1. Validity and Reliability of Constructs

Table 3 indicates the validating and reliability of all the constructs taken under study and is as follows.

**Table 3: Validity and Reliability of Constructs**

S. No	Title of the Construct	Average inter item covariance	Number of items in the scale	Scale reliability coefficient
1	Performance	0.09	4	0.73
2	Innovation Capability (IC)	0.07	27	0.87
3	Technological Capability (TC)	0.26	4	0.79
4	Operational Capability (OC)	0.37	5	0.92
5	Managerial Capability (MC)	0.32	5	0.84
6	Transactional Capability (TrC)	0.11	6	0.68

According to Hulin, Netemeyer, and colleagues (2001), an adequate rule has a scale reliability co-efficient of 0.60 to 0.70. When the calculated co-efficient of reliability exceeds 0.80, it is considered good; however, if the calculated co-efficient of reliability exceeds 0.95, it may indicate data redundancy. If the computed co-efficient of reliability surpasses 0.80, it is regarded good; however, if the calculated value of co-efficient of reliability exceeds 0.95, it may be an indicator of data redundancy (Hulin, Netemeyer, & Cudeck, 2001). Table 3 revealed that all of the constructs used in this study, namely performance, innovation capability, technological capability, operational capability, managerial capability and transactional capability, are internally consistent, valid, and reliable, and can be used for further research.

### 4.2. Descriptive Statistics

Table 4 portrays the descriptive statistics of the variables taken under study and is as follows.

**Table 4: Descriptive Statistics**

S. No	Title of the Variable	Observations	Mean	Std. Dev.	Min	Max
1	Performance	249	0.48	0.36	0	1
2	IC	249	3.85	0.27	3.11	4.48
3	TC	249	3.87	0.57	2.25	5.00
4	OC	249	3.47	0.63	2.20	5.00
5	MC	249	3.62	0.62	2.20	5.00
6	TrC	249	2.91	0.29	1.83	3.50

Key descriptive statistics of the variables are shown in Table 4. It shows that performance deviates 36% from the mean on both sides, innovation capability has a 27% deviation on both sides from the mean of 3.85, whereas the technological capability has a 57% deviation from the mean of 3.87, the operational capability has a 63% deviation from the mean of 3.47, the managerial capability for management has a 62% deviation from the mean of 3.62, and the transactional capability has a 29% deviation from the mean of 2.91. Sensitivity in the setting of a high level of variance from the mean of all variables is a sign of both the diversity of SMEs and the absence of an environment that encourages innovation. The Pakistani government must take steps to create a friendly business environment by making it easier for SMEs to conduct their operations. Efforts are to be made by Govt. in context of Ease of doing business indicators

reported by World Bank Ease of Doing Business Report. Initiatives are to be taken at SMEs level for developing the capabilities to cope up with internal and external challenges pertaining to business environment in general and innovation capabilities and performance in particular.

### 4.3. General Assessment of SMEs

Analysis of the data revealed following key insights about the general trend and glimpse about the SMEs;

**Table 5: General Assessment of SMEs taken under Study**

S. No	Criteria of Assessment	Finding/Conclusion on the basis of Data
01	Type of Industry to whom SMEs Serves	100% of the SMEs under study were providing goods to domestic and private organizations/customers. 39.56% of the SMEs under study were in the phase of Diversification in their life cycle.
02	Stages of Life Cycle	59.34% of the SMEs under study were in the phase of maturity in their life cycle. 1.10% of the SMEs under study were in the growth phase of their life cycle.
03	Percentage of Employees with Bachelors & above Qualification	Mean Value of Employees with Bachelors & above qualification is 31.64%. Minimum Value of Employees with Bachelors & above qualification is 12.12%. Maximum Value of Employees with Bachelors & above qualification is 69.86%.
04	Age of the SMEs	98.90% of the SMEs were of age of 15 Years and above, whereas, only 1.10% of SMEs were of age less than 10 Years.

Source: Summery inferred from the Introductory Portion of Data Collected through Questionnaire about SMEs under Consideration.

Analysis in Table 5 reveals that all the SMEs taken under study were supplying goods to only domestic and private sector organizations and none of them were willing to supply products to public sector organizations because of several procedural mechanisms like public procurement rules and delays in releases of funds from public sector organizations etc. This indicates the mistrust of SMEs on public sector organizations which Government needs to consider seriously on one side, whereas, on the other side, SMEs needs to consider the quality perspective of the products as wherever, the public procurement is involved, the quality parameters are always set at highest level which might be the reason which hinders SMEs to work with public sector organizations.

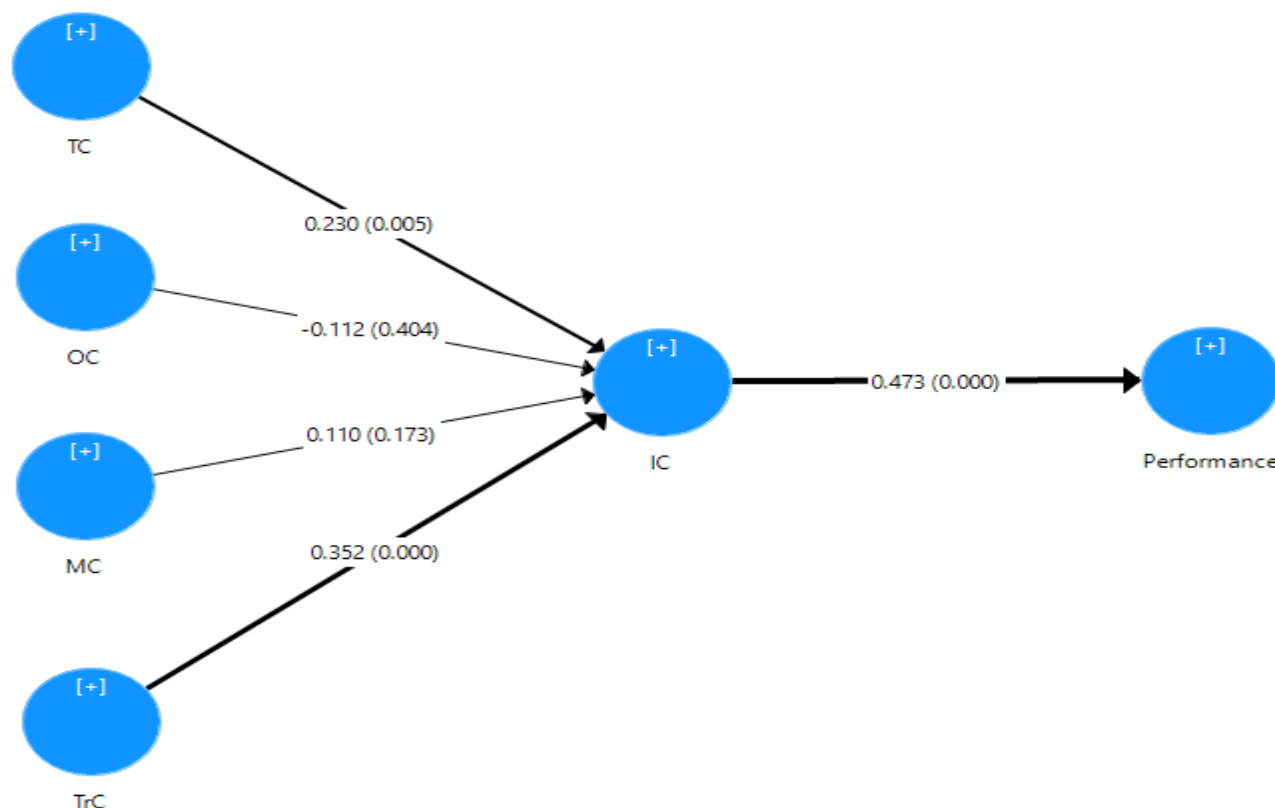
The SMEs taken under study were majorly from maturity and diversification phases of their life cycles. Analysis shows that only 1.10% of the SMEs were from growth phase of their life cycle, whereas, 59.34% were from maturity phase of their life cycle and 39.56% were from diversification phase of their life cycle. The reason of such selection were that the SMEs falling in maturity phase are those SMEs which may consider and search certain feasible options for further development either through innovation in existing setups or through diversification. In both the case of innovation in existing systems or through diversifications, SMEs generally tends to grow further which is the indication of development of innovation capabilities and performance of SMEs. Total of 98.90% SMEs which are from maturity and diversification phase of their respective life cycles are the indication of the fact that they would provide better insights about the possible nature of relationship between innovation capabilities and performance of SMEs as well as the good reflection of key determinants of innovation capability and performance of SMEs.

Success and good performance of SMEs is dependent upon several factors. Educational qualification of employees working in SME firms is important factor in determining the success of SME firms. Table 4 indicates that minimum value of number of employees with Bachelor’s degree and above is 31.64%, whereas, maximum value of number of employees with Bachelors and above qualification is 69.86%. These statistics shows that presence of highly qualified employees in SME firms is detrimental for enhancing the innovation capability and performance of SMEs under study. Integrated efforts of SMEs with research organizations and research based universities for the purpose of developing innovation friendly culture at the level of SMEs is need of the time. Govt of Pakistan has to formulate such policy in this regard so that innovation capabilities and performance of SMEs could be enhanced. In order to show seriousness at SMEs

level, SMEs has to earmark certain percentage of profits for research and development related activities with the collaboration of research organizations and research based universities.

Age of the SME firm is an important factor in determining the intensity of development of innovation capabilities and performance of SMEs as both of the constructs takes time to flourish. Analysis of data reveals that 98.90% of the SMEs were of age of 15 years and above, whereas, only 1.10% of SMEs were of age less than 10 years. This distribution of age of SME firms under consideration indicates that the data taken from them were of very useful nature in determination of level of innovation capabilities and performance of SMEs.

**Figure 3**



**Table 6: Summary of Path Coefficients**

	Original Sample (O)	Sample Mean	Standard Deviation	T Statistics	P Values
IC -> Performance	0.473	0.490	0.042	11.408	0.000
MC -> IC	0.110	0.116	0.078	1.402	0.162
OC -> IC	-0.112	-0.062	0.139	0.804	0.422
TC -> IC	0.230	0.217	0.085	2.706	0.007
TrC -> IC	0.352	0.365	0.074	4.771	0.000

The path co-efficient of innovation capability towards performance has a t-statistic of 11.40 and a p-value of 0.000. This demonstrates that there is a considerable positive relationship between SMEs' innovation capability and performance. It demonstrates that SMEs that want to improve their performance must focus on enhancing their innovation capabilities. The t-value of the path co-efficient of management competencies towards innovation capabilities is 1.40, with a p-value of 0.162. Because the p-value of 0.162 is not statistically significant, it demonstrates that, while there is a positive association between managerial competencies and SMEs' innovative capabilities, the relationship is not statistically significant in this case.

Similarly; path co-efficient of operational capabilities towards innovation capabilities shows t-value of 0.804 with p-value of 0.422. It shows that the relationship between operational capabilities and innovation capabilities is not statistically significant. It further means that managerial capabilities and operational capabilities are not statistically significant determinant of innovation capability for SMEs. One of the important managerial implications and reasons of the insignificant relationship of managerial capabilities and operational capabilities with innovation

capabilities is that SMEs are mostly managed by owners of these enterprises who mostly have very limited understanding about the role and importance of professional managerial and operational practices for their business and they usually look in to and prefer only those practices which may result in short term benefits or profits out of the operations of the business. It further shows that if SMEs intends to enhance the level of innovativeness in business, then they have to improve the managerial and operational capabilities of SMEs.

Path co-efficient of technological capabilities and transactional capabilities towards innovation capabilities shows t-values of 2.706 with p-value of 0.007 and t-value of 4.771 with p-value of 0.000 respectively. P-values of path co-efficient of technological capabilities and transactional capabilities towards innovation capabilities are highly statistically significant, which shows that there exists statistically significant positive relationship between technological capabilities and innovation capabilities and transactional capabilities and innovation capabilities. It further states that transactional capabilities and technological capabilities are statistically significant determinants of innovation capabilities of SMEs. Following are the hypotheses which are tested on the basis of Table 7;

**Table 7: Hypotheses testing related to determinants of innovation capability and impact of innovation capability on performance of SMEs**

S. No	Statement of Hypotheses	t- statistics	P-Value	Decision of Hypotheses
01	TC is significant determinant of innovation capability.	2.706	0.007	Accepted
02	OC significant determinant of innovation capability.	0.804	0.422	Rejected
03	MC significant determinant of innovation capability.	1.402	0.162	Rejected
04	TrC significant determinant of innovation capability.	4.771	0.000	Accepted
05	Innovation capability has a significant positive effect on SME performance.	11.408	0.000	Accepted

According to the data in Table 7, transactional and technological capabilities are statistically significant determinants of SMEs' innovation capability, whereas operational and managerial capabilities are not statistically significant determinants of SMEs' innovation capability. Table 8 depicts the direct relationship of management capabilities, operational capabilities, technological capabilities, and transactional capabilities on the performance of SMEs.

**Table 8: Total Indirect Effects**

	Original Sample (O)	Sample Mean	Standard Deviation	T Statistics	P Values
MC -> Performance	0.052	0.056	0.039	1.349	0.178
OC -> Performance	-0.053	-0.030	0.068	0.774	0.439
TC -> Performance	0.109	0.106	0.042	2.592	0.010
TrC -> Performance	0.167	0.178	0.038	4.440	0.000

The results demonstrate that management qualities have a statistically insignificant impact on the success of SMEs, with a t-value of 1.349 and a P-value of 0.178. Similarly, a t-value of 0.774 and a P-value of 0.439 indicate that operational capabilities have a statistically insignificant impact on the performance of SMEs. However, technological and transactional capabilities have a considerable beneficial impact on SMEs' performance, with P-values of 0.010 and 0.000, respectively, which is extremely significant. The findings reported in Table 6 are likewise consistent with the findings presented in Table 5, since the SMEs studied have a limited awareness of the best managerial and operational practices. At the policy level, the government must give SMEs with access to business development services so that they can acquire and comprehend the best management and operational techniques, which will ultimately lead to improved performance.

**Table 9: Specific Indirect Effects:**

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
MC -> IC -> Performance	0.052	0.056	0.039	1.349	0.178
TC -> IC -> Performance	0.109	0.106	0.042	2.592	0.010
OC -> IC -> Performance	-0.053	-0.030	0.068	0.774	0.439
TrC -> IC -> Performance	0.167	0.178	0.038	4.440	0.000

Table 9 present the results pertaining to the mediating effect of innovation capability between managerial capabilities, technological capabilities, operational capabilities, transactional capabilities and performance of SMEs. T- Statistics of 1.349 with p-value of 0.178 shows statistically insignificant mediating relationship of innovation capability between managerial capabilities and performance of SMEs. It means that SMEs has to made special emphasis on managerial perspectives of SME firms so that they can lead them towards better performance. T- Statistics of 2.592 with p-value of 0.010 shows statistically significant mediating relationship of innovation capability between technological capabilities and performance of SMEs.

It means that better technological capabilities will leads towards better innovation capabilities which will ultimately leads towards better performance of SMEs. It means that SMEs may improve their capability of innovativeness and performance by focusing on technological development. T- Statistics of 0.774 with p-value of 0.439 shows statistically insignificant mediating relationship of innovation capability between operational capabilities and performance of SMEs. It means that SMEs has to made special emphasis on operational perspectives of SME firms so that they can lead them towards better performance. T- Statistics of 4.440 with p-value of 0.000 shows statistically significant mediating relationship of innovation capability between transactional capabilities and performance of SMEs.

It means that better transactional capabilities will leads towards better innovation capabilities which will ultimately leads towards better performance of SMEs. It means that SMEs may improve their capability of innovativeness and performance by focusing further on transactional capabilities of SME firms.

**Table 10: Hypotheses testing pertaining to mediating role of innovation capability between its key determinants and performance of SMEs**

S. No	Statement of Hypotheses	T Statistics	P-Value	Decision of Hypotheses
01	IC mediates between TC and SME performance.	2.592	0.010	Accepted
02	IC mediates between OC and SME performance.	0.774	0.439	Rejected
03	IC mediates between MC and SME performance.	1.349	0.178	Rejected
04	IC mediates between TrC and SME performance.	4.440	0.000	Accepted

**Table 11: Total Effects**

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
IC -> Performance	0.473	0.490	0.042	11.408	0.000
MC -> IC	0.110	0.116	0.078	1.402	0.162
MC -> Performance	0.052	0.056	0.039	1.349	0.178
OC -> IC	-0.112	-0.062	0.139	0.804	0.422
OC -> Performance	-0.053	-0.030	0.068	0.774	0.439
TC -> IC	0.230	0.217	0.085	2.706	0.007
TC -> Performance	0.109	0.106	0.042	2.592	0.010
TrC -> IC	0.352	0.365	0.074	4.771	0.000
TrC -> Performance	0.167	0.178	0.038	4.440	0.000

Table 11 summarizes the total effects of all variables in a systematic way. In order to understand the narrative of the results presented in Table 9, following is the summarized conclusion in this regard as presented in Table 12.

**Table 12: Summary of Total Effects**

S. No	Statement about Possible Effect of One Variable on Other Variable	T Statistics	P Values	Conclusion about Statement on the Basis of Estimated Results (Accepted/Rejected)
01	Effect of Innovation Capability on Performance of SMEs	11.408	0.000	Accepted/Positive Effect
02	Effect of Managerial Capabilities on Innovation Capabilities	1.402	0.162	Rejected
03	Effect of Managerial Capabilities on Performance of SMEs	1.349	0.178	Rejected

04	Effect of Operational Capabilities on Innovation Capabilities	0.804	0.422	Rejected
05	Effect of Operational Capabilities on Performance of SMEs	0.774	0.439	Rejected
06	Effect of Technological Capabilities on Innovation Capabilities	2.706	0.007	Accepted/Positive Effect
07	Effect of Technological Capabilities on Performance of SMEs	2.592	0.010	Accepted/Positive Effect
08	Effect of Transactional Capabilities on Innovation Capabilities	4.771	0.000	Accepted/Positive Effect
09	Effect of Transactional Capabilities on Performance of SMEs	4.440	0.000	Accepted/Positive Effect

#### **4.4. Findings of the Study**

The studies by Guan and Ma (2003), Wang, Lo et al. (2008), Zawislak, Larentis et al. (2009), Yam, Lo et al. (2011) and Zawislak, Cherubini Alves et al. (2012) has partially validated and confirmed, relating to factors that influence innovation capacity and the favourable correlation between managerial, operational, technological, and transactional qualities. The study disproves the claims made by Zawislak, Cherubini Alves et al. (2012) and Liu (2020) that management and operational skills are a key predictor of innovation capability and that these skills are positively correlated with innovation skills. The reason for the rejection in the setting of Pakistan's SME sector could be due to differences in the dynamics of the marketplaces studied in this study as well as those studied by Zawislak, Cherubini Alves et al. (2012) and Liu (2020). Differences in results may occur because the study solely used SMEs in manufacturing sector from Hattar Industrial Estate Haripur, Khyber Pakhtunkhwa, Pakistan.

The findings of studies published by Urbinati, Chiaroni, et al. (2020) have been supported in the background of discoveries referring to technological capabilities as key determinant of innovation capability and positive correlation of technological capabilities with innovation capabilities. The studies conducted by different researchers such as Zawislak, Cherubini Alves et al. (2012), Hock-Doepgen, Clauss et al. (2020), Teixeira, Puffal et al. (2020), and Partanen, Kohtamäki et al. (2020) have been supported in the context of findings pertaining to technological capabilities as significant determinants of innovation capability and positive association of transactional capabilities with innovation capability.

#### **5. Conclusion**

A conceptual framework was developed to investigate the factors or drivers of innovation capability, the influence of innovation capability on SMEs' performance, and the mediating effect of innovation capability between its primary determinants and SMEs' performance. The findings indicate that technological and transactional capabilities are statistically significant determinants of SMEs' innovation capabilities, whereas operational and managerial capabilities are not statistically significant determinants of SMEs' innovation capability. One of the key reasons for the lack of a statistical relationship between operational and managerial capabilities is that these two capacities are associated with the attitude and behavior of SMEs, which needs to be investigated more so that explanations in this respect can be realized. The study also discovered that the influence of innovation capability on the performance of SMEs is good. This means that SMEs must focus on developing their innovation capabilities if they want to improve their performance.

The study also discovered that the role of innovation capability in mediating the relationship between technological capabilities and performance, as well as the role of innovation capability in mediating the relationship between transactional capacities and performance, is statistically significant. However, the role of innovation capabilities in mediating the relationship between managerial capabilities and performance, as well as the role of innovation capabilities in mediating the relationship between operational capabilities and performance, is not statistically significant. It indicates that SMEs' attitudes and behaviors must be investigated in this regard in order to identify the causes of SMEs' lack of managerial and operational competence and to improve SMEs' performance.



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