

**THE KEY DRIVERS OF BUSINESS MODEL IN-
NOVATION AND ITS IMPACT ON SUSTAINABLE
COMPETITIVE ADVANTAGE AMONG SMES IN
CHINA**

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**THE KEY DRIVERS OF BUSINESS MODEL IN-
NOVATION AND ITS IMPACT ON SUSTAINA-
BLE COMPETITIVE ADVANTAGE AMONG
SMES IN CHINA**

by

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
BDA	Big Data Analytics
BMI	Business Model Innovation
CB-SEM	Covariance-Based Structural Equation Modelling
CNY	Chinese Yuan
CMB	Common Method Bias
CMV	Common Method Variance
GDP	Gross Domestic Product
IMD	International Institute for Management Development
MAE	Mean Absolute Error
MIIT	Ministry of Industry and Information Technology of the People's Republic of China
OLS	Ordinary Least Squares
PLS	Partial Least Square
PLS-SEM	Partial Least Squares Structural Equation Modelling
R&D	Research and Development
RMSE	Root Mean Squared Error
SCA	Sustainable Competitive Advantage
SEM	Structural Equation Modelling
SMEs	Small and Medium-sized Enterprises
SPSS	Statistical Package for the Social Sciences
STDEV	Standard Deviation

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**PEMACU UTAMA INOVASI MODEL PERNIAGAAN DAN IMPAK-
NYA TERHADAP KELEBIHAN KOMPETITIF MAMPAN DALAM KA-
LANGAN PKS DI CHINA**

ABSTRAK

Walaupun perusahaan kecil-sederhana (PKS) adalah sangat penting di China, namun, kekurangan sumber dan modal, kekurangan teknologi dan bakat serta ketidakpastian persekitaran pasaran telah memburukkan lagi cabaran PKS yang khusus dan canggih. Untuk mencapai kelebihan daya saing yang mampan, PKS yang khusus dan canggih memerlukan inovasi model perniagaan (IMP) untuk menyesuaikan diri dengan lebih baik kepada perubahan dalam permintaan pasaran, mengurangkan kos transaksi dan akhirnya memperoleh kelebihan pasaran yang berbeza. Kajian ini menyiasat empat pembolehubah utama, iaitu kepimpinan berorientasikan pengetahuan, kecekapan analisis data besar, carian merentasi sempadan, dan keterbenaman rangkaian, yang diramalkan mempengaruhi IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) dan kelebihan daya saing yang mampan bagi PKS khusus dan canggih daripada kanta individu dan organisasi berdasarkan teori berasaskan pengetahuan, teori rangkaian sosial dan teori keupayaan dinamik. Tambahan pula, ia menyiasat kesan penyederhanaan fleksibiliti strategik antara IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) dan kelebihan daya saing yang mampan. Sifat deskriptif tesis ini membawa kepada penggunaan metodologi penyelidikan

kuantitatif, dan kaedah tinjauan telah dijalankan untuk mengumpul maklumat daripada 499 pemilik perniagaan/ ketua pegawai eksekutif/ pengurusan tertinggi PKS khusus dan canggi di Wilayah Shandong, China. Pemodelan persamaan struktur kuasa dua terkecil separa telah digunakan untuk analisis data, dan tiga penemuan utama muncul. Pertama, penemuan mendedahkan bahawa kepimpinan berorientasikan pengetahuan, kecekapan analitik data besar, dan penyematan rangkaian mempunyai pengaruh positif yang signifikan terhadap IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) manakala carian merentasi sempadan tidak mempunyai hubungan yang signifikan. Data empirikal menyokong hubungan positif antara IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) dan kelebihan daya saing mampan PKS khusus dan canggi. Kedua, IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) secara signifikan menjadi pengantara kepimpinan berorientasikan pengetahuan, kecekapan analitik data besar, dan keterikatan rangkaian, sementara tidak mengantara carian merentas sempadan dengan PKS khusus dan canggi yang mampan. kelebihan daya saing. Ketiga, untuk kesan penyederhanaan fleksibiliti strategik, kajian ini mendapati bahawa hubungan positif antara IMP (IMP berpusatkan kecekapan dan IMP berpusatkan kebaruan) dan kelebihan daya saing mampan PKS khusus dan canggi akan menjadi lebih kukuh apabila fleksibiliti strategik adalah tinggi. Penemuan penyelidikan mengandungi kedua-dua sumbangan teori dan praktikal. Mereka boleh membantu PKS khusus dan canggi memperoleh kelebihan daya saing yang mampan dan menyumbang kepada pengetahuan IMP kepada usahawan,

penggubal dasar dan penyelidik. Akhirnya, had dan cadangan untuk kajian lanjut telah ditangani.

**THE KEY DRIVERS OF BUSINESS MODEL INNOVATION AND ITS
IMPACT ON SUSTAINABLE COMPETITIVE ADVANTAGE AMONG
SMEs IN CHINA**

ABSTRACT

Although small-medium enterprises (SMEs) are of vital importance in China, nevertheless, the lack of resource and capital, technology and talent shortage and market environment uncertainty have exacerbated the challenges of the Specialised and Sophisticated SMEs. To achieve sustainable competitive advantage (SCA), Specialised and Sophisticated SMEs require business model innovation (BMI) to better adapt to changes in market demand, reduce transaction costs and ultimately obtain differentiated market advantages. This study investigated four key variables, namely knowledge-oriented leadership, big data analytics competencies, boundary-spanning search, and network embeddedness, that are predicted to influence BMI (efficiency-centred BMI and novelty-centred BMI) and SCA of the Specialised and Sophisticated SMEs from individual and organisational lenses based on knowledge-based theory, social network theory and dynamic capabilities theory. Furthermore, it investigates the moderating effect of strategic flexibility between BMI (efficiency-centred BMI and novelty-centred BMI) and SCA. The descriptive nature of this thesis led to the adoption of a quantitative research methodology, and a survey method was conducted to gather information from 499 business owners/ CEO/ top management of the

Specialised and Sophisticated SMEs in Shandong Province, China. Partial least squares-structural equation modelling (PLS-SEM) was used for data analysis, and three key findings emerged. Firstly, the findings revealed that knowledge-oriented leadership, big data analytics competencies, and network embeddedness have a significant positive influence on BMI (efficiency-centred BMI and novelty-centred BMI) while boundary-spanning search does not have a significant relationship. The empirical data supported the positive relationship between BMI (efficiency-centred BMI and novelty-centred BMI) and the Specialised and Sophisticated SMEs' SCA. Secondly, BMI (efficiency-centred BMI and novelty-centred BMI) significantly mediated the knowledge-oriented leadership, big data analytics competencies, and network embeddedness, while not mediating boundary-spanning search with the Specialised and Sophisticated SMEs' SCA. Thirdly, for the moderating effect of strategic flexibility, this study found that the positive relationship between BMI (efficiency-centred BMI and novelty-centred BMI) and the Specialised and Sophisticated SMEs' SCA will be stronger when strategic flexibility is high. The research findings contain both theoretical and practical contributions. They can aid the Specialised and Sophisticated SMEs gain SCA and contribute to the knowledge of BMI to entrepreneurs, policymakers and researchers. Finally, the limitations and recommendations for further study were addressed.

CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

This chapter is structured as the following section elucidates the current state of the Specialised and Sophisticated SMEs in China and discusses how enterprises can gain sustainable competitive advantage (SCA) through business model innovation (BMI). The subsequent section delineates the issues examined in this study. The study objectives and questions are outlined, along with the theoretical and practical implications of the study. This section delineates precise definitions of key topics employed in the research. This section finishes with a brief description of the organisations discussed in the subsequent sections of this dissertation.

1.2 Research Background

1.2.1 Overview of the Specialised and Sophisticated SMEs in China

Chinese SMEs play a crucial role in national economic development, characterised by the following metrics: they contribute over 50% of revenues from taxes, over 60% of Gross Domestic Product (GDP), over 70% of technological innovation, above 80% of urban labour employment, and over 90% of the total number of enterprises. (Yao & Yang, 2022).

SMEs had a significant role in promoting the high-quality development of China's economy and maintaining social harmony and stability (People's Daily (PRC newspaper), 2023). The health and sustainability of SMEs are vital to a nation's

economic stability. In recognition, China has introduced a qualification policy to encourage SMEs to transform into high-quality innovators, specifically by developing Specialised and Sophisticated SMEs (Jiang et al., 2022). To support this transformation, the Chinese Government has prioritised SME development, implementing a series of policies designed to foster the growth of high-quality SMEs and guide them along the path towards becoming Specialised and Sophisticated (Dong & Li, 2021; Li & Che, 2024). Specialised and Sophisticated SMEs represent such a kind of SMEs that are characterised by focus and long-term development, aim at obtaining SCAs, and are the “leaders” of the SME community (Lin, 2021; Tang et al., 2024). In policy documents and strategic deliberations, various central departments in China have emphasised the importance of “specialised, sophisticated, unique, and innovative” enterprises (Tang et al., 2024). National policy aimed at nurturing these entities concentrates on three principal areas: (1) providing financial support through diverse mechanisms to address challenges associated with financing; (2) enhancing investment in innovation, facilitated by the establishment of scientific research platforms, to foster technological advancements; and (3) concentrating on pivotal sectors to advance the digitalisation and intelligent transformation of industries (White Paper on the Development of China Specialized and Sophisticated Enterprise that Produce New and Unique Products, 2023; Li & Che, 2024).

In July 2011, the Ministry of Industry and Information Technology (MIIT) introduced “the Specialised and Sophisticated” for the first time in the “Report on China’s Industrial Development and Industrial Policy (2011)”. In July 2013, MIIT formally issued “the Guiding Opinions on Promoting the Development of the Specialised and

Sophisticated SMEs”, pointing out that it would further enhance the characteristics of SMEs in terms of specialisation, refinement, special features and novelty, and would continue to cultivate and support their numbers and proportions (Liu & Mei, 2015). In November 2018, MIIT issued the “Notice on the Cultivation of the Specialised and Sophisticated Little Giant SMEs”, which classifies the leaders of Specialised and Sophisticated SMEs as Specialised and Sophisticated Little Giant SMEs and proposes to give full play to their exemplary role in leading a larger number of SMEs to develop in the direction of Specialised and Sophisticated SMEs (Lin, 2021).

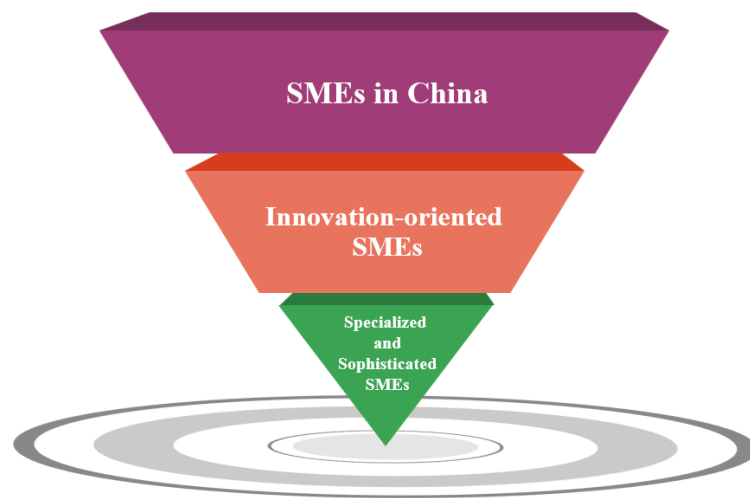


Figure 1.1 Hierarchy of SMEs in China

The selected Specialised and Sophisticated SMEs must meet the criteria for classification of SMEs be deeply engaged in a certain link of the industrial chain or a certain product in a key area, and satisfy the qualitative and quantitative index requirements in four aspects, including economic efficiency, specialisation, innovative capability and business management. The hierarchical relationship between the various types of SMEs is shown in Figure 1.1. In addition, the cultivation work has been hindered by the different selection criteria for Specialised and Sophisticated enterprises at different levels,

batches and regions. In June 2022, MIIT issued the Interim Measures for the Administration of Quality SME Gradient Cultivation, which systematically regulated the evaluation criteria for Specialised and Sophisticated SMEs.

1.2.2 Sustainable Competitive Advantage of Specialised and Sophisticated SMEs in China

Currently, China is undergoing a crucial phase of transitioning its economic growth model, with a marked shift towards high-quality, innovation-driven development. In this context, the role of Specialised and Sophisticated SMEs has become increasingly significant. These enterprises, characterised by their focus on niche markets, specialised products, and advanced technologies, are considered a key pillar in China's industrial transformation and economic rebalancing (Zhang et al., 2022). As the government continues to prioritise economic upgrading, the enhancement of SCA for SSMEs has emerged as an essential objective, not only for their own survival and growth as well as for enhancing the overall economic stability and competitiveness of the nation (Yao & Yang, 2022).

The policies implemented by the Chinese government, such as financial support, tax incentives, and infrastructure development, strive to establish a conducive environment for the development of specialised and sophisticated SMEs, with the ultimate goal of transforming these firms into high-value, competitive entities that can withstand the pressures of both domestic and global markets (Dong & Li, 2021). However, despite these efforts, many Specialised and Sophisticated SMEs continue to face significant challenges in achieving sustainable competitive advantages. These challenges include

low product competitiveness, weak brand recognition, and lack of regulatory oversight, which hinder their ability to capture and retain market share (Liu, 2022). Furthermore, the disturbances created by the COVID-19 epidemic, volatile international relations, and a series of economic shocks—including rising raw material prices, unstable global supply chains, and fluctuating demand—have compounded the difficulties faced by these enterprises (Liu, 2022). As a result, many Specialised and Sophisticated SMEs find it increasingly difficult to secure a lasting competitive position in an increasingly uncertain environment.

In the face of an increasingly complex and uncertain environment, coupled with the constraints of small scale and lack of resources, the Specialised and Sophisticated SMEs are facing many difficulties in their operations (Dong & Li, 2021; Liu, 2022; Zhang et al., 2022), and focusing on the factors affecting the competitiveness of enterprises is of significance in promoting the stable development of the enterprises and enhancing the value of the enterprises. To address this issue, Specialised and Sophisticated SMEs are promoting BMI by upgrading digital technology and optimising resource allocation, and are pushing their enterprises to follow the path of innovation and development, to gain an SCA (Lin, 2021; Dong & Li, 2021; Zhang et al., 2022).

1.2.3 The Importance of Business Model Innovation (BMI)

Along with the rapid development of information technology, the changing needs of customers and the global redistribution of production activities, competition among enterprises has intensified, and the business environment faced by enterprises has become more and more turbulent. In this highly dynamic environment, many

enterprises are facing challenges or even being subverted, and how enterprises can quickly adapt to the environment and gain SCA is a common focus of attention in both practical and academic fields. In the face of this new situation, enterprises need to innovate to avoid market risks and adjust to alterations in the external environment.

Conventional modes of innovation include product innovation, service innovation, marketing innovation, and pricing innovation, although they can bring economic benefits to a certain extent, making it difficult to become SCA for the long-term development of enterprises. First, the development of new-generation information technology has greatly reduced the cost of enterprise collaboration. The advancement of next-generation technologies, including instant messaging applications, search engines (Google, Baidu), WeChat, community platforms, and Facebook, has significantly diminished the cost and expedited the time required to locate new resources and partners (Rachinger et al., 2019). Advancements in Internet and mobile communication technologies have enabled organisations to disseminate and incorporate information rapidly. The advancements in information technology have significantly reduced the costs associated with resource reaggregation and discovery, rendering the traditional dependence on organisational processes and corporate borders for minimising transaction costs increasingly ineffective, as new organisational tools emerge. The proliferation of new information technology has dismantled industrial borders, enabling the reconstruction of value chains across industries and organisations. Along with the development of Internet technology, cross-industry value reconstruction is gradually transforming traditional industries, which breaks the established industry boundaries and subverts many

established industry logics (Daradkeh & Mansoor, 2023). Second, the global economic division of labour and the new generation of information technology have further refined business activities. Early enterprises adopted an integration approach in their operations, aiming to internalise all value-generating activities. Enterprises independently executed all activities, including research and development (R&D), manufacture, and sales. However, globalisation and integration have led more enterprises to reconstruct their value-creation activities, placing them more in cooperative networks through various forms such as outsourcing, joint ventures and alliances (Andrade Rojas et al., 2018). Along with this trend, value creation activities have shifted from an integrated to a collaborative model. Activities that used to be performed by a single enterprise are now performed jointly by a large number of specialised enterprises. The interdependence between enterprises has been further strengthened (Daradkeh & Mansoor, 2023). As Drucker and Maciariello (2004) pointed out, the competition of today's enterprises has changed from product competition to competition between business models. Enterprises need to adapt to the dynamic external environment and achieve sustainable development through BMI.

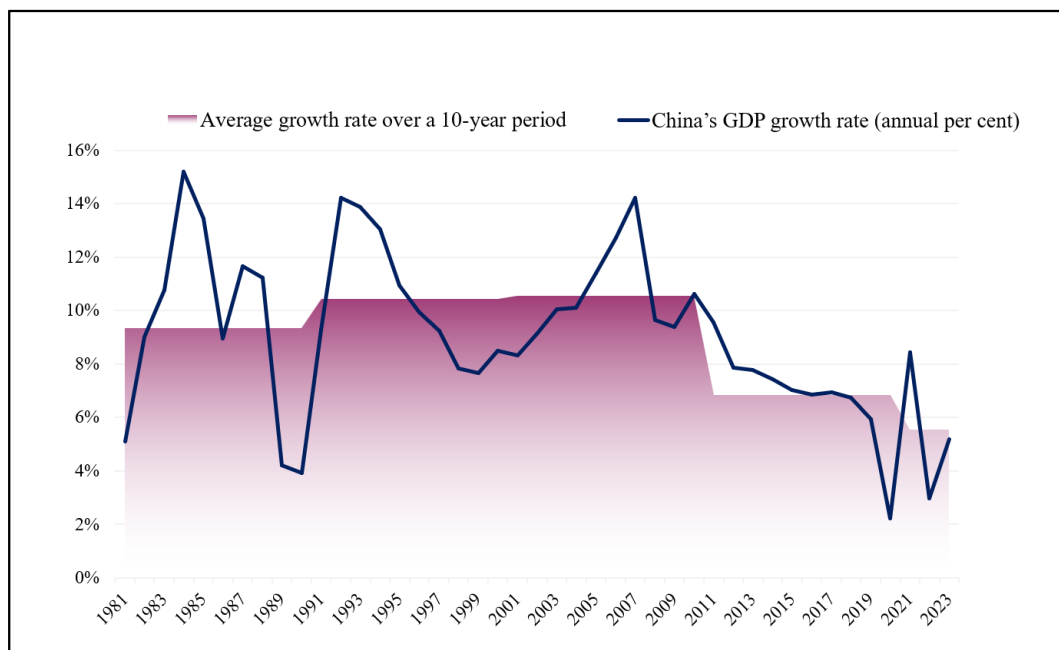
Numerous enterprises have begun to focus on BMI and discuss its role in competitive advantage. Traditional product and service innovation is more based on the path of gaining competitive advantage by raising the barriers to entry and developing valuable, scarce, and difficult-to-imitate and substitute internal resources under the internal integration model. BMI, conversely, is a path to SCA by changing the way value is created in a highly interconnected environment. BMI has different classifications. From

the perspective of value creation, BMI can be classified into novelty-centred BMI and efficiency-centred BMI (Zott & Amit, 2007). Novelty-centred BMI focuses on the innovation of new transaction structures and transaction models, such as value propositions, profit models, key businesses and processes, and uses different business operation models from those existing in the industry for value creation and acquisition (Zott & Amit, 2007). Through novelty-centred BMI innovation, enterprises gain value growth points that differentiate them from their competitors and promote or even lead to industry change (Guo et al., 2018). Efficiency-centred BMI concentrates on enhancing transaction efficiency and minimising transaction expenses for business participants through technological innovation and rational allocation of resources (Zott & Amit, 2007). Enterprises can achieve sustained profit growth through efficiency-centred BMI (H. Dong & Wang, 2022). Through both BMI can bring good performance growth, enabling enterprises to effectively respond to environmental pressures and gain a sustainable advantage in competition (Xiao et al., 2021). Therefore, BMI has become a new source of SCA for enterprises. As a primary method for organisations to achieve new economic growth and fulfil sustainable development requirements, BMI has emerged as a focal focus of study across several sectors.

1.3 Problem Statement

In recent years, China has transitioned from high-speed economic growth to a stage of high-quality development, marking a shift from extensive, factor-driven expansion to intensive, innovation-led growth (World Bank Group, 2023). This evolution is

evident in the decline of the national GDP growth rate, which dropped from an average of 10.57% in 2001–2010 to 5.55% in 2021–2023. With the traditional drivers of investment and low-cost labour reaching diminishing returns, enterprises are under growing pressure to restructure towards innovation-oriented strategies to sustain competitiveness. This macroeconomic context underscores the imperative for firms to build SCA through continuous innovation and resource reconfiguration. In the absence of such adaptive capabilities, firms are unlikely to maintain above-average returns in the long run.

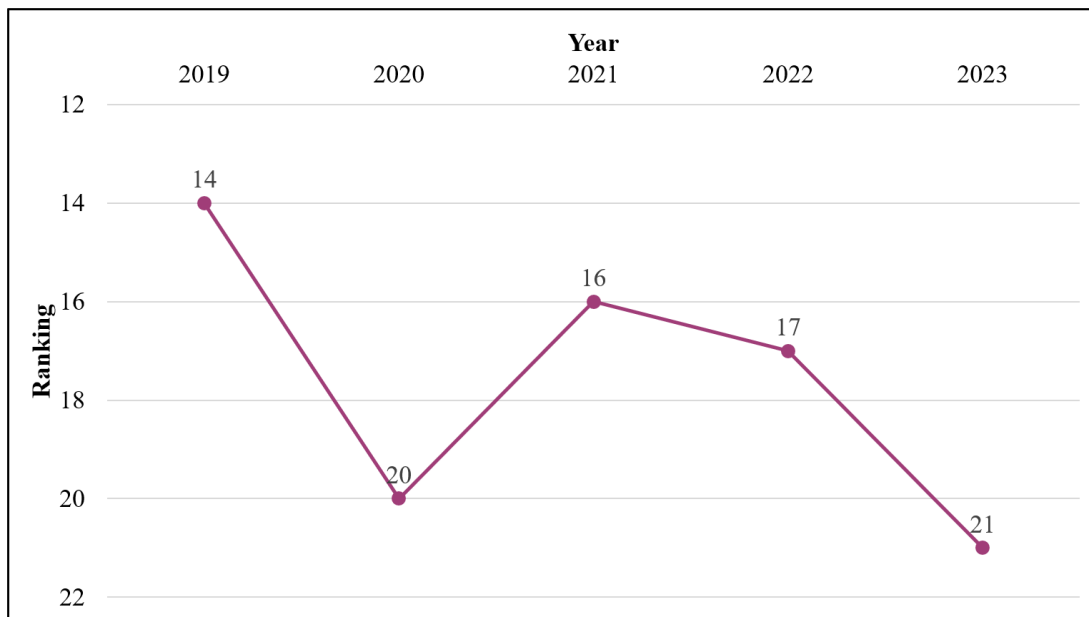


Source: World Bank Group

Figure 1.2 China's Economic Growth Rate (1981-2023)

SMEs are integral to China's economic and social development and represent a primary source of innovation (Yao & Yang, 2022). However, the average life expectancy of Chinese SMEs is less than 2.5 years—significantly shorter than their counterparts in the United States (8.2 years) and Japan (12.5 years) (Zhou et al., 2023). Moreover, between 2019 and 2023, China's position in the IMD World Competitiveness

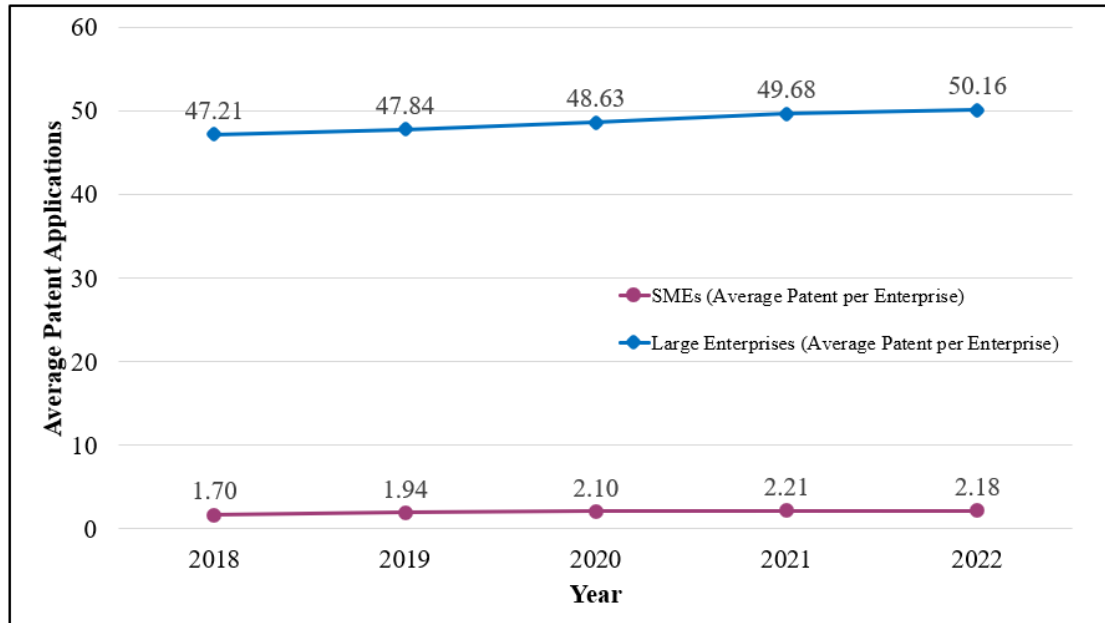
Ranking fell from 16th to 21st, with only a temporary improvement in 2020, as shown in Figure 1.3. Given that SMEs constitute over 90 percent of enterprises in China, this overall decline in competitiveness reflects systemic difficulties in achieving and sustaining competitive advantages at the SME level.



Source: International Institute for Management Development (IMD)

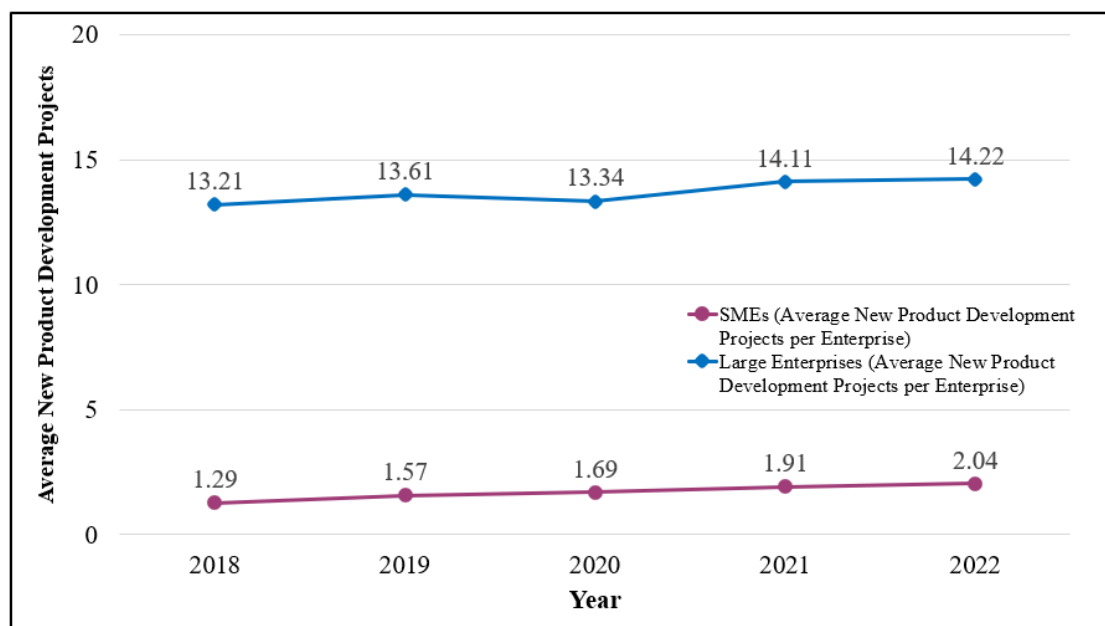
Figure 1.3 Mainland China in World Competitiveness Ranking (2019-2023)

From 2019 to 2022, Figures 1.4 and 1.5 further reveal that SMEs consistently lag behind large enterprises in key indicators of competitive capacity, such as patent applications and new product development projects. For instance, SMEs submitted fewer than three patents per industrial enterprise annually, whereas large enterprises filed more than 47. Similarly, while large enterprises increased new product projects from 13.21 to 14.22, SMEs only rose from 1.29 to 2.04. These gaps point to significant constraints in SMEs' innovation capacity, hindering their ability to generate rare, valuable, and inimitable resources—essential conditions for the development of SCA.



Source: China Statistical Yearbook of Enterprise R&D Activities (2023)

Figure 1.4 Average Patent Applications per Industrial Enterprise



Source: China Statistical Yearbook of Enterprise R&D Activities (2023)

Figure 1.5 New Product Development Projects per Industrial Enterprise (2018-2022)

In addition, with the robust growth of the digital economy, big data and platform construction have become crucial drivers for enhancing SCAs for businesses (Zare & Persaud, 2024; Akter et al., 2016). However, SMEs face numerous challenges in this

area. On one hand, the majority of SMEs display weaknesses in data collection, organisation, and analytical capabilities, which hampers their ability to effectively exploit big data for uncovering potential business values (Perdana et al., 2022) The 2024 Annual Report on Digital Transformation of China's SMEs indicates that more than 60% of SMEs are in the early stages of transformation, specifically the single-point trial phase and the partial construction phase, accounting for 32.4% and 30.2% respectively. During the single-point trial phase, SMEs experiment with digital applications in isolated scenarios, such as establishing e-commerce capabilities or launching digital advertising campaigns. In the partial construction phase, SMEs develop data mid-platforms for various business lines within their value chains, including R&D, supply chain, marketing, sales, and service. However, they have not yet established an integrated company-wide data centre. Conversely, in terms of platform development, large enterprises leverage their robust resource integration abilities and brand influence to construct comprehensive industry platforms, attracting a significant number of upstream and downstream businesses and users. In contrast, SMEs, due to a lack of funding, technology, and skilled personnel, find themselves at a disadvantage in building and participating in such platforms, struggling to use platforms to expand markets and enhance efficiency (Isensee et al., 2025).

In a competitive market, government support may be able to deal with short-term problems such as cash flow shortages, but the key to long-term success for SMEs still lies in the market competitiveness of their main business and products (Zhang et al., 2022).

From a policy perspective, although national initiatives such as the 'Specialised, Sophisticated, Distinctive, and Innovative' SME strategy aim to foster SME competitiveness, implementation remains fragmented (Dong & Li, 2021). The concept lacks clear links to enterprise-level strategy and operational planning, thereby failing to alleviate sector-specific constraints. This includes: firstly, Specialised and Sophisticated SMEs generally suffer from a lack of resources in technology, talent and business (Liu, 2022); secondly, Specialised and Sophisticated SMEs invest heavily in R&D, and encounter increased trial-and-error expenses and hazards (Zhang et al., 2022); and thirdly, Specialised and Sophisticated SMEs, as a benchmark for SMEs, have higher requirements from customers and society, which are difficult to meet (Lin, 2021). This leads to the weakness of the SCA of Specialised and Sophisticated SMEs. Consequently, a systematic investigation into the obstacles encountered by Specialised and Sophisticated SMEs is imperative. Such research will equip enterprises' managers and policy-makers with the necessary insights to develop tailored interventions, thereby enhancing the SCA across the SME landscape in China.

BMI has the potential to transform the sector, create new avenues for value growth, and facilitate superior performance against competitors (Zhou et al., 2023), and is more important than the mere pursuit of product and technological innovation. BMI innovation can quickly and qualitatively satisfy customers' diverse and individualised needs (Zott et al., 2011); it can also confer SCA by re-creating resource transactions (Zott & Amit, 2007). Since BMI is a solution to the problem of acquiring SCA in

Specialised and Sophisticated SMEs, there is a need to measure the drivers and impact of BMI on SCA.

Despite the growing interest in BMI, scholarly attention remains fragmented regarding the dual focus of efficiency-centred and novelty-centred BMI. A systematic search across the Web of Science and Scopus databases on 6 March 2024 yielded only 13 empirical studies directly addressing both dimensions, as shown in Appendix A, highlighting the scarcity and novelty of this research area. Moreover, prior studies have primarily explored the impact of BMI on organisational performance (Xiao et al., 2021), while the link between dual-centred BMI and SCA remains under-researched.

Existing literature has examined antecedents such as entrepreneurial leadership, knowledge management, and boundary-spanning search (Naqshbandi & Jasimuddin, 2018; Phangestu et al., 2020; Volery & Mueller, 2018; Simba & Thai, 2019; Bashir & Pradhan, 2023). However, little is known about how knowledge-oriented leadership, BDA competencies, and network embeddedness specifically influence efficiency- and novelty-centred BMI. Furthermore, while dynamic capabilities such as strategic flexibility are crucial for navigating environmental uncertainty, their moderating role in the BMI–SCA relationship, particularly in SMEs, is insufficiently studied.

This study addresses these gaps by investigating how individual- and organisational-level factors drive dual-centred BMI and how strategic flexibility moderates its effect on SCA, offering theoretical and practical contributions to the field of innovation management.

1.4 Research Objectives

This study aims to accomplish the following objectives:

RO1: To examine the impact of the individual factors (knowledge-oriented leadership) on BMI (efficiency-centred BMI and novelty-centred BMI) among the Specialised and Sophisticated SMEs in China.

RO2: To examine the impact of the organisational factors (BDA competencies, boundary-spanning search, network embeddedness) on BMI (efficiency-centred BMI and novelty-centred BMI) among the Specialised and Sophisticated SMEs in China.

RO3: To investigate the impact of BMI (efficiency-centred BMI and novelty-centred BMI) on SCA among the Specialised and Sophisticated SMEs in China.

RO4: To examine the mediating role of BMI (efficiency-centred BMI and novelty-centred BMI) in the relationship between individual factors (knowledge-oriented leadership) and SCA among the Specialised and Sophisticated SMEs in China.

RO5: To examine the mediating role of BMI (efficiency-centred BMI and novelty-centred BMI) in the relationship between organisational factors (BDA competencies, boundary-spanning search, network embeddedness) and SCA among the Specialised and Sophisticated SMEs in China.

RO6: To examine the moderating effect of strategic flexibility in the relationship between BMI (efficiency-centred BMI and novelty-centred BMI) and SCA among the Specialised and Sophisticated SMEs in China.

1.5 Research Questions

In accordance with the aims of this research, the following questions have been formulated:

RQ1: What are the relationships between individual factors (knowledge-oriented leadership) and BMI (efficiency-centred BMI and novelty-centred BMI) among the Specialised and Sophisticated SMEs in China?

RQ2: What are the relationships between organisational factors (BDA competencies, boundary-spanning search, network embeddedness) and BMI (efficiency-centred BMI and novelty-centred BMI) among the Specialised and Sophisticated SMEs in China?

RQ3: What is the relationship between BMI (efficiency-centred BMI and novelty-centred BMI) and SCA among the Specialised and Sophisticated SMEs in China?

RQ4: Does BMI (efficiency-centred BMI and novelty-centred BMI) mediate the relationship between individual factors (knowledge-oriented leadership) and SCA among the Specialised and Sophisticated SMEs in China?

RQ5: Does BMI (efficiency-centred BMI and novelty-centred BMI) mediate the relationship between organisational factors (BDA competencies, boundary-spanning search, network embeddedness) and SCA among the Specialised and Sophisticated SMEs in China?

RQ6: Does strategic flexibility moderate the relationship between BMI (efficiency-centred BMI and novelty-centred BMI) and SCA among the Specialised and Sophisticated SMEs in China?

1.6 Scope of Study

This investigation will examine the BMI of the Specialised and Sophisticated SMEs in China. There are three main reasons for selecting this scope of study. Initially, these enterprises align with the innovation-driven development plan promoted by the Chinese government. The majority of these are, to some extent, innovative “experts” in their respective industries, applying new technologies, processes, materials, and modes, and constantly iterating their products and services, which play an important and irreplaceable role in China’s economic and social development. Secondly, the majority of scholars concentrate on the technological advancements of Specialised and Sophisticated SMEs, while neglecting the study of BMI, and there is a research gap. Third, the information disclosure system involving Specialised and Sophisticated SMEs provides more convenience for our data collection.

1.7 Significance of Study

This study seeks to augment the existing knowledge concerning novelty and efficiency-centred BMI with SCA and endeavours to elucidate the practical ramifications of improving the SCA of the Specialised and Sophisticated SMEs in China. This study’s significance can be succinctly articulated from two perspectives.

1.7.1 Theoretical Significance

This study aims to enhance the theoretical understanding of several forms of BMI, specifically efficiency-centred and novelty-centred BMI, in contrast to the majority of prior research that has concentrated on BMI.

Firstly, while BMI has been extensively studied, the existing literature often treats it as a homogeneous concept (Bhatti et al., 2021; Madhavan et al., 2022; ElNaggar & ElSayed, 2023; Kafetzopoulos et al., 2023), overlooking the potential differences between the various types of business model innovations that organisations can pursue. This study provides a substantial theoretical contribution by differentiating between novelty-centred BMI and efficiency-centred BMI. The novelty-centred BMI focuses on disruptive, value-creating innovations that enable firms to tap into new market opportunities and generate unique competitive advantages (Zott & Amit, 2007). In contrast, efficiency-centred BMI is concerned with incremental innovation aimed at optimising existing processes, reducing costs, and improving operational efficiency (Zott & Amit, 2007). This distinction allows for a more nuanced theoretical framework, as it considers the different approaches firms can take in innovation and highlights the varying paths through which BMI may result in a sustained competitive advantage. This differentiation expands the theoretical understanding of BMI by capturing the multifaceted nature of BMI, which is crucial for understanding how different strategies may drive SME competitiveness.

Secondly, this study extends both theoretical and empirical understanding of the factors that influence BMI, specifically by investigating the relationship between various antecedents—namely knowledge-oriented leadership, BDA competencies, boundary-spanning search, and network embeddedness—and their impact on BMI. While much of the existing literature has acknowledged the importance of these factors in innovation and organisational performance (Jia et al., 2024; Ali et al., 2023; Wang et

al., 2022; Xie et al., 2024), fewer studies have explored their specific roles in the context of BMI, particularly within SMEs. This study addresses this gap by empirically examining how these antecedents influence the innovation process, thus offering new theoretical insights into the mechanisms by which these capabilities drive BMI. The findings not only confirm the importance of these antecedents in fostering BMI but also provide practical guidance for SMEs seeking to enhance their innovation capabilities.

Thirdly, previous research on BMI concerns their contribution to organisational performance (e.g. Najafi-Tavani et al., 2023; Guo et al., 2018). This current study focuses on the impact of BMI on SCA and examines the moderating role of strategic flexibility between BMI and sustainable competitiveness. This study may support researchers in obtaining in-depth knowledge pertaining to BMI in the Specialised and Sophisticated SMEs in China. This study will establish links between different types of BMI (novelty-centred and efficiency-centred) and SCA.

Fourthly, this study further contributes to the literature by integrating three theories, namely knowledge-oriented theory, social network theory and dynamic capabilities theory. These theories are connected to SCA through this study's proposed framework. As such, a more explicit outlook towards the development of BMI could be obtained. The main theory in this study is social network theory. Establishing and embedding social capital networks is of great significance to the development of SMEs, helping to promote resource exchange and product innovation, saving a lot of time and search costs, as well as gaining or maintaining competitive advantages. Establishing connections between firms and different disciplines can help firms acquire knowledge

and technology, discover new business opportunities, and enhance the flexibility of firms to innovate. Through the acquisition of knowledge, BMI can improve the sustainable competitive advantage of enterprises. In addition, the knowledge-based theory identifies knowledge-based leadership, big data analysis competencies, boundary-spanning search, and network embeddedness as key heterogeneous knowledge, which are the key factors driving BMI. Based on the dynamic capabilities theory, strategic flexibility enables enterprises to integrate, construct and reconstruct their capabilities. Therefore, strategic flexibility may affect the relationship between BMI and sustainable competition. This study enhances understanding of the moderating role of strategic flexibility in the relationship between BMI and SCA, as posited by dynamic capabilities theory.

Finally, this study expands the BMI of the Specialised and Sophisticated SME literature and contributes to the current discourse on SCA related to knowledge. The research addresses the predicament through the examination of Specialised and Sophisticated SMEs, and not large or multinational organisations.

1.7.2 Practical Significance

This research holds practical importance for the Specialised and Sophisticated SMEs and the government.

This study examines the BMI antecedents, such as knowledge-oriented leadership, BDA competencies, boundary-spanning search, and network embeddedness. The findings guide SME managers to gain insight into the drivers of BMI so that to can make strategic decisions more scientifically and reasonably, and choose a convenient way to enhance growth among the many paths of development.

This study examines the influence of several types of BMI (efficiency-centred and novelty-centred BMI) on the SCAs of Specialised and Sophisticated SMEs, and how strategic flexibility moderates the relationship between these types of BMI and SCA. The findings help Specialised and Sophisticated SMEs to design and optimise strategies and to get rid of the development difficulties, thereby enhancing the SCAs and guiding the enterprises to embark on the road of high-quality development.

In addition, this study provides policymakers with a realistic reference basis, which instructs the government on establishing a conducive innovation and development ecosystem for Specialised and Sophisticated SMEs, optimises the allocation of resources, and formulates and issues new guidelines to Specialised and Sophisticated SMEs on the provision of learning and access to knowledge resources, platform building and BMI guidance, etc., to enhance the SCAs of Specialised and Sophisticated SMEs.

1.8 Definition of Key Terms

The Specialised and Sophisticated SMEs: are SMEs with specialised, sophisticated, characteristic and innovative features. The term “specialised” refers to specialisation, which means to do well in a certain niche according to its advantages, to seek space for self-development in the cracks of large enterprises, and to seek maximum profit for the enterprise through long-term adherence to the strategy of specialised operation. “Sophisticated” refers to sophistication, requiring enterprises to have a streamlined and efficient internal management system, through the optimisation of the

enterprise's customer service, business management, human resources management and other processes, to ensure the good functioning of the enterprise. "Characteristic" refers to the special features, refers to the appearance of the product, function and other aspects of the characteristics of the product, for consumers with different needs to provide special products and services. "Innovation" refers to novelty, attracting customers with innovations in products, packaging, and so on (Liu, 2022).

Knowledge-oriented Leadership: a leadership style predicated on the quality of personal knowledge and learning capacity, aimed at fostering knowledge sharing and innovative learning among employees through knowledge management practices, thereby cultivating a positive organisational learning culture to realise the organisational vision and enhance performance (Chaithanapat et al., 2022).

Big Data Analytics (BDA) Competencies: a kind of data management capability of enterprises (Akter et al., 2016), that needs to be formed on the basis of enterprise infrastructure and talent cultivation, and is specifically represented by the ability of enterprises to mine, integrate, and utilise data resources (Gupta & George, 2016), which can provide enterprises with technical advantages in the process of sustained market competition and industrial development, in terms of technological planning and deployment, talent cultivation, and market insights, etc., and thus improve the performance of enterprises' operation and enable them to have a more powerful power of growth (Wamba et al., 2017).

Boundary-spanning Search: refers to a basic search method in organisational search, which emphasises searching across the boundaries of existing organisations and

technologies in order to obtain more novel and differentiated knowledge sources (Rosenkopf & Nerkar, 2001). Boundary-spanning search breaks through the constraints of local institutions, cultures, industrial agglomerations and other characteristic elements, expands the heterogeneous knowledge base required for breakthrough innovations, and increases the reconstruction opportunities of different types of knowledge elements, which is more conducive to the adaptation of enterprises to the dynamic science and technology and economic environments (Shao et al., 2023).

Boundary-spanning Search Extensivity: denotes the extent to which firms utilise various channels or sources to acquire information, resources, and knowledge (Zhu et al., 2024).

Boundary-spanning Search Focus: denotes the extent of acquiring knowledge, including information and resources, from various external channels or sources (Zhu et al., 2024).

Network Embeddedness: The degree to which a firm is interconnected with other firms delineates the framework of an enterprise's relationships, significantly influencing the dissemination of knowledge and information (Echols & Tsai, 2005; Gulati et al., 2000).

Structural Embeddedness: focuses on where the network participants are located in the network and the extent to which the behaviour of the enterprises is influenced by the vast network in which the organisation is embedded (Tian et al., 2023).

Relational embeddedness: focuses on the social adhesion between enterprises and accounts for particular behaviours and processes through the density, strength, etc. of the social connections (Tian et al., 2023).

Cognitive Embeddedness: the degree to which network participants are inclined to collaborate towards a common vision and engage in reciprocal collaboration (Lin et al., 2009).

Business Model Innovation (BMI): refers to the reform and improvement of an enterprise's existing operating system, changing the transaction mode between various stakeholders by crossing the boundaries, and creating value based on the use of opportunities (Zott & Amit, 2007).

Efficiency-centred BMI: concentrates on the effective use of the resources and capabilities of enterprises and their partners in the transaction network, thus improving production efficiency and transaction efficiency and minimising transaction expenses (Zott & Amit, 2007).

Novelty-centred BMI: focuses on the creation and acquisition of value through new transaction mechanisms and structures, such as new ways of connecting transaction participants, creating new types of transactions, profit models, and so on (Zott & Amit, 2007).

Strategic Flexibility: the dynamic ability of enterprises to quickly make strategic adjustments, reconfigure or even innovate in response to turbulent environments, which often has a significant impact on enterprise performance (Aaker & Mascarenhas, 1984).