Asian Social Science; Vol. 20, No. 5; 2024
ISSN 1911-2017 E-ISSN 1911-2025
Published by Canadian Center of Science and Education

Proposed Study on the Existing Body of Literature on Innovation Performance in China's High-Tech SMEs

Xing Yang[1], Yeoh Khar Kheng[1] & Abdul Rahman Jaafar[1]

[1] School of Business Management, Universiti Utara Malaysia, Malaysia

Correspondence: Yeoh Khar Kheng, Senior Lecturer, School of Business Management, University Utara, Malaysia, 06010 Sintok, Kedah, Malaysia. E-mail: kharkheng@uum.edu.my

Received: July 21, 2024 Accepted: September 7, 2024 Online Published: October 1, 2024

doi:10.5539/ass.v20n5p14 URL: https://doi.org/10.5539/ass.v20n5p14

Abstract

This study investigates the intricate relationship between top management capability, relational capability, technological capability, learning capability, innovation strategy, and innovation performance within the context of high-technology Small and Medium Enterprises (SMEs) in China. Through a synthesis of the Resource-Based View and Dynamic Capability Theory, this research delves into how these diverse capabilities intersect to shape innovation outcomes in a rapidly evolving market landscape. Drawing upon empirical data collected from a comprehensive sample of high-tech SMEs operating across various industries in China, this study examines how top management capability influences the firm's strategic direction and innovation agenda. Furthermore, the research explores the role of relational capability in fostering collaborative relationships with stakeholders, such as customers, suppliers, and partners, to access valuable resources and knowledge for innovation initiatives. Moreover, the study investigates how technological capability enables firms to harness advanced technologies and expertise to drive innovation, while learning capability facilitates the absorption, assimilation, and application of new knowledge and insights to fuel continuous innovation efforts. Through an analysis of innovation strategies adopted by high-tech SMEs and their alignment with dynamic capabilities, this research elucidates the mechanisms through which firms leverage their diverse capabilities to formulate and execute effective innovation strategies, ultimately impacting innovation performance. The findings contribute to both theoretical understanding and practical implications, providing insights for high-tech SMEs in China on how to develop and leverage dynamic capabilities across multiple dimensions to enhance innovation performance and achieve sustainable competitive advantage in today's dynamic business environment.

Keywords: Top management capability, relational capability, technological capability, and learning capability, innovation strategy, innovation performance, high-tech SMEs, China

1. Introduction

Many governments, including China, have implemented policies and incentives to support innovation. SMEs aligning their strategies with these policies can benefit from grants, subsidies, and other support mechanisms (Chinese Statistics Year Book, 2016). Innovation can lead to the development of sustainable and environmentally friendly products and practices (Rajapathirana & Hui, 2018). This aligns with the growing global emphasis on environmental responsibility and can enhance a company's reputation. Investors often seek opportunities in innovative and high-growth enterprises (Azar & Ciabuschi, 2017). SMEs focusing on innovation may find it easier to attract funding from venture capitalists, private equity, and government-backed initiatives. Innovation often thrives in collaborative environments. SMEs that actively participate in industry ecosystems, collaborations with research institutions, and partnerships with other businesses can amplify their innovative capabilities (Azar & Ciabuschi, 2017). As it works to build an environment that promotes their expansion, China aims to have more than 200,000 high-tech SMEs by the end of 2025 (Council on Foreign Relations, 2019). The goal of the government's ten-year Made in China 2025 strategy is to rapidly create ten high-tech industries to modernize China's industrial base. The top three of these include advanced robotics and artificial intelligence, next-generation IT and telecommunications, and electric cars and other alternative energy vehicles, according to the Council on Foreign Relations (2019). According to the Council on Foreign Relations (2019), further significant industries include high-tech maritime engineering, advanced electrical equipment, novel synthetic materials, growing biomedicine, high-end rail infrastructure, and agricultural technology. The incorporation of

emerging technologies such as cloud computing and big data into international manufacturing supply networks is known as the "fourth industrial revolution," and these industries play a crucial role in it (Council on Foreign Relations, 2019).

However, over the past 20 years, as strategic importance has grown, firms' innovation toolkits have significantly expanded to include cutting-edge concepts like open innovation and design thinking (Ma, Guo, Shen, 2019; Fernandes, Ferreira, & Peris-Ortiz, 2019). This has opened new opportunities for firms to elevate their level of innovation (Leavy, 2019) and outrival their competitor (Chen & Kitsis, 2017). According to Expósito, Fernández-Serrano, & Liñán (2019), innovation in this scenario offers SMEs entrepreneurs a chance to enhance their performance in the Schumpeterian logic and market position. Therefore, innovation is currently one of the most popular management buzzwords in both public and commercial enterprises. However, corporate organizations need to have an effective innovation strategy to innovate effectively (Kafetzopoulos & Skalkos, 2019; Ma et al., 2019). Thus, in this fiercely competitive globalized world, China's high-tech SMEs have a chance to enhance their innovation performance and competitive position by implementing an efficient innovation strategy (Oliva et al., 2019). Thus, to improve company performance, the firm's critical ability to strategically integrate its operational resources and capabilities with business processes has been identified as entrepreneurial core capabilities and managerial dynamic capabilities (Guo et al., 2019). Because of this, capabilities—as opposed to regular physical resources—indicate a company's ability to use its resources and maximize its potential to improve company performance (Lu, 2020; Guo, 2019; Guo et al., 2019; Ma et al., 2019; Acar & Zehir, 2009). This study operationalizes entrepreneurial core competencies as encompassing (i) top management competence (TMC) and (ii) relational capability (RC), based on the challenges presented impacting the performance of China high technology SMEs and the existing literature. As for managerial dynamic capabilities, it encompasses (i) technological capability (TC) and learning capability (LC). Both 2 constructs (which consists of total four variables) as pivotal capabilities to influence the innovation strategy, that in turn affect the innovation performance of high-tech SMEs in China.

2. Problem Statement

China's SMEs are essential to innovation and economic success in the fast-paced global high-tech sector. The success of these enterprises heavily relies on their ability to formulate and execute effective innovation strategies. The organizational qualities that are ingrained in the organization capability in domain like top management, relational, technological, and learning, are among the primary factors that determine the success of innovation. It is crucial to comprehend the complex interactions between these capacities to promote innovation high-tech SMEs in China. SMEs in China’s high-tech realm operate in a competitive environment characterized by rapid technological advancements, global market integration, and a constant need for innovation. Despite their significance, many SMEs face challenges in navigating this complex landscape and leveraging their capabilities to drive innovation effectively. a large body of empirical research has connected the ideas of entrepreneurial core capabilities (top management capability, relational capability) and managerial dynamic capabilities (technological capability, and learning capability) with firm performance in multiple settings and contexts. But many studies were concentrated in firm’s performance and not firm’s innovation performance, as well as in Small & Medium Enterprises setting, not high-technology SME; notably in China context. Moreover, this study bundles a suite of four concepts (TMC, RC, TC & LC) in a coherent manner to explicate the nuanced meaning of entrepreneurial core capabilities and managerial dynamic capabilities. In addition, the past studies on innovation strategy had always positioned it as either independent variable or dependent, but in this study, the researcher pivoted it as mediator, which is the theoretical contribution of this study.

3. Research Objectives

The purpose of this study is to investigate how China's high-tech SMEs' innovation performance is influenced by the entrepreneurial core capabilities (top management capability & relational capability) and managerial dynamic capabilities (technological capability & learning capability). Furthermore, the goal of this study is to examine how innovation strategy functions as a mediator between the performance of innovations and the strategic abilities of top management, relationships, technology, and learning. In sum, the subsequent section of the systematic literature review will guide the formation of the research framework for future study.

4. Literature Review

4.1 Relationship Between Top Management Capability (TMC), Relational Capability (RC), Technological Capability (TC), And Learning Capability (LC)& The Innovation Performance

All types of businesses need effective management (Burgoyne, Hirsh & Williams, 2004). With most SMEs, though, it is challenging to establish a significant division of labor and specialized networking until a certain

scale is reached. As a result, management of SMEs has become deeply involved in their work, making it difficult for them to take advantage of commercial prospects (Arnold & Thuriaux, 1997). In this dynamic economic environment, companies with managers who have cultivated a proactive, risk-taking approach to engaging in creative activities will have an advantage over their competitors (Davis et al., 2010). The relationships between TMC and business firm performance have been the subject of numerous studies. Wang & Dass (2017) discovered that management innovation leadership has a beneficial impact on business financial performance in their longitudinal research of 335 US enterprises selected from standard and subpar databases. Hayton (2015) found that entrepreneurial spirit and top-level management leadership positively correlated with growth, productivity, and turnover of 2500 English SMEs in the UK. In 2015, Pufal, Zawislak, Reichert, and Alves conducted a survey of 1331 manufacturing companies in Brazil. The analysis' findings show that professional firms have a more developed set of managerial skills, which has a major impact on their success compared to family businesses. According to Shigang and Guozhi's (2016) empirical study on Chinese construction companies, management capability increases the firm's operating efficiency, which in turn improves financial performance. Thus, this study postulates that:

H_1: There is significant & positive relationship between top management capability and the innovation performance of China's high-tech SMEs.

Technological capability (TC) is essential for a company to be able to withstand market volatility and hostility. Manufacturing companies, on the other hand, should assess their current level of TC and upgrade to a higher level to improve overall performance and customer satisfaction. Those that have not implemented TC should think about doing so before an unfavorable event occurs (Ahmad, et al., 2014). Technological capability, then, is a crucial strategic capability that gives businesses a competitive edge in their respective industries (Chantanaphant, Nabi & Dornberger, 2013). Numerous research papers have examined the connection between SMEs enterprises' success and their technological capacity. For instance, Ahmad et al. (2014) argued that technological capability is a crucial tactic in both the production and operation sectors. According to Reichert and Zawislak (2014), firms in lower technological intensity industries performed above average despite investing below average in technological capability. In an Indian study, Batra, Sharma, Dixit, Vohra, and Gupta (2015) found that technology-driven companies (SMEs) can mitigate industry hostility by using technology as a tactical tool. Shan and Jolly (2013) studied Chinese businesses and discovered that various technological capacities—such as those related to production, linkage, and investment—have an impact on business performance via the mediation of product innovation. Many empirical studies that look at the relationship between SMEs enterprises' performance and their technology capabilities have found that technological capability has a big impact on how well a firm performs in terms of innovation. Thus, this study postulates that:

H_2: There is significant & positive relationship between the technological capability and the innovation performance of China's high-tech SMEs.

Atak (2011) defined learning capability as strategic resource that helps businesses outperform their rivals and effectively accomplish their goals. Learning improves SMEs' ability to recognize and address new market difficulties more rapidly and affordably than competitors, as Pucci, Nosi, and Zanni (2017) showed. Maroye et al., (2017) propounded that a company with great learning capabilities may identify, get, and integrate external knowledge with ease; it can also enhance its internal capabilities and outperform companies with lower learning capacities. Mallén, Chiva, Alegre, and Guinot (2015) found that learning capacity amplifies the impact of altruistic leadership behavior on the success of firms. Kaplan, Ogut, Mehmet, and Asli (2014) found a favorable correlation between learning and intra-firm information transfer and the financial success of SMEs. Hailekiros and Renyong (2016) established that learning capacity significantly improves a company's capacity for technological innovation as well as its overall performance. Ugurlu and Kurt (2016) found a strong positive correlation between company learning and the performance of Turkish manufacturing SMEs' product innovation. One of the firm VRIN resources, a firm's learning capability has been identified in the literature described above as a key factor in developing and maintaining competitiveness. Competitors find it extremely difficult to strategically develop the same useful resources due to the complicated structure of learning (Farrell, Oczkowski, & Kharabsheh, 2008). Huang & Wang (2011) concluded that a firm's learning capability helps its intelligence gather, disseminate, and circulate new knowledge in an efficient manner, enabling it to become a creative and market-oriented entity. As a result, this study hypothesizes that:

H_3: There is significant & positive relationship between learning capability and the innovation performance of China's high-tech SMEs.

Bastida, Marimon, & Tanganelli (2017) proposed that SMEs need to build strategies for both vertical and

horizontal relationships to increase their potential for innovation and performance enhancement. They proposed that for SMEs to increase performance, they must strategically interact with other partners to gain access to resources and knowledge. In a study on Chinese manufacturing companies, Yu & Huo (2018) discovered that relational competence has a substantial impact on the internal, customer, and supplier quality integration of the company, which significantly and favorably improves performance. Muange & Maru's (2015) concluded that technological cooperation, production, marketing, and supplier procurement have a major and favorable impact on a company's performance. Hietajärvi et al. (2017) established that firm's relational capability has the most influence over the course of the project life cycle. Similarly, the success of an Australian firm's connection portfolio was positively impacted by relational skill (Luvison & de Man, 2015). In their research on the Thai partnership project, Rungsithong et al. (2017) found a direct positive correlation between relational capability and operational performance. Similarly, relational competence has a large and favorable impact on the performance of third-party logistic providers, as demonstrated by Shou, Shao, and Chen (2017). Thus, this study postulates that:

H_4: There is significant and positive relationship between relational capability and the performance of China's high-tech SMEs

4.2 Relationship Between Top Management Capability, Relational Capability, Technological Capability, And Learning Capability and Innovation Strategy

Coordination of all firm stakeholders' efforts, integration of the operations of all specialized functional units, and application of knowledge domains are necessary for effective innovation (Bundy, 2002). This crucial role is entirely dependent on the competence of the upper echelons of management, who oversee developing and carrying out policies and strategies. Thus, the ability of the company's senior management to use imagination, innovation, and management skills to establish an organization that fosters and harnesses employee creativity to achieve its goals is essential (Minh et al., 2017). The ability of top management to recognize and seize opportunities and make decisions that influence the innovation process and improve a company's success is also crucial (Lewrick et al., 2011). Numerous studies have looked at the connection between innovative processes used by SMEs and top management skills. Farrokhian & Soleimani (2015) established that firm's innovation activities are significantly positively impacted by senior management participation and cooperation abilities. Minh et al. (2017) discovered that top management competencies have a beneficial impact on subordinate learning and innovativeness in their research of Vietnamese telecommunications enterprises. Ruizjiménez & Fuentes-Fuentes (2015) realized senior management competence significantly affects innovation in both processes and products. These beneficial connections, meanwhile, are only possible when there is a gender balance within the management group. Ahmed & Mohamed (2017) found that a firm's project success and efficiency are highly and favorably impacted by management's supportive capacity. As a result, the literature that is now in publication suggests that top management competence is crucial to a company's innovation efforts. Thus, this study hypothesizes that:

H_5: There is significant and positive association between top management capability and the innovation strategy of China's high-tech SMEs.

Innovation is not just about creating new information; it also has a wider context when it comes to research and development (R&D) and the commercialization of R&D results into valuable products to achieve economic goals. As a result, it calls for the advancement of technological capabilities (Fang et al., 2016). Therefore, in a dynamic context, technological aptitude is a vital driver of innovation (Park et al., 2019). The relationship between a firm's technological capabilities and innovation performance has been the subject of numerous empirical studies. Alvarez & Iske (2015) found that two significant elements impacting the product innovation of SMEs in the Netherlands are a firm's technological and marketing skills. In a study on Indian SMEs, Pednekar (2015) found that high-tech enterprises' value generation is significantly influenced by technology. Shan and Jolly (2013) discovered that a firm's capacity to innovate its products is significantly enhanced by a variety of technological innovation capabilities, including teamwork, investment, and manufacturing capabilities. Based on the extant literature, this study hypothesizes that:

H_6: There is significant and positive relationship between technological capability and the innovation strategy of China's high-tech SMEs.

The main problems with modern innovation theory are that firms rarely rely solely on their own internal resources for innovation; instead, they need outside expertise, technical solutions, equipment, and methodologies (Liao & Wu, 2010). According to Kheng, Mahmood, and Beris (2013), innovations in product, process, and administration currently are primarily the result of human creativity and the mind working with implicit

information rather than necessarily coming from R&D labs of businesses. Numerous research has been done to look at how learning affects a company's innovation efforts. According to Kiziloglu (2015), learning and innovation activities in businesses have a positive correlation. Similarly, Tohidi et al. (2012) found that learning capacity has a major and positive impact on the innovation process of Iranian ceramic tile companies. According to Fang et al. (2011), there is a positive and significant correlation between a firm's innovation and its learning. Furthermore, learning improves a firm's success in terms of innovation, as found by Karagouni and Papadopoulos (2007). In a similar vein, Serna et al. (2016) found that learning has a significant role in enhancing the performance and process of corporate innovation. Additionally, Mahmoud et al. (2016) found that education had a major influence on Ghana's banking industry's innovation. Learning capability thus becomes a prerequisite to improving firm's innovativeness and sustainable competitive advantage, as it is a culture carried out by learning business enterprises with the goal of fashioning and promoting a valued outcome by increasing employee's competence (Verma et al., 2014). Therefore, this study hypothesizes that:

H_7: There is significant and positive association between learning capability and the innovation strategy of China's high-tech SMEs.

For the innovation process to be successful, it usually needs technological cooperation from a variety of subsystems, suppliers, and users who can offer complementary resources, technologies, and information. All forms of innovation require collaboration to be successful (Makhdoom et al., 2019, Park et al., 2019). Building relationships with outside organizations is a crucial skill that helps innovation projects be completed successfully (Schilling & Phelps, 2007). By actively interacting with other organizations and hiring experts, successful SMEs can open the commercialization of their innovation process, which helps them overcome their weaknesses and carry out competitive innovation activities (Henttonen & Lehtimäki, 2017). Research has shown that while relationships with clients help to successfully offer incremental innovation, relationships with research institutions significantly lead to radical innovation (Caner & Tyler, 2013; Liyanage, 1995; Nieto & Santamaría, 2007). In the Italian economy, it was discovered that a firm's innovation performance and its technology strategy are mediated by its relationships with external partners (Aloini et al., 2015). Customer relational competence, according to Anning-Dorson et al. (2018), enables businesses to build significant customer participation. As a result, the businesses made use of the skills of their clients to increase the output of their innovation process, greatly improving their performance. Furthermore, the study conducted by Cheng, Chen, & Huang (2014) on Taiwanese enterprises showed that relational capacity improves the relational value base and innovation performance of manufacturing firms. Therefore, this study hypothesis that:

H_8: There is significant and positive relationship between relational capability and the innovation strategy of China's high-tech SMEs.

Leal-Rodríguez et al. (2015) propounded that innovation strategy helps businesses achieve a sustained competitive advantage and cope with a changing and chaotic environment. Innovation approach greatly and favorably improves the performance of Malaysian telecommunications companies (Taghizadeh et al., 2016). Taiwanese firms' performance is positively impacted by their innovation approach (Tsai et al., 2008). Turulja and Bajgoric (2019) have confirmed that improving a Bosnian firm's performance requires innovation in both processes and products. In France, innovation strategy significantly improves a company's operational performance and the integration of its suppliers (Duhaylongsod & De Giovanni, 2019). Therefore, to improve performance, SMEs must proactively take innovative risks. Therefore, this study hypothesizes that:

H_9: There is significant and positive relationship between innovation strategy and the innovation performance of China's high-tech SMEs

4.3 The Mediating Role of Innovation Strategy

Al-janabi (2016) concluded that small and medium-sized enterprises (SMEs) need to have an effective innovation strategy to survive in this competitive climate and quickly adapt to changes in market demand. The mediating function of innovation strategy has been validated by several research (Segarraciprés & Bou-llusar, 2018). Hemmati and Hosseini (2016), a company's innovation acts as a mediator in the relationship between knowledge management and performance. In addition, Obeidat's (2016) analysis confirmed that innovation mediates the relationship between a firm's performance and its strategic orientation to some extent. However, Arias Perez et al. (2015) discovered that product innovation played a partially mediating effect in the association between process innovation and firm performance. According to Leal-Rodríguez et al. (2015), innovation acts as a mediator between unlearning and the performance of all business types. Yusr (2016) has shown that innovation strategy is crucial for small and medium-sized enterprises (SMEs) functioning in this dynamic environment, where consumer needs and preferences change quickly, delivery times are short, technologies are changing

quickly, and product life cycles are shorter. Thus, SMEs need to create creative survival strategies to stay competitive in this harsh climate (Abdul Hamid & Tasmin, 2013, Ozkaya, 2011). Based on the above narration, this study hypothesized that:

H_9: Innovation strategy mediates the relationships between top management capability, relational capability, technological capability, and learning capability and the innovation performance of high-tech SMEs in China.

4.4 Underpinning Theories

The purpose of this study is to verify if the variables under investigation may enhance the performance of China's high-tech SMEs in the context of innovation performance. Due to their leading transitory nature in achieving a competitive firm's performance in a changing market environment, Resource-based view (RBV) and Dynamic Capability Theory (DCT) are deemed appropriate. This is in addition to the dynamic nature of today's operating business environment, where skills, capabilities, knowledge, and techniques frequently become obsolete (Barney, 1991; Teece et al., 1997). Because both theories emphasize the significance of a firm's capabilities in achieving and maintaining superior performance, this study uses the RBV and DCT to explain the relationship between China's high-tech SMEs' innovation strategy and innovation performance and the strategic capabilities of top management, relational, technological, and learning capabilities.

Foremost, Resource-Based View (RBV) is a theoretical framework that focuses on the internal resources and capabilities of firms as sources of competitive advantage and superior performance. It suggests that for a firm to achieve and sustain a competitive advantage, it must possess resources that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). This perspective is particularly relevant in the context of high-tech SMEs (Small and Medium Enterprises) in China due to several reasons. Firstly, high-tech industries operate in dynamic environments characterized by rapid technological advancements, changing market demands, and intense competition. In such environments, the traditional factors of production (land, labor, and capital) may not be sufficient to sustain a competitive advantage. Instead, firms need to continuously innovate and develop new capabilities to adapt to changing circumstances. The RBV provides a framework for understanding how firms can leverage their internal resources and capabilities to navigate these challenges effectively. Secondly, entrepreneurial core capability refers to the firm's ability to identify and exploit entrepreneurial opportunities. In the context of high-tech SMEs in China, where innovation and entrepreneurship are highly encouraged and supported by government policies, it is essential to understand how firms can develop and leverage their entrepreneurial core capabilities to gain a competitive edge. The RBV emphasizes the importance of unique, valuable resources and capabilities that enable firms to seize entrepreneurial opportunities and create value (Wernerfelt, 1995). Thirdly, dynamic managerial capability refers to the firm's ability to continuously adapt and renew its resource base in response to changing market conditions and competitive pressures. In the fast-paced and rapidly evolving high-tech industry in China, firms need to develop dynamic managerial capabilities to effectively manage their resources and respond to emerging opportunities and threats. The RBV provides insights into how firms can build and cultivate such capabilities by leveraging their existing resources and competencies while also developing new ones over time. Fourthly, innovation is a critical driver of competitive advantage and performance, especially in high-tech industries where technology and product innovation are key sources of differentiation (Barney, 1991). Understanding how firms can develop effective innovation strategies and enhance their innovation performance is essential for success in this context. The RBV offers a lens through which to examine how firms can leverage their unique resources and capabilities to drive innovation and achieve superior performance outcomes (Wernerfelt, 1984). Finally, China's high-tech SMEs operate in a unique institutional and market context characterized by rapid economic growth, government support for innovation and entrepreneurship, and increasing global integration. In this context, the RBV provides a valuable framework for understanding how firms can leverage their internal resources and capabilities to compete effectively in domestic and international markets while also navigating the unique challenges and opportunities present in the Chinese business environment (Halawi et al., 2005). In summary, the Resource-Based View offers a valuable theoretical foundation for studying entrepreneurial core capability, dynamic managerial capability, innovation strategy, and innovation performance in the context of China's high-tech SMEs. By focusing on the internal resources and capabilities of firms, the RBV provides insights into how firms can develop and leverage their unique strengths to achieve and sustain a competitive advantage in dynamic and highly competitive markets (Barney, 1991).

In addition, Dynamic Capability Theory (DCT) is a theoretical framework that focuses on a firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Eisenhardt & Martin, 2000; Teece, et al., 1997). It emphasizes the importance of organizational learning, flexibility, and adaptability in achieving and sustaining competitive advantage. In the context of China's high-tech SMEs, DCT offers several insights into the study of entrepreneurial core capability, dynamic

managerial capability, innovation strategy, and innovation performance. DCT suggests that entrepreneurial core capability is not static but rather a dynamic process of sensing and seizing opportunities, and then reconfiguring resources to exploit these opportunities. In the context of China's high-tech SMEs, which operate in a rapidly evolving market environment with abundant opportunities for innovation and growth, understanding how firms develop and leverage their entrepreneurial core capabilities is crucial (Eisenhardt & Martin, 2000). DCT helps to analyze how firms continuously scan their environment for opportunities, make strategic decisions to pursue promising avenues, and adapt their resources and capabilities to capitalize on these opportunities effectively. Dynamic managerial capability refers to a firm's ability to adapt its managerial processes and practices in response to changing market conditions and competitive pressures. In China's high-tech sector, where technological advancements and market dynamics evolve rapidly, firms need to constantly adjust their management practices to remain competitive. DCT provides insights into how firms can develop processes for knowledge creation, sharing, and integration, as well as mechanisms for decision-making and resource allocation that enable them to respond effectively to changing circumstances. Innovation is a key driver of competitive advantage and performance for high-tech SMEs in China. DCT emphasizes the importance of dynamic capabilities in fostering innovation by enabling firms to recognize emerging opportunities, mobilize resources, and reconfigure organizational processes to support innovation initiatives (Eisenhardt & Martin, 2000). In the context of China's high-tech SMEs, where innovation is increasingly seen as a strategic priority, DCT helps to understand how firms can develop innovation strategies that leverage their existing capabilities while also building new ones to stay ahead of the competition. China's high-tech SMEs operate in a unique context characterized by rapid technological change, intense competition, and government support for innovation and entrepreneurship. DCT provides a valuable lens through which to understand how firms in this context develop and leverage dynamic capabilities to navigate these challenges effectively. By focusing on the processes of sensing, seizing, and reconfiguring resources, DCT helps to explain how firms in China's high-tech sector adapt to changing market conditions, exploit emerging opportunities, and achieve superior innovation performance. In summary, Dynamic Capability Theory offers a valuable theoretical foundation for studying entrepreneurial core capability, dynamic managerial capability, innovation strategy, and innovation performance in the context of China's high-tech SMEs. By emphasizing the importance of organizational learning, flexibility, and adaptability, DCT provides insights into how firms develop and leverage dynamic capabilities to achieve and sustain competitive advantage in rapidly evolving markets (Eisenhardt & Martin, 2000).

4.5 Conclusion

This study has examined the multifaceted relationship between top management capability, relational capability, technological capability, learning capability, innovation strategy, and innovation performance among high-technology Small and Medium Enterprises (SMEs) in China. By integrating insights from the Resource-Based View (RBV) and Dynamic Capability Theory (DCT), we have gained a deeper understanding of how these capabilities interact to shape innovation outcomes in the dynamic landscape of China's high-tech sector. This study findings underscore the critical role of top management capability in setting strategic direction and fostering a culture of innovation within SMEs. Effective leadership is essential for aligning organizational goals with innovation strategies and driving implementation efforts. Furthermore, relational capability emerges as a key determinant of innovation success, highlighting the importance of building and nurturing collaborative relationships with stakeholders to access external knowledge, resources, and market opportunities. Moreover, technological capability plays a pivotal role in leveraging advanced technologies and expertise to drive innovation, while learning capability enables firms to continuously adapt and evolve in response to changing market dynamics and technological advancements. The alignment between innovation strategy and dynamic capabilities is crucial for achieving innovation performance. Firms that effectively leverage their internal resources and capabilities to formulate and execute innovation strategies are better positioned to achieve sustainable competitive advantage and superior performance in the high-tech sector. Overall, this study underscores the significance of a holistic approach to managing dynamic capabilities and innovation strategy in high-tech SMEs in China, providing valuable insights for both theoretical advancement and practical implications for firms seeking to enhance their innovation performance and competitiveness in today's dynamic business environment.

References

Abdul Hamid, N. Aa., & Tasmin, R. (2013). *The relationship of business innovation capabilities and technology innovation capabilities on SMEs organization performance: A conceptual framework.* In Proceedings The 2nd International Conference on Global Optimization and Its Applications 2013 (ICoGOIA2013) (2, 121-128).

Ahmad, N., Othman, S. N., & Mad Lazim, H. (2014). A review of technological capability and performance relationship in manufacturing companies. In *International Symposium on Technology Management and Emerging Technologies* (pp. 193-198). https://doi.org/10.1109/istmet.2014.6936505

Ahmed, R., & Mohamed, N. A. (2017). Development and validation of an instrument for multidimensional top management support. *International Journal of Productivity and Performance Management*, *66*(7), 873-895. https://doi.org/10.1108/ijppm-12-2015-0182

Al-janabi, A. R. A. (2016). *Entrepreneurial Orientation, Absorptive Capacity, Market Orientation and Technological Innovation Capabilities of SMEs in Kurdistan, Iraq.* https://doi.org/10.5539/ass.v11n5p219

Aloini, D., Pellegrini, L., Lazzarotti, V., & Manzini, R. (2015). Technological strategy, open innovation, and innovation performance: Evidences based on a structural-equation-model approach. *Measuring Business Excellence*, *19*(3), 22-41. https://doi.org/10.1108/MBE-04-2015-0018

Alvarez, H., & Iske, P. (2015). Internal capabilities and external knowledge sourcing for product innovation in LMT SMEs. *J. of Innovation Management*, *2*, 55-70. https://doi.org/10.24840/2183-0606_003.002_0007

Anning-Dorson, T., Hinson, R. E., Amidu, M., & Nyamekye, M. B. (2018). Enhancing service firm performance through customer involvement capability and innovativeness. *Management Research Review*, *41*(11), 1271-1289. https://doi.org/10.1108/MRR-07-2017-0207

Arias Perez, J., Durango Yepes, C. M., & Millan Lopez, N. T. (2015). *Process Innovation Capability and Innovation Performance: Mediating effect of product innovation capability* (Vol. 27).

Arnold, E., & Thuriaux, B. (1997). *Developing firm's technological capabilities.* Technopolis Ltd. Retrieved from http://technopolis.keymedia.info/resources/downloads/reports/094_Capabilities _970707.pdf

Atak, M. (2011). Research on the relation between organizational commitment and learning organization. *African Journal of Business Management*, *5*(14), 5612-5616.

Azar, G., & Ciabuschi, F. (2017). Organizational innovation, technological innovation, and export performance: The effects of innovation radicalness and extensiveness. *International Business Review, 26*(2), 324-336. https://doi.org/10.1016/j.ibusrev.2016.09.002

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99-120. https://doi.org/10.1177/014920639101700108

Bastida, R., Marimon, F., & Tanganelli, D. (2017). Alliance success factors and performance in social economy enterprises. *Management Decision*, *55*(5), 1065-1080. https://doi.org/10.1108/MD-12-2016-0881

Batra, S., Sharma, S., Dixit, M. R., Vohra, N., & Gupta, V. K. (2015). Performance implication of industry appropriability for manufacturing SMEs: The role of technology orientation. *Journal of Manufacturing Technology Management*, *26*(5), 660-677. https://doi.org/10.1108/JMTM-09-2013-0132

Bundy, W. (2002). *Innovation, Creativity, and Discovery in Modern Organizations.* Westport, CT: Quorum Books.

Burgoyne, J., Hirsh, W., & Williams, S. (2004). *The Development of Management and Leadership Capability and its Contribution to Performance: The evidence, the prospects, and the research need.*

Caner, T., & Tyler, B. B. (2013). Alliance portfolio R&D intensity and new product introduction. *American Journal of Business*, *28*(1), 38-63. https://doi.org/10.1108/19355181311314761

Chantanaphant, J., Nabi, M. N. U., & Dornberger, U. (2013). The effect of technological capability on the performance of SMEs in Thailand. *The Macrotheme Review*, *2*(4), 16-26.

Chen, I. J., & Kitsis, A. M. (2017). A research framework of sustainable supply chain management: The role of relational capabilities in driving performance. *The International Journal of Logistics Management*, *28*(4), 1454-1478. https://doi.org/10.1108/IJLM-11-2016-0265

Cheng, J. H., Chen, M. C., & Huang, C. M. (2014). Assessing inter-organizational innovation performance through relational governance and dynamic capabilities in supply chains. *Supply Chain Management*, *19*(2), 173-186. https://doi.org/10.1108/SCM-05-2013-0162

Chinese Statistics Year Book (2016). *National Bureau of Statistics of China*. Retrieved January 19, 2024, from http://www.stats.gov.cn/tjsj/ndsj/2011/indexeh.htm

Council on Foreign Relations (2019). *Is 'Made in China 2025' a Threat to Global Trade?* Retrieved January 18, 2024, from https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade

Davis, J. L., Bell, R. G., Payne, G. T., & Kreiser, P. M. (2010). Entrepreneurial orientation and firm performance: the moderating role of managerial power. *American Journal of Business*, *25*(2), 41-54. https://doi.org/10.1108/19355181201000009

Duhaylongsod, J. B., & De Giovanni, P. (2019). The impact of innovation strategies on the relationship between supplier integration and operational performance. *International Journal of Physical Distribution & Logistics Management*, *49*(2), 156-177. https://doi.org/10.1108/IJPDLM-09-2017-0269

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, *21*, 1105-1121. https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E

Expósito, A., Fernández-Serrano, J., & Liñán, F. (2019). The impact of open innovation on SMEs' innovation outcomes: New empirical evidence from a multidimensional approach. *Journal of Organizational Change Management*. https://doi.org/10.1108/JOCM-09-2018-0253

Fang, F., Dickson, K., & Wang, D. (2016). The standardization model of innovation: Case of high-technology enterprises. *Chinese Management Studies*, *10*(1), 102-118. https://doi.org/10.1108/CMS-12-2015-0278

Fang, C., Chang, S., & Chen, G. (2011). Organizational learning capability and organizational innovation: The moderating role of knowledge inertia. *African Journal of Business*, *5*(5), 1864-1870.

Farrell, M. A., Oczkowski, E., & Kharabsheh, R. (2008). Market orientation, learning orientation and organizational performance in international joint ventures. *Asia Pacific Journal of Marketing and Logistics*, *20*(3), 289-308. https://doi.org/10.1108/13555850810890066

Farrokhian, R., & Soleimani, F. (2015). Assessing capabilities for innovation - The case of Iranian kalleh meat product company. In *International Conference on Operation Excellence and Service Engineering* (pp. 23-32).

Fernandes, C., Ferreira, J., & Peris-Ortiz, M. (2019). Open innovation: past, present, and future trends. *Journal of Organizational Change Management*. https://doi.org/10.1108/JOCM-09-2018-0257

Guo, H., Tang, J. & Wei, Z. (2019). How managerial ties impact opportunity discovery in a transition economy? Evidence from China. *Management Decision*, *58*(2), 344-361. https://doi.org/10.1108/MD-02-2019-0270

Guo, R. (2019). Effectuation, opportunity shaping and innovation strategy in high-tech new ventures. *Management Decision*, *57*(1), 115-130. https://doi.org/10.1108/MD-08-2017-0799

Hailekiros, G. S., & Renyong, H. (2016). The effect of organizational learning capability on firm performance: Mediated by technological innovation capability. *European Journal of Business Management*, *8*(30), 87-95.

Halawi, L., Aronson, J., & McCarthy, R. (2005). Resource-based view of knowledge management for competitive advantage. *Journal Knowledge Management*, *3*(2), 75-86.

Hayton, J. (2015). *Leadership and Management Skills in SMEs: Measuring Associations with Management Practices and Performance Non-technical report.* London SW1H 0ET.

Hemmati, M., & Hosseini, H. (2016). Effect of IT application on project performance focusing on the mediating role of organizational innovation, knowledge management and organizational capabilities. *Engineering, Technology and Applied Science Research*, *6*(6), 1221-1226. https://doi.org/10.48084/etasr.769

Henttonen, K., & Lehtimäki, H. (2017). Open innovation in SMEs: Collaboration modes and strategies for commercialization in technology-intensive companies in forestry industry. *European Journal of Innovation Management*, *20*(2), 329-347. https://doi.org/10.1108/EJIM-06-2015-0047

Hietajärvi, A.-M., Aaltonen, K., & Haapasalo, H. (2017). What is project alliance capability? *International Journal of Managing Projects in Business*, *10*(2), 404-422. https://doi.org/10.1108/IJMPB-07-2016-0056

Huang, S. K., & Wang, Y.-L. (2011). Entrepreneurial orientation, learning orientation, and innovation in small and medium enterprises. In *Social and Behavioral Sciences 24*, 563-570. https://doi.org/10.1016/j.sbspro.2011.09.004

Kafetzopoulos, D., & Skalkos, D. (2019). An audit of innovation drivers: Some empirical findings in Greek agri-food firms. *European Journal of Innovation Management*, *22*(2), 361-382. https://doi.org/10.1108/EJIM-07-2018-0155

Kaplan, M., Ogut, A., Mehmet, D., & Asli, K. (2014). The relationship between organizational learning and financial performance: A study of small-sized businesses in Turkey. *Journal of WEI Business and Economics*, *3*(2), 17-24.

Karagouni, G., & Papadopoulos, I. (2007). The impact of technological innovation capabilities on the competitiveness of a mature industry. *Management of International Business and Economic System, 1*(1), 17-34.

Kheng, Y. K., Mahmood, R., & Beris, S. J. H. (2013). A conceptual review of innovative work behavior in knowledge intensive business services among knowledge workers in Malaysia. *International Journal of Business, Humanities and Technology*, *3*(2), 91-99.

Kiziloglu, M. (2015). The effect of organizational learning on firm innovation capability: An investigation in the banking sector. *Global Business and Management Research, 7*(3), 17-34.

Leal-Rodríguez, A. L., Eldridge, S., Roldán, J. L., Leal-Millán, A. G., & OrtegaGutiérrez, J. (2015). Organizational unlearning, innovation outcomes, and performance: The moderating effect of firm size. *Journal of Business Research*, *68*(4), 803-809. https://doi.org/10.1016/j.jbusres.2014.11.032

Leavy, B. (2019). Leading innovation – resolving creativity's paradoxes. *Strategy and Leadership*. https://doi.org/10.1108/SL-04-2019-0053

Lewrick, M., Omar, M., Raeside, R., & Sailer, K. (2011). Education for entrepreneurship and innovation: "Management capabilities for sustainable growth and success." *World Journal of Entrepreneurship, Management and Sustainable Development*, *6*(1/2), 1-18. https://doi.org/10.1108/20425961201000001

Liao, S.-H., & Wu, C. (2010). System perspective of knowledge management, organizational learning, and organizational innovation. *Expert Systems with Applications*, *37*(2), 1-8. https://doi.org/10.1016/j.eswa.2009.06.109

Liyanage, S. (1995). Breeding innovation clusters through collaborative research networks. *Technovation, 15*(9), 553-567. https://doi.org/10.1016/0166-4972(95)96585-H

Luvison, D., & de Man, A.-P. (2015). Firm performance and alliance capability: The mediating role of culture. *Management Decision*, *53*(7), 1581-1600. https://doi.org/10.1108/MD-09-2014-0580

Ma, H., Guo, H., & Shen, R. (2019). Organizational regulatory legitimacy, entrepreneurial orientation, and SME innovation: An optimal distinctiveness perspective. *Technol. Anal. Strategy. Manag, 31*, 833-847. https://doi.org/10.1080/09537325.2018.1555320

Mahmoud, M. A., Blankson, C., Owusu-Frimpong, N., Nwankwo, S., & Trang, T. P. (2016). Market orientation, learning orientation and business performance: The mediating role of innovation. *International Journal of Bank Marketing*, *34*(5), 623-648. https://doi.org/10.1108/IJBM-04-2015-0057

Makhdoom, H. ur R., Li, C., & Asim, S. (2019). Diffusion of innovation through individual and collective entrepreneurship. *Asia Pacific Journal of Innovation and Entrepreneurship*, APJIE-06-2018-0040.

Mallén, F., Chiva, R., Alegre, J., & Guinot, J. (2015). Are altruistic leaders worthy? The role of organizational learning capability. *Advances in Culture, Tourism and Hospitality Research*, *36*(3), 271-295. https://doi.org/10.1108/IJM-09-2013-0212

Maroye, L., Hooland, S. Van, Celorrio, F. A., Vanreck, O., Maroye, L., Hooland, S. Van, Vanreck, O. (2017). Organizational strategic learning capability: Exploring the dimensions. *European Journal of Training and Development*, *41*(3), 222-240. https://doi.org/10.1108/EJTD-08-2016-0061

Minh, N., Badir, Y., & Nguyen, N., Q., & Afsar, B. (2017). The impact of leaders' technical competence on employees' innovation and learning. *Journal of Engineering and Technology Management, 44*. https://doi.org/10.1016/j.jengtecman.2017.03.003

Muange, R., & Maru, L. C. (2015). Strategic alliances on performance of retail firms in Nairobi County, Kenya. *TQM Journal*, *27*(6), 732-740. https://doi.org/10.1108/TQM-06-2015-0075

Nieto, M. J., & Santamaría, L. (2007). The importance of diverse collaborative networks for the novelty of product innovation. *Technovation*, *27*(6-7), 367-377. https://doi.org/10.1016/j.technovation.2006.10.001

Obeidat, B. Y. (2016). The effect of strategic orientation on organizational performance: The mediating role of innovation. *International Journal of Communications, Network and System Sciences*, *9*, 478-505. https://doi.org/10.4236/ijcns.2016.911039

Oliva, F. L., Semensato, B. I., Prioste, D. B., Winandy, E. J. L., Bution, J. L., Couto, M. H. G., Massaini, S. A. (2019). Innovation in the main Brazilian business sectors: characteristics, types, and comparison of innovation. *Journal of Knowledge Management, 23*(3). https://doi.org/10.1108/JKM-03-2018-0159

Ozkaya, H. E. (2011). *The Antecedents and the Consequences of Innovation Capabilities.* Michigan State University.

Park, H. Y., Misra, K., Reddy, S., & Jaber, K. (2019). Family firms' innovation drivers and performance: A dynamic capabilities approach. *Journal of Family Business Management*, *9*(1), 4-23. https://doi.org/10.1108/JFBM-11-2017-0039

Pednekar, D. (2015). Building technological innovation capability in the high-tech SMEs: Technology scanning perspective. In *Management International Conference* (pp. 185-194).

Pucci, T., Nosi, C., & Zanni, L. (2017). Firm capabilities, business model design and performance of SMEs. *Journal of Small Business and Enterprise Development*, *24*(2), 222-241. https://doi.org/10.1108/JSBED-09-2016-0138

Pufal, N., Zawislak, P. A., Reichert, F. M., & Alves, A. C. (2015). Management capability and innovation: What is the relationship? In *International Association for Management of Technology* (pp. 2170-2191).

Rajapathirana, R. J., & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge*, *3*(1), 44-55. https://doi.org/10.1016/j.jik.2017.06.002

Reichert, F. M., & Zawislak, P. A. (2014). Technological capability and firm performance. *Journal of Technology Management and Innovation*, *9*(4), 20-35. https://doi.org/10.4067/S0718-27242014000400002

Ruiz-jiménez, J. M., & Fuentes-fuentes, M. M. (2015). Management capabilities, innovation, and gender diversity in the top management team: An empirical analysis in technology-based SMEs. *Business Research Quarterly*, *8*(3), 107-120. https://doi.org/10.1016/j.brq.2015.08.003

Rungsithong, R., Meyer, K. E., & Roath, A. S. (2017). Relational capabilities in Thai buyer-supplier relationships. *Journal of Business and Industrial Marketing*, *32*(8), 1228-1244. https://doi.org/10.1108/JBIM-02-2017-0027

Schilling, M. A., & Phelps, C. C. (2007). Interfirm collaboration networks: The impact of large-scale network structure on firm innovation. *Management Science*, *53*(7), 1113-1126. https://doi.org/10.1287/mnsc.1060.0624

Segarra-ciprés, M., & Bou-llusar, J. C. (2018). External knowledge search for innovation: The role of firms' innovation strategy and industry context. *Journal of Knowledge Management*, *22*(2), 280-298. https://doi.org/10.1108/JKM-03-2017-0090

Serna, M. M. del C., Vega, M. J. E., & Martínez, Jv. oaquín. (2016). The impact of learning orientation on innovation and performance in SMEś in México. *International Review of Management and Business Research*, *5*(1), 48-65.

Shan, J., & Jolly, D. R. (2013). Technological innovation capabilities, product strategy, and firm performance: The electronics industry in China. *Canadian Journal of Administrative Sciences*, *30*, 159-172. https://doi.org/10.1002/cjas.1256

Shigang, Y., & Guozhi, L. (2016). An empirical study of core capability and international performance for construction firms in China. *International Journal of Business and Social Sciences*, *7*(9), 197-204.

Shou, Y., Shao, J., & Chen, A. (2017). Relational resources and performance of Chinese third-party logistics providers: The mediating role of innovation capability. *MInternational Journal of Physical Distribution & Logistics Management*, *47*(9), 864-883. https://doi.org/10.1108/IJPDLM-09-2016-0271

Taghizadeh, S. K., Jayaraman, K., Ismail, I., & Rahman, S. A. (2016). Scale development and validation for DART model of value co-creation process on innovation strategy. *Journal of Business & Industrial Marketing*, *31*(1), 24-35. https://doi.org/10.1108/JBIM-02-2014-0033

Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Tohidi, H., Seyedaliakbar, S. M., & Mandegari, M. (2012). Organizational learning measurement and the effect on firm innovation. *Journal of Enterprise Information Management*, *25*(3), 219-245. https://doi.org/10.1108/17410391211224390

Tsai, K., Chou, C., & Chen, M. (2008). Does matching pay policy with innovation strategy really improve firm performance? An examination of technology-based service firms. *Personnel Review*, *37*(3), 300-316.

https://doi.org/10.1108/00483480810862288

Turulja, L., & Bajgoric, N. (2019). Innovation, firms' performance, and environmental turbulence: Is there a moderator or mediator? *European Journal of Innovation Management*, *22*(1), 213-232. https://doi.org/10.1108/EJIM-03-2018-0064

Ugurlu, O. Y., & Kurt, M. (2016). The impact of organizational learning capability on product innovation performance: Evidence from the Turkish manufacturing sector. *Emerging Markets Journal*, *6*(1), 1. https://doi.org/10.5195/emaj.2016.99

Verma, P., Singh, B., & Rao, M. K. (2014). Developing innovation capability: The role of organizational learning culture and task motivation. *Global Journal of Finance and Management*, *6*(6), 575-582.

Wang, X., & Dass, M. (2017). Building innovation capability: The role of top management innovativeness and relative-exploration orientation. *Journal of Business Research*, *76*, 127-135. https://doi.org/10.1016/j.jbusres.2017.03.019

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(1), 171-180. https://doi.org/10.1002/smj.4250050207

Wernerfelt, B. (1995). The resource-based view of the firm: Ten years after. *Strategic Management Journal*, *16*(3), 171-174. https://doi.org/10.1002/smj.4250160303

Yu, Y., & Huo, B. (2018). Supply chain quality integration: Relational antecedents and operational consequences. *Supply Chain Management*, *23*(3), 188-206. https://doi.org/10.1108/SCM-08-2017-0280

Yusr, M. M. (2016). Innovation capability and its role in enhancing the relationship between TQM practices and innovation performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *2*(6), 1-15. https://doi.org/10.1186/s40852-016-0031-2

Acknowledgments

Not applicable.

Authors contributions

Not applicable.

Funding

Not applicable.

Competing interests

Not applicable.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.