THE EFFECT OF CEO BACKGROUNDS ON INNOVATION OF LISTED FIRMS IN CHINA: THE MODERATING ROLE OF CEO POWER

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THE EFFECT OF CEO BACKGROUNDS ON INNOVATION OF LISTED FIRMS IN CHINA: THE MODERATING ROLE OF CEO POWER

by

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LIST OF ABBREVIATIONS

CEO	Chief executive officer
CSMAR	China stock market accounting research
DV	Dependent variable
FEM	Fixed effects model
GMM	Generalised Method of Moments
IV	Independent variable
OLS	Ordinary least squares
REM	Random Effects Model
R&D	Research and Development
VIF	Variance Inflation Factor

KESAN LATAR BELAKANG CEO TERHADAP INOVASI FIRMA TERSENARAI DI CHINA: PERANAN PENYEDERHANAAN KUASA CEO

ABSTRAK

Latar belakang CEO merupakan sumber strategik penting yang berupaya membentuk kapasiti inovatif firma, terutamanya dalam pasaran yang dinamik dan kompetitif. Dalam konteks China, pengaruh latar belakang CEO terhadap inovasi korporat masih kurang mendapat perhatian ilmiah, walaupun negara tersebut menekankan pertumbuhan berasaskan inovasi. Kajian ini, berlandaskan teori berasaskan sumber (RBT), menyiasat latar belakang CEO mempengaruhi inovasi firma tersenarai di China dari 2010 hingga 2022. Selain itu, berdasarkan teori kuasa pengurusan (MPT), ia mengkaji sama ada kuasa CEO menyederhanakan kesan latar belakang CEO terhadap inovasi firma tersenarai di China. Analisis empirikal menggunakan set data panel yang terdiri daripada 19,137 pemerhatian firma-tahun daripada 3,199 firma tersenarai di China sepanjang tempoh 2010–2022. Inovasi korporat diukur melalui keamatan dan perbelanjaan R&D, manakala latar belakang CEO diwakili oleh pengalaman asing, pengalaman akademik, serta tahap pendidikan. Kuasa CEO pula diwakili oleh dualiti CEO dan tempoh jawatan CEO. Diagnostik statistik, termasuk ujian Poolability, ujian Breusch-Pagan LM, dan ujian Hausman, mengesahkan model kesan tetap sebagai pendekatan penganggaran yang paling sesuai. Bagi menangani isu potensi endogeniti dinamik, regresi GMM sistem dua langkah panel dinamik digunakan. Hasil kajian menunjukkan bahawa ketiga-tiga atribut latar belakang CEO memberi kesan positif dan signifikan terhadap inovasi korporat, sejajar dengan RBT. Pengalaman asing, akademik, dan pendidikan membentuk kognisi CEO, sekali gus menyediakan aset penting bagi mendorong inovasi. Selain itu, selaras

dengan MPT, kuasa CEO memperkukuh kesan positif tersebut dengan meningkatkan kecekapan membuat keputusan, mengurangkan kos komunikasi, menyelaraskan insentif, dan menggerakkan sumber. Hal ini membolehkan firma melaksanakan projek inovatif yang berisiko tinggi namun berpotensi pulangan besar, yang berupaya memberi impak besar terhadap strategi inovasi firma. Kajian ini menyumbang dengan memperkaya literatur mengenai peranan latar belakang dan kuasa CEO dalam inovasi korporat, di samping menyediakan implikasi praktikal bagi individu berbakat, pembuat dasar korporat, serta pembuat dasar kerajaan dalam memacu agenda inovasi.

THE EFFECT OF CEO BACKGROUNDS ON INNOVATION OF LISTED FIRMS IN CHINA: THE MODERATING ROLE OF CEO POWER

ABSTRACT

CEO backgrounds represent an important strategic resource that can shape the innovative capacity of firms, particularly in dynamic and competitive markets. In the context of China, the influence of CEO backgrounds on corporate innovation has received relatively limited scholarly attention, despite the country's emphasis on innovation-driven growth. This study, grounded in resource-based theory, investigates CEO backgrounds affect the innovation of listed firms in China from 2010 to 2022. Furthermore, drawing on managerial power theory, it examines whether CEO power moderates the impact of CEO backgrounds on innovation of listed firms in China. The empirical analysis is based on a panel dataset comprising 19,137 firm-year observations from 3,199 listed firms in China over the period 2010–2022. Corporate innovation is measured by R&D intensity and R&D expenditures, CEO backgrounds are proxied by CEOs' foreign experience, academic experience, and education level, and CEO power is represented by CEO duality and CEO tenure. Statistical diagnostics, including the Poolability test, Breusch–Pagan LM test, and Hausman test, confirm the fixed effect model as the most suitable estimation approach. To address potential dynamic endogeneity, a dynamic panel two-step system GMM regression is employed. The results show that all three CEO background attributes exert significant and positive effects on corporate innovation based on resource-based theory. Foreign experience, academic experience, and educational level shape CEO cognition, and CEOs have foreign resources, academic resources, and educational resources, which are essential resources for corporate innovation. Furthermore, CEO power enhances

the positive impact of CEO backgrounds on corporate innovation based on managerial power theory. Based on managerial power theory, CEO power enhances innovation by improving decision efficiency, reducing communication costs, aligning incentives, and mobilizing resources, thereby enabling firms to pursue high-risk, high-return innovative projects, which can significantly impact a firm's innovation strategy. This study contributes specific theoretical implications regarding the role of CEO power and CEO backgrounds on corporate innovation and provides beneficial practical information for talented individuals, enterprise policymakers, and government policymakers on corporate innovation.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter focuses on the study's background, scope, and motivation, as well as the problem statement. It also presents the research questions, research objectives, significance of the study, and definitions of key terms. The last section details the organization of the thesis.

1.2 Background of the Study

The concept of innovation was originally developed by sociologist Gabriel Tarde, who claimed that social change is caused by the adoption of new tools and behavioral patterns by individuals and, furthermore, that the process of imitation accelerates the diffusion of innovations (Kochetkov, 2023). The development of innovations, whether by introducing new or improved learning behaviors, are integral to cultural progress and plays a key role in human success. These developments make it easier for us to adapt to and transform habitats, address novel challenges, and thrive in various environments (Rawlings & Reader, 2024). The term innovation is often understood in two distinct ways: (1) the introduction of something new, or (2) a new idea, method, or device (Kahn, 2018).

Across history, breakthrough innovations—from the Industrial Revolution in Europe to the digital transformation in Silicon Valley—have reshaped industries, enhanced productivity, and transformed everyday life. Globally, leading companies such as Apple and Microsoft have demonstrated how strategic innovation and competition for industry standards can reshape entire markets and consumer behaviors (Wonglimpiyarat, 2012). Similarly, Tesla's innovation strategy—driven by visionary leadership—has significantly disrupted the automotive industry, highlighting the intertwined role of technological breakthroughs and executive decision-making in achieving global market dominance (Qin, 2023). There has been a discernible trend towards acknowledging the importance of independent innovation. As a result, countries worldwide have been developing and enacting policies and releasing official statements to cultivate an environment that supports innovation. These policies are designed to assist businesses in improving their competitive edge and strengthening their innovation capabilities to ensure sustainable development (Song et al., 2022). Firms in China are experiencing rapid growth and deeper integration into the global economy. China's accession to the World Trade Organization (WTO) exemplifies its commitment to international economic participation (Mattoo, 2002), and there is a growing interest among firms in China in pursuing foreign listing opportunities (Pan & Brooker, 2014). However, despite these developments, China still has room for improvement in the area of innovation (Lin et al., 2011). The emergence of various challenges, including limited resources and experience, poses important considerations for the innovation strategies of publicly listed companies (Wang et al., 2016).

The CEO is the top manager whose decisions substantially impact the firm (Quigley & Hambrick, 2015). The CEO is responsible for numerous crucial business decisions, including entering and exiting significant markets, spearheading innovations, and allocating resources (Brower & Nath, 2018). CEO background refers to the personal and professional characteristics of CEOs that could affect their leadership style and decision-making (Li et al., 2023). Research shows that CEOs with more diverse career experiences can access a wider array of external resources, as evidenced by lower investment-cash flow sensitivity and greater utilization of external funding sources (Hu & Liu, 2015). The cognitive dimension is defined as the resources that enable the development of a mutually shared perception of the different perspectives, interpretations, and mental models about the environment (Auh & Menguc, 2005). Messinis and Ahmed (2013) confirm the importance of cognitive skills as a key driver of innovation.

Power can be considered a relative concept (Emerson, 1962) that bestows the ability to influence others in order to achieve specific objectives. From an organizational standpoint, power may allow CEOs to navigate complex situations and make decisions during uncertain times to impact innovation.

1.2.1 Innovation of Listed Firms in China

In the early 20th century, China's market economy development was primarily characterized by labor-intensive and production-factor-intensive methods, driven by significant labor and resource input and, ultimately, improvements in economic aggregate (Yang, 2016). Since the late 1970s, the Chinese Family Planning Program has been implemented with the primary objective of controlling population growth, which in turn had long-term implications for the labor supply and demographic structure (Wang, 2012). Over time, declining birth rates began to reshape the composition of the workforce, creating new challenges for sustaining the labor-intensive growth model. These demographic changes, coupled with the economic slowdown following the 2008 financial crisis—when China recorded its slowest growth rate in three decades (Womack, 2017)—placed additional pressure on businesses to adapt. Moreover, the enactment of the 2008 Labor Contract Law increased the complexity of staffing adjustments, intensifying the difficulties firms faced in managing rising wages and labor costs (Xu et al., 2023).

Similar to other growing economies, Chinese exporters emphasize cost leadership as a key competitive factor in international markets (Smith, 2007). Rapid economic growth increases labor expenses (De Sousa & Poncet, 2011). The research of Guth and Ginsberg (1990) suggests that technological innovation plays a vital role in improving both labor force productivity and product productivity, thereby leading to reduced manufacturing costs, helping businesses win price wars and enhance overall performance. In response to the 2008 global financial crisis, the Chinese government changed its policies, placing greater emphasis on increasing local demand and promoting industrial technological advancement through measures such as innovation and regulatory reforms (Yi et al., 2013). In the Government Work Report 2015, Premier Li Keqiang (2015) proposed achieving mass entrepreneurship and innovation, which set off a wave of innovation in China (Li et al., 2024;Yang et al., 2021).

Corporate research and development (R&D) expenditure is widely acknowledged as a critical factor in enhancing the innovation capacity of nations and firms (Audretsch & Feldman, 2004). According to a study by Jefferson et al. (2006), corporate R&D personnel actively contribute to enhancing innovation. The quantity of corporate R&D personnel indicates the level of human capital essential for fostering innovation capability, making it a significant metric (Liu, 2011). This research will examine its moderating the impact of CEO backgrounds on innovation in China's listed firms. This study on the effect of CEO backgrounds on innovation (which examines the moderating role of CEO power) has both theoretical and practical significance.

According to Table 1.1, China's corporate R&D expenditures increased from 1192.35 billion yuan in 2016 to 1867.38 billion yuan in 2020, and the number of corporate R&D personnel increased from 1472400 persons in 2016 to 2409400 persons in 2020. This shows that enterprises are paying increasing attention to innovation.

Table 1.1 Corporate R&D Expenditures and Corporate R&D Personnel from 2016-2020 in China

Indicator	2016	2017	2018	2019	2020
Corporate R&D expenditures (Billion yuan)	1192.35	1346.49	1507.93	1692.18	1867.38
Corporate R&D personnel (Person)	1472400	1766500	1972500	2206200	2409400

Note: Data sourced from the website of the National Bureau of Statistics of the People's Republic of China (https://www.stats.gov.cn/)

This study aims to assess the current innovation situation in China by analyzing corporate R&D expenditure and R&D personnel. It is widely acknowledged that innovation serves as a core competitive strategy for firms' survival and sustainable growth in China (Chao et al., 2017). Therefore, it is essential to understand China's innovation potential depends on factors that foster innovative activities.

CEOs, boards of directors, and owners are essential decision-makers in shaping the company's overall innovation strategy (Sariol & Abebe, 2017; Zona et al., 2013). CEOs are instrumental in steering the development and execution of strategic decisions, particularly when it comes to the thoughtful allocation of resources for innovation projects (Bromiley & Rau, 2016). A CEO's managerial competence is shaped by accumulated work experience (Dalziel et al., 2011). CEOs should have the expertise and experience to assist businesses in spotting opportunities (Dess, 2003). Therefore, in this study, based on resource-based theory, it is significant to study the effect of CEO backgrounds on innovation of listed firms in China.

The influence of a CEO can derive from multiple sources, one of which may include the practice of CEO duality (Jackling & Johl, 2009). When a company invests in innovation, it inherently assumes risk, especially for innovations that necessitate substantial time and resources but have uncertain outcomes (Flor et al., 2018). CEO power can also provide CEOs with increased managerial autonomy to allocate resources according to their own objectives (Zhang et al., 2022). Adams et al. (2005) highlighted that the power of CEOs' perspectives significantly impacts firm outcomes. Nevertheless, CEOs may encounter challenges when endeavoring to take decisive actions without a solid power base (Tang et al., 2011). Therefore, based on managerial power theory, there is particular research value for CEO power as a moderating variable in corporate innovation.

1.2.2 CEO Backgrounds of Listed Firms in China

The traits and capabilities of CEOs differ from those of lower-level managers due to the nature of their pivotal jobs (Michael et al., 2021; Wai & Rindermann, 2015). CEOs hold a significant impact on shaping the future of companies, employees, markets, and even the prosperity of entire nations and regions (Edersheim, 2007). Compared to Western economies, the influence of CEOs is more pronounced in China (Lin, 2001). The CEOs occupy the most influential position (Quigley & Hambrick, 2015) and employ organizational strategy formulation and execution to realize the company's long-term goals (Vera et al., 2022). The growing need for management proficiency in China can be attributed to the effects of privatization and heightened market competition (Child & Markóczy, 1993). In this regard, it is worthwhile to consider a crucial query: What kind of CEO backgrounds can affect corporate innovation? The study by Buyl et al. (2011) underscores the notion that CEOs with diverse backgrounds tend to demonstrate varying attitudes toward corporate innovation. According to Dalziel et al. (2011), CEOs should build relationships to help companies obtain resources essential for entrepreneurial ventures, particularly in the context of operations in China.

Recent research suggests that the background and cognitive characteristics of CEOs play a central role in shaping firms' innovation outcomes (Messinis & Ahmed, 2013; Zhang et al., 2017). A CEO's background can encompass multiple dimensions, including political affiliation, early-life experience, social networks, foreign experience, academic experience, and education and finance experience, all of which may influence innovation (Dong et al., 2024; Dai et al., 2024; Gao et al., 2023; Loukil et al., 2020;Protogerou et al., 2017; Semadeni et al., 2022;Wei & Ling, 2015) .

This study focuses specifically on three cognitive dimensions of CEO background—foreign experience, academic experience, and education level—as proxies for the broader construct of CEO background. These dimensions are selected for three reasons. First, they are theoretically grounded in the resource-based view, which emphasizes value, rarity, and inimitability as sources of firm advantage. Second, they are empirically validated in prior research as critical drivers of innovation (Loukil et al., 2020;Protogerou et al., 2017;Wei & Ling, 2015). Third, they are objectively measurable and comparable across listed firms, making them more suitable for rigorous empirical analysis than more subjective dimensions such as leadership style, political orientation, or personal charisma. By conceptualizing CEO background broadly and operationalizing it through these three cognitive proxies, this study ensures both theoretical comprehensiveness and empirical feasibility in examining how CEOs' backgrounds shape innovation performance.

Therefore, this study chooses three backgrounds of CEOs and introduces the definition: CEOs' foreign experience refers to whether CEOs have foreign studies or work experience (Giannetti et al., 2015; Kaplan et al., 2012). CEOs' foreign experience is an invaluable and irreplaceable resource for the company (Carpenter et al., 2001). CEOs' academic experience is divided into three categories (Shao et al., 2020; Wang et al., 2021): (1) having taught in universities and engaged in academic research; (2) having worked in scientific research institutions and engaged in research work; (3) having engaged in research work in academic associations or teams. The level of education, the amount of formal schooling, the type, and the quality of education are important factors that contribute to shaping the CEOs' educational level (Dorcas et al., 2021). Leaders with diverse cognitive traits may bring unique perspectives and experiences that can greatly enrich the business (Loukil et al., 2020). Creativity is generally regarded as primarily influenced by cognitive processes that occur within the individual (Rank et al., 2004). Foreign experience, academic experience, and educational level shape CEO cognition, and CEOs have foreign resources, academic resources, educational resources, which are essential resources for corporate innovation. Therefore, the selection of foreign experience, academic experience, and education level as the focal CEO resources in this study is both theoretically justified and contextually relevant under the resource-based theory framework.

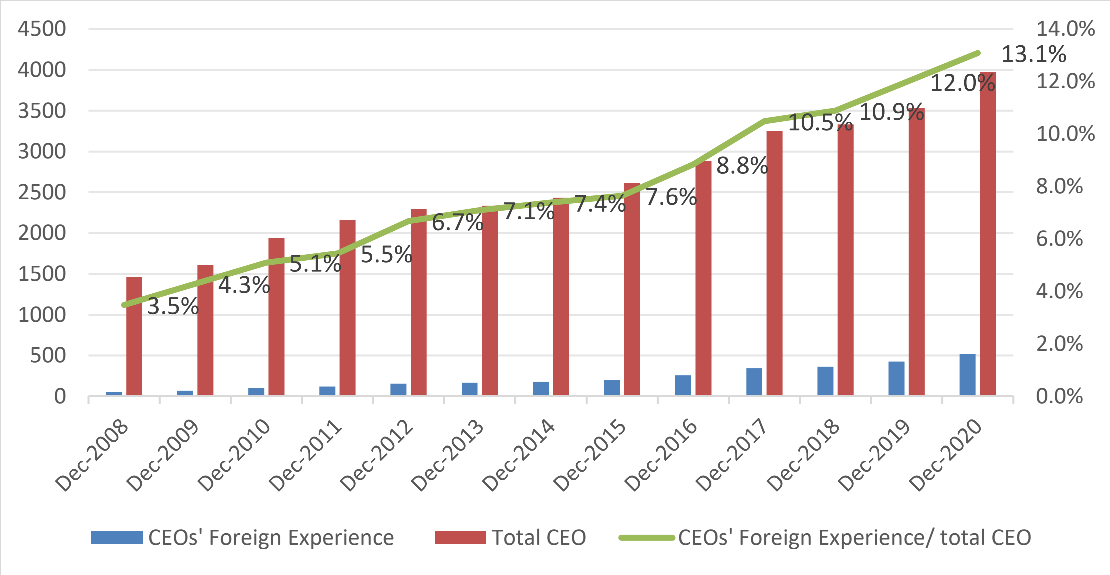
1.2.2(a) CEOs' Foreign Experience of Listed Firms in China

Since the early 1990s, provincial governments have implemented initiatives to draw in foreign-experienced talents to encourage entrepreneurship and facilitate the establishment of new companies (Giannetti et al., 2015; Zweig, 2006). In December 2008, the Chinese central government released a directive known as the High-level

Foreign Talent Introduction Plan, also referred to as The Thousand Talents Plan (Yuan & Wen, 2018). China is recognized as a leading destination for both foreign students and workers, holding a prominent position in the global arena (Liang et al., 2024).

In a rapidly growing market such as China, the foreign experience of CEOs has the potential to introduce new knowledge and foster positive spillover effects on the technological capabilities of local firms, thereby transforming a brain drain into a brain circulation phenomenon (Saxenian, 2007). CEOs' foreign experience exposes them to technological and business practice disparities between developed and home countries, which is particularly crucial given that emerging markets often follow developed countries in economic and technological development (Batjargal, 2007). The experience of CEOs in foreign countries can help identify opportunities for innovation and entrepreneurship, especially in the context of the disparity between developed and developing nations.

According to Figure 1.1, from 2008 to 2020, the proportion of CEOs with foreign experience gradually increased, from 3.5% in 2008 to 13.1% in 2020. In just thirteen years, the increase was 9.6%, indicating that listed firms in China are paying increasing attention to CEOs' foreign experience.



Note: Data sourced from the website of CSMMAR (https://www.gtarsc.com): TMT_FIGUREINFO

Figure 1.1 CEOs' Foreign Experience Variation Tendency of Listed Firms in China from 2008-2020

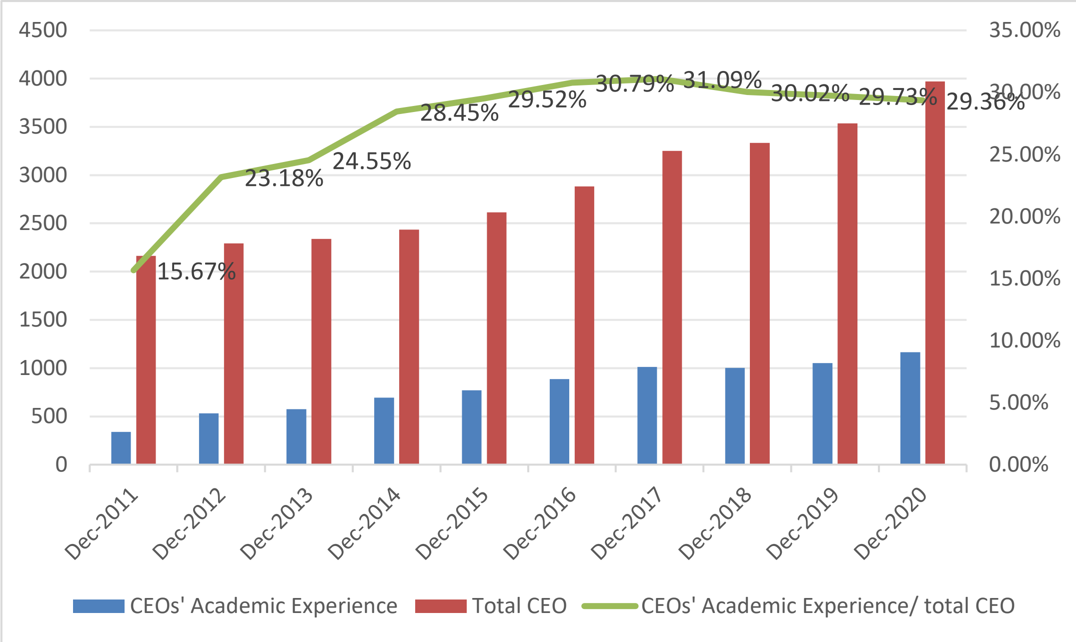
Firms in developing countries often encounter challenges in accessing the necessary resources for innovation, mainly due to the underdeveloped nature of institutional systems and commercial infrastructures (Zhang et al., 2007). Hence, corporates in developing countries have the opportunity to boost corporate innovation by tapping into resources from foreign (Li et al., 2010). Le and Kroll (2017) suggest that CEOs who have experience in countries with well-established market institutions are likely to acquire valuable insights. This knowledge can significantly enhance their ability to facilitate market-oriented adaptations in transitioning economies. Acquiring the necessary knowledge to navigate contemporary challenges not only enhances the cognitive resources of CEOs but also empowers them to prioritize and focus on long-term strategic planning (Ge et al., 2024).

Therefore, researching CEOs' foreign experience is particularly relevant to policymakers in China and other emerging markets.

1.2.2(b) CEOs' Academic Experience of Listed Firms in China

In China, there is a strong emphasis on academic collaboration with enterprises and the pursuit of entrepreneurship, which represents a departure from the practices commonly observed in Western traditions. In the wake of the major economic reforms of the 1990s, a notable transition occurred among academics and professors from governmental, research, and university backgrounds, as many of them shifted from non-commercial roles into commercial or entrepreneurial pursuits. According to Dickson (2007), the phenomenon is locally known as going down the sea, meaning entering business from academia. In 2017, in response to the economic downturn, the Ministry of Human Resources and Social Security in China introduced a preferential policy to encourage academics to pursue employment in businesses or entrepreneurship endeavours (Zhang et al., 2022). Companies in China have adopted a novel approach to enhance their technological capabilities known as forward engineering, which involves direct collaboration with academia (Lee et al., 2011).

Figure 1.2 shows that from 2011 to 2020, the proportion of CEOs with academic experience of listed firms in China gradually increased, rising from 15.67% in 2011 to 29.36% in 2020. Within just ten years, this represents an increase of 13.69%, indicating that an increasing number of CEOs with academic experience have been involved in corporate management in China.



Note: Data sourced from the website of CSMMAR(https://www.gtarsc.com): TMT_FIGUREINFO

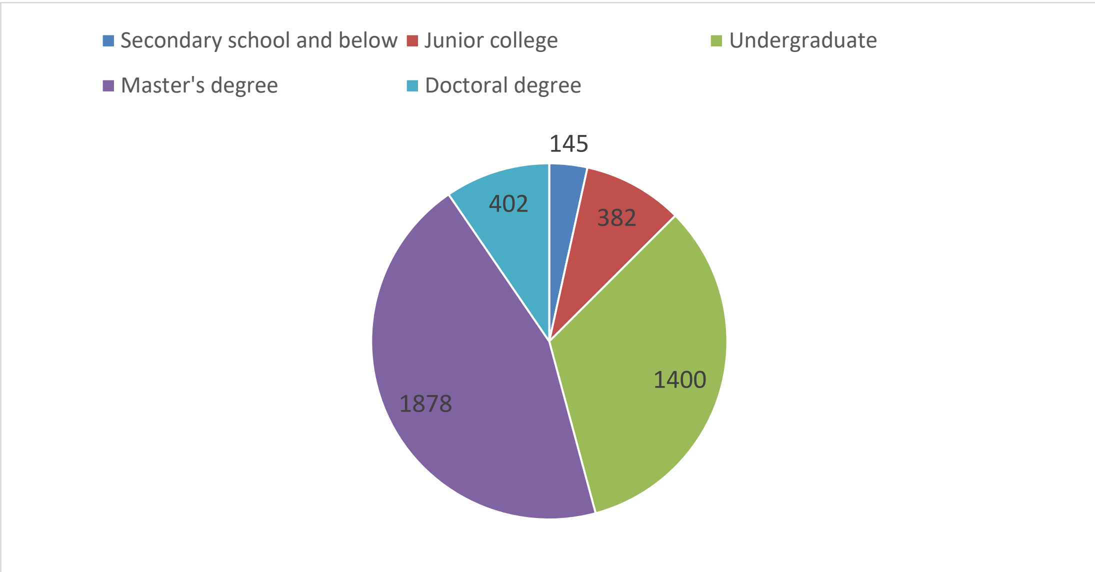
Figure 1.2 CEOs' Academic Experience Variation Tendency of Listed Firms in China from 2011-2020

The academic experience of CEOs can play a significant role in shaping a firm's approach to innovation activities in the context of China, guiding the allocation of attention and resources in this vital area (Shao et al., 2020). Those groups with a greater knowledge and capability base perform creative problem-solving tasks better than their counterparts with scarce resources (Bantel & Jackson, 1989). Cognitive diversity is a valuable resource; working in diverse functional areas fosters diverse cognition and positively influences attitudes (Bantel & Jackson, 1989), just as CEOs' academic experiences in universities, research institutions, academic associations, or teams can shape diverse cognition.

Therefore, studying the impact of CEOs' academic experience on corporate innovation is significant.

1.2.2(c) CEOs' Education Level of Listed Firms in China

In 2017, the Opinions on Deepening the Reform of the Education System and Mechanism highlighted the importance of prioritizing talent training within universities. It encouraged institutions to refine their educational concepts and to take comprehensive measures aimed at enhancing their capacity for nurturing talent effectively (Xue & Li, 2022). In 2018, during the National Education Conference, Xi Jinping emphasized the importance of establishing top-tier universities, fostering collaborative innovation, and implementing an innovation-driven development strategy to nurture innovative talent (Xue & Li, 2022). It reflects the important position and role of education in national development. Therefore, this study focuses on CEOs' education level. According to Figure 1.3, CEOs' education level of listed firms in China in 2022 show the highest proportion holding a master's degree, followed by an undergraduate degree, then a doctoral degree, junior college, and a secondary school degree.



Note: Data sourced from the website of CSMMAR (https://www.gtarsc.com): -TMT_FIGUREINFO

Figure 1.3 The Proportion of CEOs' Education Level of Listed Firms in China in 2022

The cognitive approach regards knowledge as an internal capability tied to the brain and situated in social practice (Nightingale, 1998). King et al. (2016) explain that a person's cognitive capability forms the basis for predetermining a range of variables associated with social and economic issues. The social networks of well-educated leaders possess a discernible advantage in both size and quality, which allows them to access greater support resources (Li & Shi, 2010).

Therefore, studying the impact of CEOs' education level on corporate innovation is significant.

1.2.3 CEO Power of Listed Firms in China

CEOs who possess a higher level of authority are often in a stronger position to promote the interests of both the firm and its shareholders (Lange et al., 2015). The findings of Qiao et al. (2017) suggest that CEO power, by effectively navigating competing push-and-pull forces, can enhance both the short-term and long-term performance of firms in China.

CEO power has been conceptualized in multiple ways across the corporate governance literature. Finkelstein (1992) proposed a widely cited framework that classifies CEO power into four dimensions: structural power, ownership power, expert power, and prestige power. Structural power arises from formal authority within the organization, such as holding the dual role of CEO and board chair, or leading critical board committees. Ownership power stems from equity stakes held by the CEO. Expert power reflects a CEO's accumulated knowledge and experience, while prestige power is derived from external legitimacy, such as elite education, political ties, or interlocking directorships. These dimensions highlight that CEO power is multidimensional and can be measured using a variety of observable proxies (Finkelstein, 1992; Haynes & Hillman, 2010).

In this study, CEO power is proxied by CEO duality, which occurs when the CEO simultaneously serves as the chair of the board (Ruigrok et al., 2006). This proxy has been widely adopted in corporate governance and strategic management research because it directly reflects structural power. This includes the formal authority to influence board agendas, reduce monitoring intensity, and centralize decision-making authority (Krause et al., 2014). Compared to alternative proxies, such as CEO ownership, tenure, or network centrality, CEO duality offers notable advantages: it is objectively observable from publicly available disclosures, involves minimal measurement error, and facilitates comparability with prior studies on corporate governance and innovation (Haynes & Hillman, 2010; Krause et al., 2014). Empirical evidence also demonstrates that CEO duality significantly shapes managerial discretion and strategic outcomes, including innovation (Krause et al., 2014).

Therefore, there is particular research value in using CEO power as a moderating variable in corporate innovation.

1.2.3(a) CEO Duality of Listed Firms in China

In this study, CEO power is proxied by CEO duality (Haynes & Hillman, 2010). In China, the executive team operates in two organizational structures: one where the chairman and CEO roles are merged and another where the two roles are separate (Peng & Fang, 2010). CEO duality describes a circumstance in which an individual holds both the roles of CEO and chairman within an organization (Peng & Fang, 2010). This arrangement can lead to a unique governance structure and may influence the dynamics of leadership and oversight. CEO duality may impact the CEO's ability to guide the company's strategic decisions toward investment in innovation (Vandenbroucke et al., 2016).

Scholars have increasingly focused on examining the impact of corporate leadership structures on firm innovation and growth, with particular attention to the effect of CEO duality on firms (Wijethilake & Ekanayake, 2019). According to previous research (Haynes & Hillman, 2010), the role of the CEO is also that of a chairperson, which can create a solid power base.

CEO duality is usually valued and endorsed by Chinese senior management team members and the board of directors, placing more emphasis on it as an authority. The respect and recognition of authority by Chinese senior management team members facilitate the execution of the CEO's preferred strategy (Mizruchi & Stearns, 2006).

The lack of independence due to the frequent personal relationships between the firm's top management and board members may diminish the monitoring function of board personnel (Bai et al., 2004). The existence of CEO duality, coupled with an ineffective board of directors, thus contributes to the CEO's retention of substantial power, which provides the CEO with the opportunity to shape the firm's direction and growth advantages (Lin, 2001). Hassan et al. (2023) found that firms with CEO duality have higher cumulative abnormal returns. CEO duality reflects the fusion of leadership and control, which enhances managerial effectiveness (Tao et al., 2018). A newly appointed CEO on the board of directors provides greater authority and influence over the board, stakeholders, and subordinates, reduces ambiguity and uncertainty, lowers risk, and ultimately significantly impacts innovation (Finkelstein & D’Aveni, 1994). Therefore, CEO duality holds particular value as a proxy for CEO power in this study. This research will examine how CEO power moderates the impact of CEO backgrounds on innovation of listed firms in China.

1.3 Scope of the Study

The sample for this study consisted of companies listed between 2010 and 2022 on China's A-share stock market, which is traded on the Shanghai Stock Exchange and Shenzhen Stock Exchange. The rationale behind selecting China's listed companies from 2010 to 2022 as samples in this study was rooted in the stabilization of China's economic and trade market policies following the 2008 financial crisis. The recent activity of listed firms in China has injected renewed vibrancy into the market, enhancing data accessibility, comparability, and representativeness for previous studies on listed firms in China (Liu et al., 2023). In order to address the possible data distortion caused by the 2008-2009 financial crisis, data prior to 2010 were excluded, and this study conducted a regression analysis of the effect of CEO background on corporate innovation (Cao et al., 2022).

This study focuses on China for the following primary reasons. China's national strategy is closely linked with talent and innovation. The 19th National Congress of the Communist Party of China emphasized that fostering innovation serves as a fundamental catalyst for sustainable development (Yu, 2019). In 2020, the Proposal issued by the CPC Central Committee on the Formulation of the Fourteenth Five-Year Plan for National Economic and Social Development, as well as the Vision Goals for 2035, highlighted the significance of prioritizing the cultivation of personnel who are innovative, application-focused, and possess strong skills. This approach is seen as a vital step towards fostering sustainable development and achieving our collective goals (Xue & Li, 2022). Therefore, there is significant research value in studying listed firms in China.

1.4 Motivation of the Study

Considering the current situation in China, it is crucial to grasp the elements that promote innovation in different environments. Motivated by the necessity of improving corporate innovation, this research posits that CEO power moderates the impact of CEO backgrounds on innovation based on a sample of listed firms in China from 2010 to 2022.

This study is motivated by research gaps. First, drawing on resource-based theory, foreign experience, academic experience, and educational level shape CEOs' cognition and provide them with valuable resources that are essential for fostering corporate innovation. Secondly, based on managerial power theory, CEO power moderates the impact of CEO backgrounds on innovation of listed firms in China. Finally, the growing significance of innovation in less technologically developed countries underscores the need for increased academic research, as there is a scarcity of studies focusing on this topic. Especially in China, based on managerial power theory, there is limited research on how CEO power as a moderating variable strengthens or weakens the impact of CEO backgrounds on innovation.

1.5 Problem Statement

Although China has long been recognized as a manufacturing power, the capacity for independent innovation among firms in China has consistently lagged behind the demands of sustained economic development and industrial upgrading. According to the National Innovation Drive Development Strategy Outline published by the State Council and CPC Central Committee in 2016 (Yu, 2019), the dynamic force of corporate innovation is not enough, and the overall efficiency of the innovation system is not high. This issue still exists in China. In light of the evolving economic landscape, it is imperative for China to cultivate a development model with innovation at its core expeditiously.

R&D serves as a fundamental catalyst for technological innovation. It plays a vital role in strengthening the core competitiveness of enterprises and contributes to their long-term sustainable development. It is an indispensable microeconomic foundation for realizing the national innovation-driven strategy (Niu & Wang, 2024). The R&D investment of China's firms was only 2.6% of GDP in 2022 (Yao et al., 2023). According to internationally recognized standards, firms are expected to allocate more than 5% of their resources to R&D in order to remain competitive (Yang & Xiang, 2023). By contrast, when the R&D investment ratio is 2% or lower, firms are generally limited to maintaining basic survival rather than achieving innovation-driven growth. Hence, there is still room for listed firms in China to improve their innovation.

Innovation is essential to contemporary businesses' existence, prosperity, and expansion (Bolívar-Ramos et al., 2012; Chatzoglou & Chatzoudes, 2018; Kyrgidou & Spyropoulou, 2013). Promoting innovation in China's listed firms is essential not only for improving production methods, efficiency, and core competitiveness to support economic growth and enhance international competitiveness (Lucas, 1988), but also for driving industrial reform, advancing technological progress, and ensuring the high-quality and sustainable development of the national economy (Han et al., 2021; Yang et al., 2020). The economic growth of China is greatly influenced by innovation, and it is imperative for policymakers to acknowledge it as a critical issue with a positive economic impact (McCann & Oxley, 2012; Yu et al., 2013). The Chinese government, enterprises, and academic circles have widely discussed innovation. Therefore, this study is focused on corporate innovation.

However, several factors make the relationship between innovation and survival uncertain. Firstly, R&D can often be a significant investment with inherent risks (Mata & Woerter, 2013), which causes a situation where the associated costs exceed the benefits. The responsibility to innovate may increase the risk of business challenges or new product launch failures (Sinha & Noble, 2008). Secondly, in highly competitive markets, firms may experience challenges in fully realizing their innovation advantage due to the possibility of competitor imitation (Kafouros et al., 2008). Thirdly, Deng et al. (2012) suggest that firms' success through innovation may be jeopardized in the face of competition, and innovation activities usually involve long-term strategic planning that requires initial investment before eventual success (Hou et al.,2017). Finally, enterprises in developing countries often encounter challenges such as limited technology expertise, constrained access to external resources, and underdeveloped commercial infrastructure for innovation (Li & Atuahene-Gima, 2001).

A new development model centered on both domestic and international circulation is emerging in China. In light of the evolving economic landscape, it is important to unlock the potential for domestic development, enhance the efficiency of domestic circulation, and foster independent innovation capabilities. By reducing dependence on foreign technology, China aims to promote the high-quality development of its innovation-driven economy in a balanced and sustainable manner (Niu & Wang, 2024). The implementation of the innovation drive should be based on market mechanisms and enterprise-led. However, the lack of firms engaging in original innovation in China has been a subject of ongoing criticism (Niu & Wang, 2024). Therefore, determining the success of China's innovation-driven strategy hinges on fully stimulating the vitality of corporate innovation.

In this context, CEOs play a key role in shaping corporate strategy and influencing organizational behavior in China, including promoting innovation (Chen et al., 2014). Appointing CEOs with diverse backgrounds is widely recognized as a strategy to provide new perspectives and increase access to resources (Faccio et al., 2016; Farag & Mallin, 2016). Although prior studies acknowledge the importance of CEO backgrounds, there is still limited evidence on how specific CEO backgrounds—such as foreign experience, academic experience, and education level—affect innovation. CEOs' foreign experience provides essential technological expertise and global relationships that are critical resources for innovation-related activities (Kotabe et al., 2007). CEOs' academic experience has resources of outside knowledge, experience, and academic networks (Fabrizio, 2006). CEOs' education levels shape cognition (Wally & Baum, 1994), contribute to knowledge acquisition (Hitt et al., 2001), and enhance innovation awareness (Lin et al., 2011). However, the extent to which these CEO backgrounds influence innovation within the context of China remains underexplored from the perspective of resource-based theory.

The influence of CEO power plays a crucial role in shaping and implementing strategic decisions. The power of CEOs enables them to more comprehensively integrate their preferences into strategic actions (Combs et al., 2007). Prior studies show CEO power significantly alters innovation strategies and outcomes (Bebchuk & Fried, 2003; Tang et al., 2011). From the perspective of the management, among all the factors influencing enterprise innovation, the important feature that cannot be ignored is managerial power, which is the ability of the management to implement enterprise decisions based on their own will (Finkelstein, 1992). The management is the main body of making and executing enterprise innovation decisions, whose power directly affects enterprise innovation performance (Garms & Engelen, 2019). Prior research has paid inadequate attention to the influence of managerial power (Akıncı et al., 2022; Haider et al., 2023). If managerial power is effectively exercised, it can not only stimulate the potential and motivation of enterprise innovation, but also fully obtain external information and other supports to concentrate on integrating resources for innovation. Besides, it is also conducive to encouraging staff innovation autonomy. Management exercises greater control due to the power it holds. They can decide the formulation and implementation of enterprise innovation decisions according to their own will and meet preferences for investment in innovation projects, thereby promoting enterprise innovation performance (Huo & Li, 2023).

Taken together, while existing research has explored either CEO backgrounds or managerial power in isolation, few studies have systematically examined how CEO power interacts with different CEO backgrounds to influence firm innovation. This represents a critical gap in the literature, as CEO backgrounds may provide valuable resources and perspectives, but their effectiveness in driving innovation may depend on whether CEOs possess sufficient power to implement their vision.

Therefore, motivated by managerial power theory, this study is significant in examining whether the power of the CEO, as a moderating variable, strengthens or weakens the influence of the CEO backgrounds on innovation of listed firms in China. Managerial power theory is chosen because it directly emphasizes how CEOs can shape firm outcomes through their discretion and influence over strategic decisions, including innovation. It thus provides a stronger explanatory framework for analyzing CEO power as a moderating variable in the CEO backgrounds–innovation relationship.

1.6 Research Questions

This study attempts to examine the following research questions:

1. Do CEOs' foreign experience, CEOs' academic experience, and CEOs' education level affect the innovation of listed firms in China?

2. Does CEO power moderate the impact of CEO's foreign experience, CEOs' academic experience, and CEOs' education level on innovation of listed firms in China?

1.7 Research Objectives

This study aims to examine the effect of CEO backgrounds on corporate innovation of listed firms in China from 2010 to 2022. This study pursues the following objectives to answer the above research questions:

1. To examine whether CEOs' foreign experience, CEOs' academic experience, and CEOs' education level affect the innovation of listed firms in China.
2. To examine whether CEO power moderates the impact of CEO's foreign experience, CEOs' academic experience, and CEOs' education level on innovation of listed firms in China.

1.8 Significance of the Study

The current study seeks to offer two important theoretical and practical significances, which are outlined as follows:

1.8.1 Theoretical Significance

This study extends the research scope of CEO backgrounds and corporate innovation, and studies the impact of CEO backgrounds on corporate innovation from three dimensions of theoretical significance: CEOs' foreign experience, CEOs' academic experience, and CEOs' education level. Most studies examining the effect of CEO backgrounds on innovation use the upper echelons theory (Bennat & Sternberg, 2022; Dorcas et al., 2021; Zhu et al., 2023). This study, based on resource-based theory, enriches the theoretical significance of the research on corporate innovation management.

The effect of CEO backgrounds on innovation has sparked considerable debate in both business and academic circles. The ongoing discourse in organization studies between social and economic theorists significantly contributes to the diversity of perspectives within the field. Previous research indicates that CEO power can have both advantageous and disadvantageous effects (Sheikh, 2018). Previous research on CEO power has been mainly based on agency theory (Cai et al., 2021; Li & Pan, 2022; Song et al., 2015). Therefore, in this study based on managerial power theory, CEO power moderates the impact of CEO backgrounds on innovation of listed firms in China. CEO power is proxied by CEO duality. CEO power is proxied by CEO tenure for robustness. While the discussion about CEO duality versus nonduality is a prominent topic in both academic literature and practice, there remains a gap in clear evidence linking CEO backgrounds to innovation, especially within listed firms in China. This study provides direct evidence of CEO duality and CEO tenure influence on corporate innovation.