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Influence of Entrepreneur Leadership on Small and Medium Enterprise (SMEs) Innovation with the Mediating Role of Artificial Intelligence and Employee Ambidexterity

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ABSTRACT

Current research on entrepreneurial leadership in small and medium enterprises focuses on innovation with the mediating role of artificial intelligence and employee ambidexterity. This study aim to explore the impact of artificial intelligence and employees' ambidexterity on innovation in small and medium enterprises within the manufacturing sector. The data for this research was collected from small and medium enterprises using convenience sampling. The target organization conducted a survey with managerial-level employees and utilized SEM for data analysis and path analysis. The development of entrepreneurial leadership and small and medium enterprises has greatly contributed to economic development in many countries around the world. This economic development is mainly reliant on innovation in small and medium enterprises. However, despite their significant economic contributions, Pakistan's small and medium enterprises have not received adequate attention in this regard. With the growth of technological advancements and globalization, small and medium enterprises are now striving to enhance their competencies by adopting new know-how to penetrate global markets. This study focuses on innovation by developing a model that investigates the relationship between entrepreneurial leadership and innovation in Pakistan's manufacturing sector, with the aim of promoting the country's economic strength. Public sector entities like SMEs may also be tasked by the government to conduct such training for incumbents, especially in the less educated segment, which forms part of our SMEs.

1. Introduction

Artificial Intelligence (AI) is having a significant impact on the digital transformation of organizations (Kraus et al., 2022). In the manufacturing industry, the implementation of AI technologies has become revolutionary (Bokrantz et al., 2023). We define AI as "a system's ability to interpret external data correctly, to learn from such data, and to use those to achieve specific goals and tasks through flexible adaptation" (Kaplan & Haenlein, 2019, p. 17). AI implementation is regarded as the process of deploying and using AI technologies within an organisation, which determines its use, return on investment, and trust (Dwivedi et al., 2021). The implementation of AI technologies has produced multiple benefits (Abdallah et al., 2023) and, in the manufacturing industry, companies are benefiting from flexibility in production processes that are facilitating the move towards major levels of customer product customization or accelerating the enhancement of human resources performance in company processes (Li et al., 2023). However, AI implementation is a sophisticated process that involves changes in production practices and management styles, which present significant challenges to companies (Wang et al., 2023). This challenge is particularly relevant for small and medium-sized Enterprises (SMEs) in the manufacturing industry because these companies are required to make fundamental changes to their internal resources, processes, and capabilities (Dey et al., 2023; Ahmad et al., 2024).

Strengthening small and medium enterprises (SMEs) is essential for fostering sustainable economic growth, given their significant role in the economy. In Pakistan, SMEs contribute approximately 40% to the national GDP, represent 99% of all business establishments, generate 78% of non-agricultural employment, and account for 20% of the manufacturing sector. Recognizing their critical impact, initiating focused research on SMEs is a necessary step toward enhancing their growth, competitiveness, and contribution to the broader economic landscape (Surya et al., 2021; Khan et al., 2024). The study calls for collaboration among different segments of society. This includes industry, academia, government, and development agencies. This paper is a step to foster these elements. People around the world interpret the term SME differently. In Pakistan, SMEs have been defined in the National SME Policy of 2007: "a business with an employment size of up to 250, an annual turnover of PKR 250 million, and paid-up capital of PKR 25 million. Despite their modest size, we can refer to small and medium-sized businesses as 'engines of growth' and 'key sources of innovativeness. The SME Development Authority and various surveys indicate that this industry contributes 40% to the annual GDP, with a further 25% coming from exports. s. According to IFC 2012, out of 3.2 million businesses in Pakistan, SMEs constitute more than 90% of business stakes and employ more than 70% of the labor force in the country. Nowadays, small and medium enterprises in Pakistan are striving to adopt new technologies so as to compete in the global market. SME is an effective tool of economic development in Pakistan. Nevertheless, this sector is facing multiple challenges, and one of these is "innovation" in the industry (Gherghina et al., 2020; Ali et al., 2024).

Moreover, the human resource capital available to SMEs in Pakistan primarily stems from higher education institutions and technical training centers. However, these institutions often lack familiarity with the distinct requirements of SMEs and are not adequately equipped to address their specific needs. As a result, the innovative capacity of SMEs remains constrained, limiting their ability to enhance value creation and adopt advanced technologies. Additionally, Pakistani SMEs face mounting competition from economies such as China and India, where supportive ecosystems have enabled SMEs to thrive and contribute significantly to economic development. The majority of SMEs rely on loans from friends/relatives, personal finances, and credit from suppliers (Naz et al., 2016; Khan, Ullah & Sultan, 2021; Sair et al., 2023; Khan et al., 2023). They complain of higher taxes, high prices of energy resources, and corruption. Furthermore, the World Economic

Forum regards innovation as a crucial factor in determining a country's global competitiveness index. The overall index ranks Pakistan 82/134 for innovation. Hence, it is the need of the hour to promote innovation in different small and medium sectors and develop appropriate strategies for competing globally in this field. This is evident in the journey of Toyota and Honda companies, which began as small factories and have evolved into industrial giant corporations through the implementation of appropriate government policies, as well as the adoption of appropriate leadership and strategies. Although small and medium enterprises are making all their efforts to innovate to compete globally, despite the endeavors by the government of Pakistan, there still exists a gap that needs improvement and promoting financial power of the country. This document aims to explore the entrepreneurial leadership perspective and devise strategies that SMEs can adopt to foster innovation in the industry, thereby contributing to economic development in Pakistan (Ahmad et al., 2023; Ali and Khan, 2024).

SME have been able to draw significant attention in emerging economy and most of these economies try to improve the potential of SME sector to enable these to achieve the desired economic growth and analyse the innovative capabilities of Small and Medium Enterprisesas underlying factors of export performance (Hernita et al., 2021; Ali et al., 2024). Therefore, innovation in manufacturing SME becomes significant as far as business atmosphere of countries such as Pakistan is concerned for indigenization and self-reliance of the industry. This analytical study is also significant as it determines the degree to which Pakistani manufacturing Small and Medium Enterprises are currently benefiting from Entrepreneur Leadership and what is the impact of Entrepreneur Leadership on innovation of these organizations (Abisuga-Oyekunle et al., 2020; Khan et al., 2023).

This research identified the gaps facing business enterprises in Pakistan, as outlined in the SME Policy 2007. Although the SME sector engages in low-value manufacturing, it presents ample opportunities for innovation. The study has proven to observers that innovation directly contributes to economic development (Shah & Syed, 2018: Hafeez et al., 2023). However, the lack of innovation in our SME sector is primarily due to the absence of the entrepreneurial leadership style necessary to foster an innovative culture within SMEs. Recent studies indicate that entrepreneurial leadership is more likely to generate creative opportunities. However, the studies do not take into account the absence of an employee's balanced pursuit of exploitative and explorative activities, nor the importance of an error management culture. The study unfolds the effectiveness of entrepreneurial leadership along with the critical role of error management culture and employee ambidexterity in organizations, ultimately leading to innovation in manufacturing SMEs. Globalization has significantly heightened business competition, and Pakistani manufacturing SMEs have yet to excel in international markets. Therefore, they must embrace innovation to remain competitive on a global scale. Therefore, it is necessary to investigate the factors that contribute to the innovation of small and medium enterprises (Vu et al., 2024; Ali et al., 2024).

1.1 Research Questions

- What is the role of entrepreneurial leadership in small and medium enterprise innovation?
- What is the entrepreneurial leadership influence on employee ambidexterity in context of artificial intelligence mediating role in SMEs?

2. Literature Review

A greater part of the literature acknowledges that AI implementation can be analyzed through the lenses of organizational strategy and organizational capabilities with specific reference to dynamic

capabilities-the resource-based view and the resource orchestration (RO) theory (Ma et al., 2023;Ali et al., 2024). In particular, RO theory provides a novel theoretical lens to identify how to manage AI technologies, people, and processes to successfully create value by implementing AI applications in organizations (Zhang et al., 2021). The RO theory contributes to a further understanding of resource management because it is an approach that centers on the role of managers in the creation of value through resource transformation (Sirmon et al., 2011). It is a theory that contributes to a broader understanding of AI implementation because it reveals the dynamics in which companies identify, acquire, and combine the utilization of resources. Thus, the RO theory helps us to comprehend the management of a company's resources and capabilities in the process of creating value for owners and customers (Sirmon et al., 2007). However, the literature has yet to focus on explaining how manufacturing SMEs orchestrate resources to implement AI technologies across their processes of digital transformation (Dey et al., 2023). This topic is particularly important since manufacturing SMEs have struggled to understand the impact that AI has on their businesses (Andrea et al., 2021). Therefore, SMEs face multiple challenges concerning AI implementation because of their limited awareness of AI technologies, their scant access to human talent with AI capabilities, and their limited investment capacity for AI applications (Abdulaziz et al., 2020; Ali et al., 2024).

The inherited a thin industrial base at the time of independence, and the government adopted its strategy for industrial development at the very outset. Interestingly, an uplift plan was conceived. Consequently, the theme continued to resonate in future plans (Andrea et al., 2021).. Unfortunately, the situation remained more or less the same. Policy planners concentrated their efforts on creating a large industry from its inception. Observing global development patterns, policy planners directed their attention toward small and medium-sized enterprises, viewing them as the center of economic activity for long-term growth (Abrokwah-Larbi et al., 2024). Thus, the Small and Medium Enterprise Development Authority came into being in 1998 under the Pakistan Ministry of Industries and Production with the aim of providing policy advice and training to SMEs to enable them to grow their businesses. Literature does not provide a uniform definition of SME. However, a SME is defined as a firm with fewer than 250 employees. However, the core elements of small and medium enterprises are their labor force, invested capital, and annual turnover (Hafeez, 2014). In Pakistan, the National SME Policy 2007 defines SME "as a business with paid-up capital of PKR 25 million, employment size of up to 250, and an annual turnover of PKR 250 million (Kopka & Fornahl, 2024).

Keeping pace with the changing world, Small Medium Enterprises in Pakistan are also trying to adopt new technologies to enter into the global market. It is expected that there will be further demand of innovation in Small Medium Enterprises keeping in view the economic activities generated through China Pakistan Economic Corridor. Small Medium Enterprises are considered as a high priority sector by the government. China Pakistan Economic Corridor being a $60 billion investment presents unprecedented avenues for growth in the Small Medium Enterprises sector; thus, China Pakistan Economic Corridor offers opportunities to enhance productivity of this sector. As per the Economic Survey 2005, 50% of economic activity is undertaken in wholesale, hotels and restaurants, and retail trade. Agriculture, Livestock, Mining, Electricity, Gas & Water, Construction, Social and Personal Services, accounts for 28% of total establishments. Manufacturing accounts for 18% followed by Transport, Communication, Real Estate and Business Services. Robust and distinct manufacturing sector provides the basis for self-sufficiency. Thus, the role of manufacturing sector in any economy cannot be overstated. According to Pakistan Ministry of Finance (2011) in recent decade the small-scale manufacturing firm's performance was low as compared to last decades, as illustrated below. Small Medium Enterprises are in a position to upgrade technologically and are therefore, low in growth, as Small Medium

Enterprises in Pakistan face serious issues in performance resultantly they are under performance in the global markets because of lack of competitiveness (Sirmon et al., 2007). The main challenges are the scarcity of entrepreneurial competencies, wherein, entrepreneurs in Pakistan face obstacles such as financial issues, dearth of entrepreneurial education, training related issues, poor infrastructure, corruption, relying on low and out of date technology, all these restrict Small Medium Enterprises for their long-term sustainability and development and contribute to the reasons behind the lower performance of SME sector of Pakistan (Oldemeyer et al., 2024; Ali et al., 2024).

Presently, the Small Medium Enterprises sector of Pakistan is performing less than what is desired as they have a high potential and even can improve their performance. Pakistani SMEs continue to face numerous dangers and challenges such as technological constraints and lack of innovation, dearth of specialist technologies of mass production areas, outdated technological infrastructure, scarcity of entrepreneurial education, financial constraints, shortage of skilled human resources, Inability to adapt new technology and mismanagement of valuable resources. Pakistan has to thus prepare vital strategic choices to ensure even superior growth in manufacturing sector in the fast-growing competitive environment at the international level (Kopka & Fornahl, 2024). It is also significantly evident from the Pakistan Vision 2030 and the Government of Pakistan Planning Commission Vision 2030, country's development is under performance due to a variety of factors including lacking in R&D, innovation and value addition; and lack of an enabling environment. Pakistan being ranked 147 out of 190 countries is reflective of its performance. Key goal of the Vision 2030 is to see Pakistan ranked in the top 50 countries of doing business by the year 2030. Moreover, the fundamental and core point of Government of Pakistan Planning Commission Vision 2030 is also "the establishment of a society which is productive as well as innovative". This is the main way to be competitive in the 21st Century and its key objectives are the importance of entrepreneurial education, networks and competencies so as to enhance economic growth. SMEs have always been under extensive study in the developed economies but no worthwhile research exists in developing countries (Zhang et al. 2022). Hence, it is essential that entrepreneurs should realize the dangers of failure and strive to get the valuable resources for enhancement of their success prospect. This could be possible by research and targeting on entrepreneurial education which is the primary source of its economic growth in the globalization world. Better managerial practices, innovation and technological levels are needed to make Small and Medium Enterprises more competitive. Therefore, this study is significant as it provides guidelines for the potential as well as existing entrepreneurs, policymakers, regulators and investors to develop an understanding that lead to innovativeness in SME of Pakistan (Zhang et al. 2022).

2.1 Innovation in Small and Medium Enterprises (SMEs)

Innovation refers to the systematic process of introducing modifications to products, processes, and services, ultimately leading to the development of novel solutions that enhance organizational value. It not only improves customer experience but also contributes to the organization's knowledge repository, fostering long-term growth and competitiveness. In the context of Pakistan, particularly within the small and medium-sized enterprise (SME) sector, innovation remains in its nascent stage. Despite its potential to drive economic progress, the adoption and integration of innovative practices among Pakistani SMEs are still evolving, necessitating targeted policy interventions and strategic initiatives to accelerate innovation-driven growth (Radicic & Petković, 2023). Successfully creating an innovative environment depends on a business environment that supports innovation. An environment where operations are not well defined and best-cultures are not deeply rooted into decision making process, the cost of new development is high and thus

innovation is not achievable. This decreases the organization's innovation advantage even if the resources are available, there needs to be a management involvement in every step to check that the ideas are merged with culture and due value is assigned to each innovative idea floated from various levels of the organization. Investment on research and development can increase the organization's efficiency in developing products but without management support at every level these resources can't provide full potential from the investments. SMEs are considered as workshops leading to inventions and creativity all over the world. Pakistan has great potential to innovate in engineering sector (Teoh et al., 2023).

2.2 Entrepreneurial Leadership

Entrepreneurial leadership is the key element for the development of any venture. It is termed as the force multiplier for change. It is seen as an innovator and source of innovative ideas and procedures who are the key factors in any economy. These people have the skills and foresightedness to anticipate current and future challenges. They come with good new ideas to the economic market. Entrepreneurship generally, creates a business plan and mobilizes all the resources including labor (Joel et al., 2024). They provide leadership and managerial skills for the business. Unique in style, the entrepreneurial leadership can exists in an organization of any type, size, or age that can influence the activities of any group for the accomplishments of its goals. Most of the old research has taken into account the traditional leadership styles; take for instance transformational leadership to enhance its creativity. Nevertheless, managers lead at present has changed considerably which has given birth to entrepreneurial leadership styles emphasizing on creativity (Omeihe et al., 2023). Entrepreneurial leadership can be defined as, “Persuading the performance of the group in such a manner so as to achieve the organizational goals. This may involve recognizing and exploiting entrepreneurial opportunities. In simple words, entrepreneurial leaders are required by the organizations that aspire for innovation and creativity. These leaders support their co-workers in creatively recognizing and exploiting new opportunities to benefit the organization. Entrepreneurial leadership mobilizes co-workers and encourage them to polish their creative potential. Entrepreneurial leadership dimensions include innovativeness, proactiveness, risk-taking, visionary and motivation. To put it simple, entrepreneurship as explained is to “conceive ideas and convert them into products and or service. Thereafter take the product to market. In the words of “entrepreneur is an innovator that creates and exploits opportunity; therefore, it creates value and change for the betterment of the society and economy (Strobl et al., 2023). Researchers in the corporate sector contemplated how to nourish entrepreneurial behaviors in organizations. They focus on entrepreneurial leadership which differs from management as it concentrates on coordination and planning. New generation of Pakistan has great potential and their ideas could give Pakistan the marvels of business if given proper guidance noted that ventures that are spearheaded by entrepreneurial leaders gain competitive advantage, because they are innovative and proactive so, enjoy first mover advantages (Strobl et al., 2023).

2.3 Employee Ambidexterity

Employee ambidexterity is characterized as individuals' balanced pursuit of exploitative and explorative behaviours. Exploitative actions consider current opportunities, whereas fresh opportunities pertain to exploratory efforts. Nonetheless, knowledge of ambidexterity at the individual level is still constrained. The research in this domain is significantly insufficient. Furthermore, there is insufficient comprehension of how individual ambidexterity influences the total ambidexterity of the organization (Joseph et al., 2023). Ambidexterity represents a burgeoning field of inquiry within management sciences. It can be characterized as an

organization's capacity to adeptly integrate both exploitative and explorative activities. Exploitation enhances existing knowledge for improved efficiency and innovation, while exploration fosters experimentation and the discovery of new information to further innovation. Organizations require both exploitation and exploration, as reliance just on exploitation can result in a success trap, while an exclusive concentration on exploration may lead to a failure trap. The essence of ambidexterity lies in prioritizing both exploitation and exploration. Nonetheless, concurrently controlling these two facets poses a formidable challenge (Alam et al., 2023).

2.4 Artificial Intelligence

Artificial intelligence (AI) comprises information communication technologies that replicate human intelligence to enhance tasks, increase efficiency, and stimulate economic growth (Arakpogun et al., 2021). Knowledge is the essential element that facilitates AI advancements, enhancing the value of intelligent agents and systems (Robbins, 2019). The intelligent agents generated by AI activities possess several competencies essential for enhancing productivity and generating new knowledge in corporate processes. An AI-driven approach is a strategy that facilitates the accessibility of useful information for employees through technology-driven platforms. Moreover, AI possesses extensive capabilities in enhancing an organization's innovation strategies through strategic knowledge initiatives. This resurgence is propelled by research indicating that competitive advantages within industries are increasingly constrained and critical for growth (Liebowitz, 2006). However, intelligent automation requires a conducive intelligent systems environment to develop and address the prevailing difficulties within a business (Huang & Rust, 2018). Consequently, in the absence of a conducive environment, organizations encounter difficulties in the development and deployment of intelligent systems, as well as in the processes of distribution, retention, and knowledge re-utilization. In these conditions, techniques for information retrieval, dissemination, and reutilization are constrained and difficult to execute. Therefore, a supplementary strategy that integrates AI and knowledge-sharing tools with other organizational elements must be taken into account. The emphasis of this complimentary connection is on enhancing productivity by developing a knowledge-based system centered on the organization's workers (Malik et al., 2020).

2.5 Small Medium Enterprise Innovation

Economy of Pakistan has weakened due to lack of modern technology and innovation and carried out a study and investigated Entrepreneurship Posture and New-venture Performance in Pakistan. He assessed the effect on the performance of newly-established endeavors, of two major constructs: entrepreneurial predisposed Ness, including its dimensions of innovativeness, proactivity and risk taking, and entrepreneurial motivation. The results showed that proactivity and risk-taking have a substantial effect on new-venture performance, with innovativeness (Aslam et al., 2023). The study also brought to limelight that managers of new ventures with innovative mindset enjoy superior performance and tried to investigate the relationship of entrepreneurial leadership with organization demand for innovation. It also studied the moderator role played by employees' self-efficacy. By providing unbiased evidences, this research supported the entrepreneurial leaders and their firms who identify and generate more opportunities for their organizations and demand for innovation (Supeni et al., 2023). Organizations need to deal with challenges that lie ahead in the field of external competitiveness and survival as this is the era of innovation. The study also explored the effects of innovation on SMEs It concluded that there would be an increase in SMEs growth with innovation. Ultimately, there would be increase in the economic activities in the country. This research investigated the relationship between individual and collective entrepreneurship and their simultaneous impact on innovation in context of Small and Medium

Enterprises. The study concluded that both the individual entrepreneur as well as the collective efforts of the team contributes to innovation in Small and Medium Enterprises. Entrepreneur's personality traits have a direct positive impact on innovation whereas; the centralized decision-making impedes the innovation in an organization (Cotrino et al., 2020; Mittal et al., 2018). It is important to methodically manage errors as part of a firm's culture. Entrepreneur Leadership has a positive effect on manufacturing SMEs Innovation. It inspires the co-workers to have self-confidence in their creative skills and display innovation in their performance. Thus, Entrepreneur Leadership has a positive influence on the Employee Ambidexterity which successively has a positive effect on innovation of manufacturing Small and Medium Enterprises. Moreover, Entrepreneur leaders also encourage the employee's participation in decision making which consecutively stimulate an "Error Management Culture" that decentralizes decision making through delegation of authority and relaxes the bureaucratic procedures and rules, consequently boost firm performance. So it can be said that entrepreneur leadership has a positive effect on the error management culture and error management culture has a positive influence on innovation of manufacturing small and medium enterprises (Cotrino et al., 2020; Mittal et al., 2018).

2.6 Hypotheses Development

2.6.1 Entrepreneur Leadership impact on Small and Medium Enterprises Innovation

Entrepreneurial behaviors are extremely essential for various reasons. These behaviors promote innovation as well as adaptation to changing environments in any organization. For example, we may cite Apple which is considered as the most admired company at present. For that matter, business opportunities have to be seized constantly, by the companies even in less volatile industries so as to remain viable. This implies that the workforce at all levels of any organization has to remain abreast with entrepreneurial behaviors and attitudes. Entrepreneurs are more focused on helping their families and communities and adding value than offering products and gaining money. Although gaining profit is important, business owners often avoid thoughts of expanding the business because of profit and economic growth. Hence, entrepreneurial success including personal satisfaction gains more attention and leads to business sustainability. Entrepreneurial success from a micro-business perspective requires entrepreneurs with unique abilities and personality characteristics such as leadership capabilities, knowledge skills, entrepreneurial opportunity recognition innovation capability and technological abilities. The increased understanding has inspired business owners to design solutions to their stakeholder problems, changing them into sustainable leaders and establishing a sustainable business setting for their business. Leadership is a critical entrepreneurial skill for micro-business owners/managers, and it is considered vital in various EL-related factors, such as promoting innovation and adapting to environmental changes. Entrepreneurial leadership focuses more on personal traits like vision, problem-solving, and decision-making (Taleb et al., 2023). EL developed through literature on entrepreneurship and leadership to include scenario enactment and cast enactment. Five roles are highlighted by EL; namely, framing the challenge, absorbing uncertainty, underwriting, building commitment, and defining gravity. The key traits of an entrepreneurial leader include the capacity for identifying and seizing business opportunities, active coordination and planning, and a focus on adaptable and creative solutions (Hoang et al., 2023). When faced with challenges, EL calls for flexibility, prompt responses, swift and adaptable problem-solving, and decisive action. It necessitates having a strong entrepreneurial and strategic mindset and unavoidably involves taking risks. Further, a successful entrepreneurial leader can provide key resources and information to gain the trust of crucial stakeholders, enabling sustainable business. EL is still crucial because micro-entrepreneurs might not be able to grow their businesses without exhibiting strong

leadership traits. Although EL has a significant effect on ES, business performance, growth, and business sustainability further investigation on the link between EL and ES is still needed (Srimulyani et al., 2023).

H1: *Entrepreneur Leadership has a positive impact on small and medium enterprises innovation.*

2.6.2 Entrepreneur leadership impact on Employee Ambidexterity

Entrepreneurial leaders are required in any organization which aims to achieve innovation and creativity. They also need to support their co-workers in so as to enable them to explore new opportunities and thus benefit the organization. It can therefore, be argued that such entrepreneurial leaders inspire their co-workers to have self-confidence in their abilities and creativity. The Entrepreneur Leadership in an organization fosters and encourages employee's participation in decision making and enhances employee ambidexterity. In turn an employee with higher ambidexterity level will focus towards achievement of organizational goal. If employee ambidexterity is higher, the organization is likely to achieve its goals. The top leader's ability to balance dual modes of learning, balancing dualities and paradoxes of change and stability, control and flexibility and local and global pressures by adopting an ambidextrous leadership style (Probst et al., 2011; Heavey et al., 2015; Zacher and Rosing, 2015) has been noted as a critical approach in creating an ambidextrous context (Chang et al., 2022; Cunha et al., 2019; Malik et al., 2017, 2019). In a resource-constrained and emerging market context, an ambidextrous leadership style is critical in balancing the tensions that dualities present and achieving OA. Finally, the HRM function should promote and enable ambidextrous leadership at a practice and process level by implementing human resource planning, performance management systems, rewards and learning and development practices. The relationship between ambidextrous leadership and organizational innovation has been studied (Jia et al., 2022). Ambidextrous leadership has positively affected ambidextrous innovation (Berraies and Zine El Abidine, 2019). The relationship between ambidextrous leadership and organizational innovation has been studied (Jia et al., 2022). Ambidextrous leadership has positively affected ambidextrous innovation (Berraies and Zine El Abidine, 2019). Leadership scholars focusing on ambidextrous leadership (e.g. Rosing et al., 2010, 2011), especially in SMEs (Chen and Liu, 2020; Oluwafemi et al., 2019; Soto-Acosta et al., 2018) note two critical sets of leadership behaviours: opening and closing behaviours. Similarly, using the two learning routines of exploration and exploitation, Mu et al. (2020) further developed a typology of individual-level ambidexterity relevant to the SME contexts. Ambidextrous behaviours, identified by (Oluwafemi et al., 2019) were further linked to the exploratory and exploitative learning modes to achieve OA and deliver innovative outcomes in SMEs. The authors further suggest that the presence of the above leadership behaviours had a positive impact on employee ambidexterity for engaging in exploratory and exploitative innovative behaviours; the presence of an adaptive and flexible leadership style was further found to mediate the relationship between ambidextrous leadership and employee ambidexterity (Oluwafemi et al., 2019).

H2: *Entrepreneur Leadership has a positive significant impact on Employee Ambidexterity contributive towards Small and Medium Enterprises Innovation.*

2.6.3 Entrepreneur Leadership impact on Artificial Intelligence

Companies are pushing digital transformation strategies based on implementing AI to support digital innovation (Kim et al., 2022). Notably, companies' digital transformation through

AI has become increasingly vital in the manufacturing industry because its implementation boosts productivity and enhances firm performance (Ahmad et al., 2022). The implementation of AI technologies has allowed manufacturing companies to achieve optimal operating conditions and promote efficient operation management processes (Ishfaq et al., 2023). Centrally, AI's rapid expansion is having a transformational impact on businesses by shaping companies' business models and core processes to strengthen competitiveness (Brynjolfsson & Mcafee, 2017). Notably, AI implementation has brought awareness and understanding of the digitalization of operations management while allowing the identification of challenges and opportunities for businesses (Mypati et al., 2023). Through key components, the data pipeline, and the use of algorithms, experimentation platforms, and infrastructure (Iansiti & Lakhani, 2020), AI's capacity to accomplish highly complex tasks opens up a wide range of applications and future prospects for the manufacturing industry (Frank et al., 2019).

Companies are increasingly identifying the different possibilities that arise from implementing AI through the development and functioning of manufacturing processes in different ways. To illustrate, (Demlehner et al., 2021) explored how AI enhances car manufacturing through the assessment and identification of general use cases classified in two dimensions: estimated business value and realizability. Their study has raised the call for an exploration of the literature on AI behavioral, managerial, and organizational challenges. According (Hradecky et al., 2022) explored the perceptions and organizational readiness to adopt AI in the exhibition sector of the events industry. By exploring the Technology Readiness Index and a framework composed of three dimensions notably, technology, organisation and environment the authors show that the European exhibition industry is configured as a slow AI adopter, inhibited by issues of data management, organizational technological practices, and financial resources (Ali et al., 2024).

H3: *Entrepreneur Leadership impact on artificial intelligence to contributive towards Small and Medium Enterprises Innovation.*

2.6.4 Entrepreneur Leadership impact on Small and medium Enterprises Innovation with mediating role Employee Ambidexterity

Although the idea of ambidextrous leadership has only just come into view recently, this concept has been vital in theory of leadership from the beginning (Rosing et al., 2011). It was stated by (Bass, 1990) that effective leaders should be able to adopt the necessary leadership behavior that is in accordance with the particular situation. A great leader can not only decide what type of leadership behavior is suitable for which situation, but it can also exhibit high amount of transformational and transactional behavior according to the situation (Luo et al., 2018). The term "ambidextrous leadership" implies that the leader is able to balance transformational and transactional leadership as the situation prevails (Mueller et al., 2020). An ambidextrous leader uses transformational leadership when he faces a dynamic environment and uses transactional leadership when he faces a stable environment. The traditional form of leadership is symbolized by transactional leadership (Lowe et al., 1996). It refers to the trade that takes place between leaders and followers whose purpose is to meet their self-interest (Bass, 1990). The focus of transactional leader is to maintain and ensure that day-to-day operations are performed as efficiently as possible. On the contrary, transformational leaders are imaginative and passionate; they function without considering their self-interest and perform to promote learning that is adaptive according to the need (Zuraik and Kelly, 2019). An ambidextrous leader is capable of switching between transformational and transactional leadership, as per the need and situation at hand (Zacher and Rosing, 2015). Different studies related to transactional and transformational styles of leadership

significantly relate to the concept of ambidexterity and innovation. The study by (Giltinane, 2013) can be taken as an example that highlighted the contingent relationship, combination and the use of various styles of leadership that can be utilized as a possible method by the leaders in their organizations to become ambidextrous. This also raises the question for various leaders that is associated with how they can evaluate, outline and contrast transactional and transformational styles of leadership in such a way that enables them to implement the concepts and important principles of ambidextrous leadership (Khairuddin et al., 2021).

Ambidextrous leadership has three features: opening leadership practices, and closing leadership practices and (3) having a versatile feature that can select the best among the two as needed by the circumstance (Liu et al., 2019). In particular, activities that energize changeability in project worker behaviors for motivating exploration have been suggested by opening leadership practices that could incorporate empowering autonomous reasoning, scanning for elective techniques or systems, and offering help to test status quo (Harmaakorpi et al., 2017; Rhee et al., 2017).

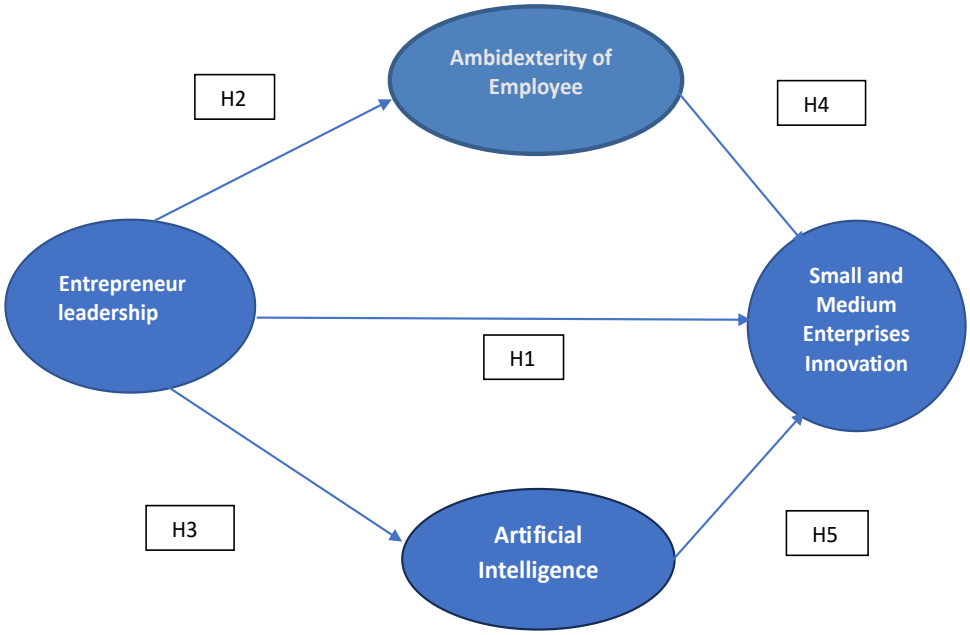
H4: *Entrepreneur Leadership impact on Small and Medium Enterprises Innovation with mediating role of Employee Ambidexterity.*

2.6.5 Entrepreneur Leadership impact on Small and Medium Enterprises Innovation with mediating role of Artificial intelligence.

With the increasing recognition and pursuit of AI implementation by SMEs, the issue associated with the impact of varying company sizes becomes more apparent. The existing insights and experiences predominantly focus on large enterprises (Upadhyay et al., 2023). However, their applicability to SMEs is largely limited. The varying starting conditions of the different company sizes have a particularly substantial impact, especially when it comes to the implementation of AI. These differences include, for example, the financial capabilities of a company, the availability of data, or the desired complexity of an AI application (Agerri et al., 2014; Jain et al. 2021). Hence considering AI publications based on enterprise size provides a distinct advantage and therefore it is crucial to illustrate AI as closely aligned with a company's specific circumstances (Bauer et al. 2020; Hansen and Bøgh 2021). Besides the importance of the distinction according to enterprise size has already been highlighted in reviews on other new technologies (Cotrino et al., 2020; Mittal et al. 2018). This is because information asymmetry enables more transparent communication of value propositions and simplifies comprehending the product or service offered. In light of this, using technology may be the most effective means of enhancing the connection between frugal innovation and the accomplishment of internationalization goals (Alayo et al., 2021, Mikalef et al., 2019). Consequently, family-owned SMEs use the capabilities of artificial intelligence and big data, which gives them an advantage when they possess more or better information than their competitors operating in the MENA region including UAE and Qatar (Hossain, 2022, Reypens et al., 2021).

H5: *Entrepreneur Leadership impact on Small and Medium Enterprises Innovation with mediating role of Artificial intelligence.*

2.7 Research Model



3. Methodology

Deductive approach using post-positivist paradigm have been adopted in the research. Data have been collected through a quantitative survey method, obtaining cross sectional data from industry. The unit of analysis is employees in the mid-level managerial roles (Nasri, 2023). We selected managers for our sample because they are potential entrepreneurs, ready to rise in their profession. This research was used the survey method to collect the data from 168 managerial level employees (Sunder et al., 2012). SPSS have been used for data analysis This research sample size for the given population of the study that comes out to be as 694 is 375. However, having adopted post-positivist approach the 380 major registered Small and Medium Enterprises were approached from major industrial cities of Pakistan using simple random technique after exploring directories of Chambers of Commerce of Pakistan, Engineering Goods of exporters and Industrial source book of Pakistan. Moreover, it was also kept in mind that Normality of the data and the method used for estimation also influences the size of sample and who further suggested that 10 responses against each parameter are valid. Likewise, this was also supported by who argued that in order to determine the minimum sample size, 5 responses against each parameter are sufficient (Saxena, 2023).

A questionnaire for the study was adopted from the previous studies containing 36 questions to be answered, designed to assess the aspects contributing towards fostering innovation in manufacturing SMEs. To measure Small and Medium Enterprises Innovation, we applied concept adopted from (Khana, 2019) The scale for entrepreneurial Entrepreneur Leadership was adopted from (Carsrud, 2013) Employee Ambidexterity was measured by widely using six-item questionnaire of (Hage and Aiken, 2016) and for measuring Error Management Culture in the organization, we adopted the seventeen -item scale developed by (Dyck, 2005) All the constructs' items have been measured by seven-point Likert scales, ranging from strongly disagree to strongly agree.

The questionnaire was designed and sent to respondents via email, messages, media groups, an online link to fill the form online as well as hard copy was posted to some respondents. A link in the email was provided following this link one could reach the shared link where the respondent was able to fill the form using his computer, at the end of the form; the respondent was able to submit the response promptly. A total of 168 responses were collected, which showed a response rate of 45% of the sample size. This response rate was considered as a good response rate as the previous such studies had observed a response rate in the margin of 40% or above. A well formulated method of delivery of research questionnaire with a rigorous campaign of follow-ups and contacting the respondents was helpful in generating better response rate. Follow-up calls and emails to organizations which failed to respond were able to respond after these follow-ups. Some organizations did not respond despite a number of follow-ups attempted, it was believed that the confidentiality issues were adequately considered and removed from the questionnaire with no personal or organizational data being collected which could lead to the identification of an individual or an organization what so ever (Beauvais et al., 2023).

3.1 Data Collection and Analysis

To analysis data obtained from survey, descriptive and inferential approach was selected, the main aim was to investigate the role of entrepreneur leadership on innovation of manufacturing Small and Medium Enterprises coupled with degree of employee ambidexterity and effect of error management culture. The objective behind use of descriptive analysis was to present a complete picture of collected data (Nneoma et al., 2023).

Inferential analysis is helpful in providing an idea of possible outcomes of statistical tests and makes deductions from collected data (Gallagher, 2009). The quantitative data collected in this study was analyzed using Statistical Software SPSS-24 by IBM (George et al., 2019). The software is used to convert data in to evidence and to quantify it so, as to approve or reject the hypothesis. First of all, the data has been checked for its reliability, authenticity and genuineness. Thereafter, the tests to analyze the obtained data, which are being considered for this study, consisted of descriptive analysis, construct reliability, correlation, and regression. The main resolve behind selection of these data analysis techniques is to test the hypothesis and assumptions of the study, presented in the beginning of this report. Various analysis tests of the survey data were run through statistic software to test reliability and consistency of survey data and test the hypothesis of the study (Gallagher, 2009).

4. Results

This research primarily aims to provide quantitative analysis, encompassing demographic findings and correlation analysis of the variables utilized in the study. The initial section of the report presents a quantitative analysis of the dataset containing the demographic variables (De Coster and Claypool, 2004). This investigation employed the partial least squares structural equation modelling (SEM) methodology to examine the hypotheses, utilizing the Smart-PLS software. Numerous scholars value the SEM methodology for its capacity to estimate complex models including multiple constructs, indicator variables, and structural pathways without necessitating distributional assumptions regarding the data (Hinton et al., 2014). In analysis, this is particularly crucial, as the loadings determine the relative significance of the indicators in forming the optimal order assembly (Wang et al., 2021).

4.1 Reliability Measurement

Table 1: Reliability and Convergent Validity

Variable	Cronbach Alpha	rho_A	CR	AVE
Entrepreneur Leadership	0.84	0.85	0.90	0.75
Small and medium enterprises innovation	0.85	0.82	0.88	0.80
Artificial intelligence	0.91	0.81	0.89	0.84
Employee Ambidexterity	0.83	0.75	0.90	0.80

Note. CR = Composite Reliability; AVE = Average Variance Extracted.

The evaluation of internal consistency involves the application of Cronbach's alpha alongside measures of convergent validity, including composite reliability and average variance extracted. Cronbach's alpha was employed to assess the internal consistency and reliability of the measuring items, revealing that all variables exhibited values exceeding 0.70 (Kimberlin & Winterstein, 2008). Convergent validity was evaluated by assessing composite reliability and calculating the average variance extracted. Composite reliability is a metric ranging from 0 to 1, with values exceeding 0.70 deemed acceptable. The composite reliability values for all constructs, ranging from 0.92 to 0.92, are considered satisfactory. The recorded AVE values ranged from 0.59 to 0.80, indicating that they are within an acceptable range. CR and AVE collectively validated the convergent validity of the measures. The assessment of the measurement model is presented in Table 1, utilizing Cronbach's alpha, composite reliability (CR), and average variance extracted.

4.2 Discriminant Validity

Table 2: Discriminant Validity

Variable	EL	SMEI	AI	EA
Entrepreneur Leadership	0.85	--	--	--
Small and medium enterprises innovation	0.55	0.83	--	--
Artificial intelligence	0.64	0.47	0.88	--
Employee Ambidexterity	0.47	0.04	0.497	0.71

Note. AI = Artificial Intelligence; SMEs = Small and medium enterprises; EL = Entrepreneur Leadership; EA = Employee Ambidexterity:

These methods can also assess discriminant validity. Moreover, the assessment of item loading was conducted, characterizing the concept's "discriminant validity" as its degree of empirical differentiation from other constructs within the structural model (Cheung et al., 2024). To facilitate a comprehensive evaluation of all structural model components, it is imperative to compare the squared inter-construct correlation of each construct with its extracted average variance (AVE). Table 2 delineates the correlations and square-rooted Average Variance Extracted (AVEs) for each construct, with values of 0.85 for AI, 0.55 for CE, 0.64 for OP, and 0.47 for CMCS. The observation of all square-rooted Average Variance Extracted (AVE) values at substantial distances from the diagonal correlation values indicates robust discriminant validity.

4.3 Correlation

It was suggested by (Hair et al., 2019) that the ratio of correlations may be used as an additional way for testing discriminant validity. This would be in addition to the AVE-based approach that was described earlier. This criterion includes the computation of bootstrapping confidence intervals with resamples as part of its scope

Table 3: Correlation Analysis

Variables	EL	SMEI	AI	EA
Entrepreneur Leadership	1	0.520**	0.290**	0.209**
Small and medium enterprises innovation	--	1	0.446**	0.285**
Artificial intelligence	--	--	1	0.393**
Employee Ambidexterity	--	--	--	1

Note. AI = Artificial Intelligence; SMEs = Small and medium enterprises; EL = Entrepreneur Leadership; EA = Employee Ambidexterity:

The results presented in Table 3 demonstrate a robust correlation between Entrepreneur Leadership, artificial intelligence, small and medium enterprises innovation, Employee Ambidexterity, with values of 0.520**, 0.290**, and 0.393**. Similarly, we establish discriminant validity when the shared variance of one construct surpasses the share variance of all other constructs. Additionally, there is a significant relationship between Entrepreneur Leadership, artificial intelligence, small and medium enterprises innovation, Employee Ambidexterity, as evidenced by the values of 0.446**, 0.285**, and 0.393**. The correlation between all the variables shows significant positive impacts.

Table 4: Variance Inflation Factor (VIF)

Variable	EL	SMEI	AI	EA
Entrepreneur Leadership	1.00	0.87	1.24	1.00
Small and medium enterprises innovation	1.00	0.77	1.01	1.00
Artificial intelligence	0.70	0.82	-0.10	0.76
Employee Ambidexterity	0.81	0.67	1.29	1.00

Note. AI = Artificial Intelligence; SMEs = Small and medium enterprises; EL = Entrepreneur Leadership; EA = Employee Ambidexterity:

The variance inflation factor (VIF) is a widely used statistic to determine the collinearity of formative indicators. A VIF score of five or higher indicates significant issues with collinearity among the indicators of the formatively measured variables, and all variables have a significant impact on each other and values are under the indicates (Kimberlin & Winterstein, 2008). The author (Becker et al., 2015) asserts that collinearity concerns can arise even at lower VIF levels of 3. This means that the VIF ratings should be at least three. Collinearity was not a concern as all observed VIFs were below 3. Therefore, we calculated and reported the variance inflation factor (VIF) in Table 4.

4.4 Structural Model Hypotheses Tested

Table 5: Path Coefficients and Hypotheses Tested

Paths	Hypotheses	Standard Beta	T Statistics	Coefficient	P Values	Decision
EL -> SMEI	H1	0.38	8.50	.491	0.001	Supported
EL -> EA	H2	-0.07	1.38	.464	0.170	Not supported
EL -> AI	H3	0.29	5.98	.450	0.010	Supported
AI x EL ->SMEI	H4	-0.10	3.67	.359	0.012	Supported
AI -> EA -> EL	H5	0.11	4.66	.399	0.011	Supported

Note. **p < 0.05; ***p <0.001; Note. AI = Artificial Intelligence; SMEs = Small and medium enterprises; EL = Entrepreneur Leadership; EA = Employee Ambidexterity:

Regarding hypothesis testing, H1 proposed that Entrepreneur Leadership has a positive impact on small and medium enterprises innovation. The results show that artificial intelligence on cost efficiency had a significant impact (t = 8.50, p <.001), supporting H1 Contrary to our expectations, the results did not support H2 proposal of Entrepreneur Leadership has a positive significant impact on Employee Ambidexterity contributive towards Small and Medium Enterprises Innovation (t = 1.38, p =.170), as Pakistani transformational sector organizations are currently not prepared to implement and adopt artificial intelligence, despite the recorded influences. H3 proposed Entrepreneur Leadership impact on artificial intelligence to contributive towards Small and Medium Enterprises Innovation. This hypothesis was also supported (t = 5.98, p <.001). In terms of (H4 Entrepreneur Leadership impact on Small and Medium Enterprises Innovation with mediating role of Employee Ambidexterity is strong; it was discovered that (t = 5.90, p<.000) and there was a strong correlation and a noticeable effect. The hypothesis (H5) says that artificial intelligence affects how well an organization does its job and how well its cost management control systems work together. The relationship gets stronger when artificial intelligence is high, and it was also significant (t = 2.40, p<.05). Entrepreneur Leadership impact on Small and Medium Enterprises Innovation with mediating role of Artificial intelligence were also supported by the data analysis (t = 4.66, p<.000). Contrary to expectations, data analysis supported the mediation effect of artificial intelligence and Employee Ambidexterity (t = 1.31, p =.001).

Table 6: Measurement Scale Appendix A

Variable Items	EL	SMEI	EA	AI
EL1	0.86			
EL2	0.85			
EL3	0.79			
EL4	0.70			
EL5	0.78			
EL6	0.80			
EL7	0.82			
EL8	0.78			
EL9	0.86			
EL10	0.75			
EL11	0.90			
EL12	0.78			
EL13	0.81			
EL14	0.78			
SMEI1		0.89		
SMEI2		0.86		
SMEI3		0.76		
SMEI4		0.83		
SMEI5		0.73		
SMEI6		0.78		
SMEI7		0.76		
SMEI8		0.77		
EA1			0.84	
EA2			0.82	
EA3			0.85	
EA4			0.81	

EA5	0.82	
EA6	0.68	
EA7	0.67	
AI1		0.83
AI2		0.81
AI3		0.86
AI4		0.89
AI5		0.88
AI6		0.77
AI7		0.89

Note. AI = Artificial Intelligence; SMEs = Small and medium enterprises; EL = Entrepreneur Leadership; EA = Employee Ambidexterity:

5. Discussion

After having gone through the research study, it is established that there is a substantial association between Entrepreneur Leadership and innovation in the manufacturing industry. This study established that an effective entrepreneur Leadership with abilities and proficiencies will lead to a higher innovation of SMEs. The result shows that there is a significant association between Employee Ambidexterity and innovation in Small and Medium Enterprises. In this research, application of Error management culture is found to have a positive significant relationship with Employee Ambidexterity and innovation in SMEs. The adoption of Error management culture will assist an organization in building Employee Ambidexterity which will facilitate innovation in SMEs. In conclusion, effective Entrepreneur Leadership, high employee ambidexterity and adoption of Error management culture do have a significant impact on the innovation of SMEs in Pakistan whereas the use of Entrepreneur Leadership has the strongest connection among the three variables in affecting the innovation in SMEs in the manufacturing industry in Pakistan. The first hypothesis of study that Entrepreneur Leadership has a positive result on innovation of manufacturing Small and Medium Enterprises (H1) was supported. Investigation also revealed that Entrepreneur Leadership has a positive impacted influence on The Employee Ambidexterity. (H2). Further, Significant positive relationship has been found between Employee Ambidexterity and innovation of manufacturing Small and Medium Enterprises thus H3 is supported. Significant positive impacted has also been found between Entrepreneur Leadership and artificial Intelligence thus H4 is supported. Lastly, significant association of Artificial intelligence in the relationship with innovation of manufacturing Small and Medium Enterprises (H5) supported.

Extensive studies have been conducted in developed countries about the small businesses however; this is not the case in the developing countries. The focus of this paper is Small and Medium Enterprises sector of Pakistan in particular as there exists knowledge gap in this regard. Hence, this study is an attempt to fill this void. This study brought to limelight the hiccups faced by Small and Medium Enterprises sector in Pakistan. Additionally, the study also highlights that the artificial intelligence facilitated employees' ability to simultaneously contribute to the present and future competitive advantage of their organizations. This in turn enables them to find better ways of discharging their duties in individual capacity and an organization will have to create a culture which encourages learning as well as knowledge sharing to achieve explorative and exploitative activities within a business unit. Leadership grooming and training at every tier should be focused on error management so that the SMEs continue to learn from mistakes without making these impediments in their growth. Leaders need to be convinced that error management would in fact encourage their employees to think innovatively without fearing the possibility of failure. Provision of an environment of error management must be added to the list of critical success

factors for the Organization such as freedom & encouragement of employees for new ideas generation to enhance firm innovative behavior, proactive performance and risk-taking attitude. Concluding that there is a great need to give error management culture a top position in an organization. To summarize, technological advancement is considered the key to the success of any organization in 21st century. Therefore, new technology should be encouraged in the manufacturing sector. This will help in improving productivity and technical efficiency in the industrial units at the domestic level will contribute towards the economy of the country. The recommendations above will serve as guidelines not only for the government, regulatory authorities and official setups but also for the educational and professional institutions sponsoring the cause of SMEs in any capacity in Pakistan.

5.1 Conclusion

This research takes into consideration those small business managers who are eager to encourage entrepreneurship at every level in their business setup and incumbents who are trying to re-establish themselves through entrepreneurial initiatives in the fast-growing business market. Based on the outcomes, effective Entrepreneur Leadership, appropriate employee ambidexterity and application of error management culture are significantly related to the innovation in the SMEs. The constructs that have strongest positive association with innovation in the SMEs are the effective Entrepreneur Leadership, adoption of error management culture followed by high employee ambidexterity.

5.2 Research Finding

Findings propose that organizational Innovation floods when businesses promote an Entrepreneur Leadership. The research revealed that Entrepreneur Leadership in business has a positive relationship with the Innovation of the firm, directly and through Employee ambidexterity. Moreover, Entrepreneur Leadership has a positive effect on error management culture which has a positive influence on the success of a firm in terms of innovation which is desired to increase exports which consequently boosts the economy of the country. The findings of study were just acquired for manufacturing sector only. Therefore, more effort should be dedicated to study the factors affecting the innovation in SMEs in Pakistan for different sectors. The study used three precise independent variables only. Future researchers can increase the independent variables or add moderating variables to the study to augment the outcomes. In further studies researchers can develop their researches by including trading and servicing sector that could improve the diversity of perceptions. It nevertheless, highlighted all types of firms. However, all Small and Medium Enterprises could not be covered in this study. In spite of the shortcomings, the research makes important contribution to the store of knowledge in the Small and Medium Enterprises sector. For studies in future, it is recommended that while measuring success or failure of small businesses researchers should also compare SMEs sector situation with other evolving countries taking into account their economic situation.

5.3 Recommendation

Because of the positive impact of entrepreneur leadership on innovation of manufacturing Small and Medium Enterprises, it is proposed that frequent leadership seminars may be held in universities and other educational institutions focusing specially on developing innovative thinking. Public sector entities like SMEs may also be tasked by the government to conduct such training for incumbent, especially in the less educated segment, which forms part of our SMEs. SMEs should start adopting the unique style of entrepreneurial leadership in all managerial levels as an integral part of their business systems to influence the performance of the employee in such a

manner so as to achieve the organizational goals and to aspire for innovation and creativity. Entrepreneur leadership should be seen as a critical part of organization's core activities to make sense. Employee ambidexterity has also been shown to improve with entrepreneur leadership. It has further shown a positive relationship with innovation. Hence current and future leadership may focus their attention towards empowering their employees in respective domains. This would enhance their confidence level and ultimately benefit the organization as their ambidexterity will provide innovative ideas for manufacturing and growth.

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