THE INFLUENCING FACTORS OF TECHNOLOGICAL INNOVATION CAPABILITY OF APPLE'S BEIJING BRANCH

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This Independent Study has been Approved as a Partial Fulfillment of the Requirements for the Degree of Master of Business Administration

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ABSTRACT

This study investigated the factors influencing technological innovation capability, focusing on Apple's Beijing Branch. A structural model was developed to examine how key factors including external environment, innovation input, organizational management, and innovation outcome interacted and contributed to the company's technological innovation capacity. Through rigorous hypothesis testing and model validation, the study provided a comprehensive understanding of the dynamics between these factors and offered insights into the pathways through which they shaped innovation performance in the context of Apple's Beijing Branch.

The primary purpose of this study was to propose constructive ideas and suggestions for enhancing the technological innovation capability of Apple's Beijing Branch. By understanding the influencing factors and their relationships with technological innovation capability, the study aimed to offer practical guidance for enterprises seeking to improve their innovation performance. Based on a substantial amount of relevant literature, this study systematically reviewed Dynamic Capability Theory and applied it to the context of technological innovation capability.

A quantitative research method was employed in this study to collect and analyze data. A total of 400 questionnaires were distributed , and 345 valid responses were received, resulting in an effective response rate of 86.25%. The research reveals that external environment, innovation input, organizational management, and innovation outcome all have significant effects on technological innovation capability. These factors interact in complex ways, collectively shaping the technological innovation landscape of the enterprise.

Based on the research findings, the following suggestions are proposed for the enterprise to enhance its technological innovation capability: (1) Strengthen environmental monitoring to seize innovation opportunities; (2) Optimize the allocation of innovation input to enhance innovation efficiency; (3) Improve organizational

management to stimulate innovation vitality; (4) Accelerate the commercialization of innovation outcome to realize business value.

Keywords: Dynamic Capability Theory, technological innovation capability, Apple's Beijing Branch

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The completion of this independent study not only serves as a summary of my past learning journey but also marks a new starting point for my future academic research. I will continue to uphold a rigorous and truth-seeking academic attitude, ceaselessly exploring and striving forward on the path of education.

WANGTIANYU

DECLARATION

I, WANGTIANYU, hereby certify that the work embodied in this independent study entitled *"The Influencing Factors of Technological Innovation Capability of Apple's Beijing Branch"* is result of original research and has not been submitted for a higher degree to any other university or institution.

(WANGTIANYU)
July 3, 2025

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Chapter 1 Introduction

1.1 Background of the Study

In the current era, the global technology industry is flourishing at an unprecedented pace. Emerging technologies, represented by information technology, artificial intelligence, big data, and the Internet of Things, are constantly emerging and deeply integrating, driving digital transformation and innovative changes across various industries. As the main body of technological innovation, technology enterprises play an increasingly crucial role in the global economic landscape. Their technological innovation capability not only determine their survival and development but also have a profound impact on the economic competitiveness of countries or regions. The rise of the smartphone industry has completely transformed the ways people communicate, entertain themselves, and live their lives, making it one of the most important pillars of the global technology industry (Aguinis et al., 2020).

The consumer electronics market is one of the most fiercely competitive areas in the technology industry. With the improvement of people's living standards and the deepening of technology penetration, consumers' demands for consumer electronics products are becoming increasingly diversified and personalized. They not only require products with high performance and quality but also expect them to bring brand-new user experiences and innovative features. This compels consumer electronics companies to continually increase their investment in technological research and development and enhance their technological innovation capability to quickly launch new products that meet market demands and secure a place in the fiercely competitive market (Qu, 2022). Taking the smartphone market as an example, major brands such as Apple, Samsung, and Huawei invest substantial resources in technological research and development every year and continuously introduce innovative products to attract consumers and maintain market share (Bao & Chen 2019).

Apple, as a global leader in the technology industry, boasts a massive user base and extremely high brand recognition worldwide due to its exceptional technological innovation capability, high-quality products, and unique brand culture. Since its inception, Apple has launched a series of groundbreaking products, including the Macintosh personal computer, iPod music player, iPhone smartphone, and iPad tablet computer (Songkajorn et al. 2022). These products have not only changed people's lifestyles but also led the development trends of the global technology industry. Apple's success stems from its strong technological innovation capability, enabling it to continuously combine advanced technologies with outstanding designs to create disruptive products.

Beijing, as China's political, cultural, and technological center, is endowed with rich technological resources, an excellent talent pool, and a favorable innovation

environment. Apple's Beijing Branch, as an important research and development and operational base of Apple in China, undertakes multiple key technological research and development tasks and business operational functions (Lu et al., 2018). It holds a significant position in Apple's global strategic layout, providing strong support for Apple's development in the Chinese market and participating in Apple's global technological innovation activity. The development status and technological innovation capability of Apple's Beijing Branch not only affect Apple's competitiveness in the Chinese market but also, to a certain extent, influence the operation of Apple's global technological innovation system.

In the technology industry, technological innovation is the core driving force for enterprises to maintain a competitive edge and achieve sustainable development. For technology giants like Apple, continuous technological innovation enables them to launch innovative products and services, meet consumers' ever-changing demands, and thus consolidate their leading positions in the market. Technological innovation can also create new business growth points and profit sources for enterprises, enhancing their profitability and market value (Wang et al. 2021). Through continuous innovation, Apple has transformed the smartphone from a mere communication tool into an intelligent terminal integrating communication, entertainment, office, and other functions, creating a brand-new business model and market space.

Conducting in-depth research on the influencing factors of Apple's Beijing Branch's technological innovation capability holds significant practical importance. On the one hand, by identifying and analyzing the key factors influencing technological innovation capability, Apple's Beijing Branch can better understand its strengths and weaknesses, formulate targeted technological innovation strategies and management measures, optimize resource allocation, and improve the efficiency and quality of technological innovation, thereby further enhancing its technological innovation capability. On the other hand, for other technology enterprises, Apple's Beijing Branch's technological innovation experience and practices can serve as a valuable reference. By studying the influencing factors of its technological innovation, other enterprises can gain useful insights and inspiration, promoting the overall improvement of technological innovation levels in the entire technology industry.

1.2 Questions of the Study

This study is based on Dynamic Capability Theory and technological innovation, aiming to explore the influencing factors of technological innovation capability. It focuses on revealing the action mechanisms of various elements on technological innovation capability from four dimensions: external environment, innovation input, organizational management, and innovation outcome.

(1) Does external environment affect technological innovation capability?

(2) Does innovation input affect technological innovation capability?

(3) Does organizational management affect technological innovation capability?

(4) Does innovation outcome affect technological innovation capability?

1.3 Objectives of the Study

Although scholars have conducted extensive research on Dynamic Capability Theory and technological innovation, there has been relatively little exploration and analysis of the influencing factors of technological innovation based on Dynamic Capability Theory. Taking Apple's Beijing Branch as a case, this study aims to comprehensively understand the core influencing factor framework of technological innovation capability from a systematic perspective of Dynamic Capability Theory.

(1) To explore the influence of external environment on technological innovation capability.

(2) To explore the influence of innovation input on technological innovation capability.

(3) To explore the influence of organizational management on technological innovation capability.

(4) To explore the influence of innovation outcome on technological innovation capability.

1.4 Scope of the Study

This study focused on the influencing factors of the technological innovation capability of Apple's Beijing Branch, conducting in-depth analysis from multiple dimensions. The geographical scope was clearly defined as Beijing. Beijing has a unique technological industry ecosystem, strong policy support, and a fiercely competitive market environment. Apple's Beijing Branch's technological innovation activity exhibits distinct local characteristics and representativeness, and studying this region helps to grasp the influencing factors under specific circumstances.

The research content covered the impacts of external environment, innovation input, organizational management, and innovation outcome on the technological innovation capability of Apple's Beijing Branch. Data collection was carried out using the professional online questionnaire platform Wenjuanxing, which is easy to

operate and facilitates convenient data statistics, effectively improving the efficiency and quality of data collection. The data collection period was from May to June 2025. In the data analysis stage, the study combined the professional statistical analysis software SPSS and employed correlation analysis and multiple linear regression methods to explore the action mechanisms between various influencing factors and technological innovation.

1.5 Significance of the Study

1.5.1 Theoretical Significance

For the theoretical system of technological innovation, most current research focuses on the macro level or general enterprises, and there is a relative lack of research on the technological innovation of branches of multinational technology enterprises in specific regions. As Apple's core research and development and operational entity in China, Apple's Beijing Branch has a unique organizational structure, innovation model, and operating environment. Conducting in-depth research on the influencing factors of its technological innovation capability can precisely reveal the internal laws and action mechanisms of multinational technology enterprises' technological innovation activity in specific regions from a micro perspective. This adds new cases and empirical evidence to the technological innovation theory, contributing to the further improvement and enrichment of the existing technological innovation theoretical system and promoting its continuous development and deepening.

In the field of research on multinational enterprises' technological innovation, the technological innovation activity of multinational enterprises is often influenced by the interaction of multiple factors from the home country and the host country. Apple's Beijing Branch not only carries Apple's global innovation strategy but also needs to adapt to China's unique market environment, policies, regulations, and cultural background. Research on the influencing factors of its technological innovation capability can deeply analyze the differences and commonalities in technological innovation among multinational enterprises under different cultural, institutional, and economic environments. This expands the scope of research on multinational enterprises' technological innovation and provides a unique Chinese perspective and valuable Chinese experience for the international development of multinational enterprises' technological innovation theory.

From the perspective of the interaction between regional innovation systems and enterprise innovation, Beijing, with its rich technological resources, complete innovation infrastructure, and active innovation ecosystem, is a typical representative of regional innovation systems. Apple's Beijing Branch, as an important subject in the

regional innovation system, has technological innovation activity that interact and influence the regional innovation system. By studying the influencing factors of the technological innovation capability of Apple's Beijing Branch, we can reveal how the elements and structure of the regional innovation system affect enterprise innovation and how enterprise innovation, in turn, affects the optimization and upgrading of the regional innovation system. This helped to deepen the understanding of the interaction between regional innovation systems and enterprise innovation and provides new ideas and directions for relevant theoretical research.

1.5.2 Practical Significance

For the development of Apple's Beijing Branch, identifying the key factors influencing its technological innovation capability is of great significance. This helps the company's management formulate more scientific and reasonable technological innovation strategies based on its strengths and external environment. For instance, if research and development investment and talent reserve significantly affect technological innovation, the company can increase investments in these areas, optimize resource allocation, and improve innovation efficiency, thereby enhancing its core competitiveness. Understanding the influencing factors of technological innovation capability enables Apple's Beijing Branch to identify problems and deficiencies in its innovation management process and make targeted improvements to its innovation management processes and methods. In a rapidly changing market environment, technological innovation is the key for enterprises to adapt to the market and meet consumer demands. By studying the influencing factors, Apple's Beijing Branch can better grasp market trends and changes in consumer demands, timely adjust the direction and focus of technological innovation, and launch more competitive products and services, enhancing its market adaptability and market share.

For other technology enterprises, Apple's Beijing Branch has accumulated rich experience and successful practices in technological innovation. Other technology enterprises can learn from its advanced innovation concepts, management models, and technological routes by studying the influencing factors of its technological innovation capability. Based on their actual situations, they can formulate technological innovation strategies suitable for their development and enhance their technological innovation capability. Collaborative innovation among technology enterprises is an important driving force for industrial development. Understanding the influencing factors of Apple's Beijing Branch's technological innovation helps other technology enterprises better collaborate with Apple's Beijing Branch, achieve resource sharing and complementary advantages, jointly carry out technological research and development and innovation activity, and promote the collaborative development and upgrading of the entire technology industry.

From the perspective of government policy formulation, by studying the influencing factors of the technological innovation capability of Apple's Beijing Branch, the government can gain a deeper understanding of the challenges and needs that tech enterprises encounter during the process of technological innovation. Consequently, it can formulate more targeted industrial policies, providing tech enterprises with a favorable policy environment and development opportunities. Beijing, as a science and technology innovation center, its innovation layout and resource allocation play an important leading role in the national science and technology innovation development. Research on the influencing factors of the technological innovation capability of Apple's Beijing Branch helps the government understand the innovation demands and development trends of enterprises in the regional innovation system, optimize the regional innovation layout, reasonably allocate innovation resources, improve regional innovation efficiency and competitiveness, and promote Beijing's construction into a globally influential science and technology innovation center.

1.6 Definition of Key Terms

Technological Innovation Capability: It refers to an enterprise's ability to rely on and utilize various knowledge, technologies, and resources to carry out technological innovation activity and successfully transform innovation achievements into commercial value.

External Environment: It refers to the sum of various factors and forces outside the enterprise that have a direct or indirect impact on the enterprise's technological innovation activity.

Innovation Input: It refers to the sum of various resources invested by an enterprise in the process of technological innovation. These resources are the foundation and guarantee for carrying out technological innovation activity, and their quantity and quality directly affect the effectiveness and capability of the enterprise's technological innovation.

Organizational Management: It refers to a series of activity and mechanisms through which an enterprise plans, coordinates, and controls the internal structure, processes, culture, and personnel to achieve technological innovation goals.

Innovation Outcome: It refers to the various achievements and benefits obtained by an enterprise through technological innovation activity. It is a direct reflection of the enterprise's technological innovation input and organizational management, and also an important indicator for measuring the enterprise's technological innovation capability.

Chapter 2 Literature Review

2.1 Introduction

This chapter reviews the literature related to Dynamic Capability Theory and technological innovation, providing a theoretical foundation for the variable relationships and research hypotheses of this study. The literature review covers critical factors influencing technological innovation, including external environment, innovation input, organizational management, and innovation outcome. Through a systematic review of existing literature, this chapter offers theoretical support for each variable in the research model. It also helps determine the relationships between these variables and provide a basis for subsequent hypothesis testing.

2.2 Literature Review

2.2.1 Dynamic Capability Theory

Dynamic Capability Theory was first proposed by Teece et al. (1997) in the Journal of Strategic Management. This capability involves integrating, constructing, and reshaping internal and external capabilities to adapt to a constantly changing and complex environment. Dynamic Capability Theory analyzes how firms create wealth in a rapidly changing technological environment and examines the sources and pathways of wealth creation (Qu, 2022). The evolution process of firm dynamic capabilities can be summarized as follows: firms are influenced by changes in external environment, identify development opportunities, implement reforms in resources and management, and ultimately establish new operational capabilities through the integration and reconfiguration of internal and external resources (Lu et al., 2018). The characteristics of dynamic capabilities include complexity, openness, systemicity, dynamism, and contradiction (Teece et al., 1992). Jiao et al. (2021) defined firm dynamic capabilities as the firm's ability to scan the environment, identify opportunities, and, based on these insights, integrate, construct, and adjust internal and external resources to enhance operational capabilities and adapt to complex and rapidly changing environments.

From the perspectives of practice and organizational evolution, Winter (2018) observed that dynamic capabilities distinctly differ from static resources and firm capabilities traditionally studied. Dynamic capabilities represent a unique learning approach, with the essence of this specific capability lying in its repeatability in practice. From the perspective of business processes, Eisenhardt and Martin (2011) argued that the dynamic capabilities of an organization include acquiring new resources through various means, integrating and organizing organizational resources, and reconfiguring internal and external resources to adapt to and even lead the market.

From the perspective of organizational knowledge, Songkajorn et al. (2022) suggested that dynamic capabilities can be viewed as a universally applicable entrepreneurial capability that organizations can utilize to formulate and adjust organizational plans in response to constantly changing industry environments.

Dynamic Capability Theory is now widely applied in the fields of corporate strategic management and corporate innovation (Jiao et al., 2021). By adapting to environmental changes and reconfiguring resources, firms can seize development opportunities and gain competitive advantages, achieving firm performance through innovations such as new products, new markets, and new technologies generated by restructuring or adjusting resource combinations (He et al., 2023). Xu and Xu (2012) categorized the dynamic capabilities of technological innovation into three aspects: investment capacity, output capacity, and transformation capacity of technological innovation. They argued that existing research focuses on static stages without considering the processual and cumulative nature of technological innovation. They contend that the dynamic capabilities of technological innovation are comprehensive indicators that reflect the processual and cumulative nature of technological innovation and explain technological innovation capacity. Dynamic capabilities have a positive impact on organizational innovation and serve as a prerequisite and foundation for organizational innovation (Wang, 2018).

2.2.2 Technological Innovation Capability

2.2.2.1 Connotation of Technological Innovation Capability

Technological innovation refers to innovative practical activity conducted by firms to improve product quality and develop new products to capture the market and realize market value (Qu et al., 2023). To further enhance the competitiveness of innovative products, firms primarily take measures such as applying innovative knowledge, new technologies, and new processes, and making efforts to update production modes and management methods. Joseph Schumpeter first proposed in his work “The Theory of Economic Development” that technological innovation is the primary driving force behind economic development (Christensen, 1995). His work involves recombining production factors and conditions, which includes multiple aspects such as the development of new products, the introduction of new production technologies, the expansion of new markets, the exploration of new sources of raw materials, and the emergence of new organizational forms (Taylor, 2004). According to his viewpoint, innovation is not technological progress but covers a broader domain, including, but not limited to, entrepreneurship, market competition, and organizational change.

The academic community is concerned with how to measure technological innovation, thereby emphasizing the capability for technological innovation (Wei &

Xu, 1996). However, due to different research perspectives, there are certain differences in the specific content of technological innovation capability. The main divergence lies in the definition and expression of the connotation of technological innovation (Winter, 2018). Despite differences in the definitions and connotations of technological innovation capability among scholars domestically and internationally, there is a prevailing view that technological innovation in firms is a time-consuming process and not achieved overnight (Hanxi et al., 2017).

Scholars have proposed various viewpoints regarding the elaboration of technological innovation capability. The first viewpoint emphasizes the comprehensive nature of technological innovation capability, arguing that it is not limited to the research and development phase but involves all links in the technological innovation chain, requiring coordination and cooperation among these links. The second viewpoint highlights the role of market demand in the development of technological innovation capability, suggesting that market demand is the key factor driving the development of technological innovation capability, which can stimulate firms to engage in research and development activity and promote the generation and application of technological innovation outcome. The third viewpoint emphasizes the promoting effect of technological progress on technological innovation capability from a "technology-driven" perspective. Simultaneously, technological innovation also promotes the release and satisfaction of latent market demands. The fourth viewpoint combines the previous perspectives and proposes the idea of "push-pull integrated effect," viewing technological innovation capability as the result of the interaction between market demand and science and technology. Market demand and science and technology interact and jointly constitute the driving force behind the formation and development of technological innovation capability (Flor & Oltra, 2004).

Fu and Oltra (2004) argued that the formation of technological innovation capability includes not only a firm's research and development of new products, formation of new processes, and exploration of new markets, but also involves acquiring new raw materials, producing semi-finished products, and even establishing new corporate structures. Scholars regard technological innovation capability as a process formed by the interaction of multiple parts (Lu & Liu, 2022). Currently, many scholars widely hold the view that technological innovation capability is mainly divided into five categories: resource investment in technological innovation, innovation management, research and development, production and manufacturing, and marketing (Wu, 2014). These elements interact and influence the process of technological innovation, promoting the generation of technological innovation outcome. Therefore, establishing a systematic evaluation of technological innovation capability can help firms to enhance their technological innovation capability levels and further facilitate their high-quality development.

2.2.2.2 Research on Factors Influencing Technological Innovation Capability

Scholars have explored factors related to technological innovation from different perspectives, primarily divided into internal and external factors of firms, and have analyzed them from these two angles.

(1) Internal Perspective of Firms

First, internal capital investment in firms is also regarded as one of the critical factors. Based on nine years of Chinese provincial panel data, Jin et al. (2021) found that the intensity of research and development investment from different capital sources has varying impacts on technological innovation output, suggesting that increasing a firm's self-funded research and development investment can effectively promote the output level of technology firms. Wang et al. (2023) introduced the innovative concepts of "effective technological innovation and technological innovation effectiveness" and observed that input and output elements of innovation, capital and patent investments, have gradually become key internal factors determining provincial innovation gaps, significantly influencing firms' technological innovation. Building on this, Xie et al. (2023) found that for private firms, achieving equilibrium between input and output and maximizing the utilization of their innovation resources promotes firm growth and brings about scale benefits. Ji (2020) observed that when capital injection and outflow strategies have clear objectives, they can significantly enhance a firm's technological innovation strength. The article also studied the relationship between the financing structure of China's high-tech industries and technological innovation from both regional and industry perspectives. Cao & Qiu (2018) pointed out that differences in research and development capital investment among firms are a key factor leading to imbalanced development in technological innovation among firms. Francis et al. (2020) argued that organizational capital plays a positive role in innovation, with more organizational capital promoting the growth of patent numbers.

Second, human resource investment and the internal innovation environment are regarded as two emerging factors (Qu et al., 2023). Through in-depth mechanism analysis, Gao (2024) showed that human resource investment affects the level of technological innovation, and digital finance can significantly enhance the quality of technological innovation by strengthening human capital accumulation. Liu and Mei (2020) indicated that the main factors influencing firm technological innovation are the current knowledge reserve status and its internal relationship network. For some small and medium-sized enterprises, the number of highly educated employees and research and development investments is relatively important, with patents serving as feedback on the firm's innovation environment. Yang and Wang (2020) proposed that the accuracy of patent analysis and the economic benefits brought by technological

innovation determine whether a firm can successfully conduct technological innovation. Fan and Ma (2024) found that in-depth industry-university-research collaboration is crucial when evaluating a firm's technological innovation capability. Fan et al. (2021) incorporated spatial factors into the impact of environmental regulations on regional technological innovation by constructing three different spatial weight matrices, thereby building a spatial econometric model to evaluate the impact of environmental regulations on regional technological innovation. The study found a significant positive correlation between regional technological innovation and environmental regulations. According to Yu's (2023) research, the entropy method was used to construct a technological innovation indicator system, and then the TOPSIS method was employed to evaluate firms' technological innovation capability, including scores and rankings. Technological maturity is also a key factor influencing technological innovation. Liu's (2023) research indicated that to promote high-quality innovation development, further expanding the technology market is crucial. Hötte (2023) suggested that technological innovation and transformation are not solely based on new scientific and technological discoveries but are also related to the interaction between specific needs and solutions, with firms possessing advanced technology control systems being able to internationalize more rapidly.

Third, internal management capabilities of firms. Research on the management capabilities for technological innovation is currently limited overall, but some scholars have proposed their viewpoints. Jiang et al. (2024) argued that the dynamic management capabilities of senior managers significantly drive breakthroughs in key technologies, with cross-domain integrated innovation playing an intermediary role. Their research suggested that the capabilities of senior management in high-level innovation management have a significant impact on technological innovation. From another perspective, Yu's et al. (2024) research, based on panel data analysis, suggested that management innovation involves the reshaping and improvement of multiple aspects such as organizational structure, business processes, commercial strategies, and production and operations. Lu and Dang (2019) held the view that corporate governance plays a crucial role in a firm's technological innovation. Therefore, a firm's investment in technological innovation should align with its governance level. Deng (2020) believed that the collaborative development of organizational innovation and technological innovation has a positive effect during a firm's growth process, significantly enhancing its operational efficiency. In-depth research and analysis of the logical connections and matching strategies between the two will help firms achieve efficient and sustainable development goals.

(2) External Environment Perspective of Firms

First, external policy factors. Lan (2023) argued that implementing industrial policies has a significant driving effect on improving firms' innovation capabilities. From the perspectives of technological innovation capability and resource reallocation efficiency, it was found that the execution of industrial policies mainly promotes

firms to embark on the path of innovation by enhancing technological innovation and improving resource reallocation efficiency. Shao et al. (2024) believed that government subsidies, as a core way for firms to obtain funds, have a significant impact on both high-quality innovation output and overall innovation output. As government subsidy funds gradually increase, a firm's innovation output will initially be stimulated to a certain extent, but this stimulating effect will gradually diminish and may eventually lead to a decline in output. Cao and Liang (2022) adopted a single-step multiple mediation model to explore how government subsidies act as a mediator in a firm's innovation input and output. Under its influence, the effects of government subsidies vary significantly among firms of different sizes. Meanwhile, some scholars have also suggested that government financial subsidies may not always be beneficial and could have a certain inhibitory effect on a firm's technological innovation.

Second, external market factors. An (2023) conducted in-depth research on the relationship between consumption upgrading and technological innovation, revealing that the contribution of consumption upgrading to technological innovation is continuously and rapidly increasing, further highlighting the status of consumption upgrading in a firm's technological innovation process. Chen (2023) indicated that information consumption has a significant positive empowering effect on promoting regional industrial upgrading in China, not only influencing residents' consumption upgrading but also indirectly driving regional industrial technological upgrading, proving that residents' consumption upgrading plays a key intermediary role in this process. Guan and Zhu (2020) found that changes in consumption patterns stimulate new demands, a process that not only promotes the emergence of new products to replace old ones but also accelerates the pace of technological innovation. Fan and Fan (2023) conducted in-depth research on how differences in firm risk preferences affect their green technological innovation decisions under four dimensions: market green demand, market competition intensity, government price subsidies, and market technology orientation. They constructed and tested a multi-agent simulation model based on dynamic evolutionary game theory, finding that various market factors, such as demand, market competition, and market pressure, can effectively activate a firm's innovation capabilities. However, this effect is determined by the coupling relationship between market factors and firm profitability. An (2023) pointed out that heterogeneity in demand affects a firm's technological innovation level and detailed how market segmentation prompts firms to strengthen technological innovation.

2.2.2.3 Research on Evaluation Methods for Technological Innovation Capability

To ensure a firm's technological innovation capability, adopting scientific and appropriate evaluation methods is crucial. With in-depth research in this area domestically and internationally, various evaluation methods have been proposed, divided into three categories: subjective, objective, and a combination of multiple

methods (Zhang et al., 2023).

Objective evaluation methods rely on raw data analysis to clarify the relationships between indicators and include various approaches such as principal component analysis, entropy method, TOPSIS method, BP neural network method, and data envelopment analysis (Wei, 2019). To address the limitations caused by a single evaluation method, some scholars have begun to integrate various assessment methods to construct a comprehensive evaluation model. Scholars have chosen different types of technological innovation capability evaluation frameworks, most of which are established based on the characteristics of the research objects themselves (Wang et al., 2020).

Bao and Chen (2019) conducted an in-depth analysis of the various stages of technological innovation and proposed four evaluation dimensions: implementation capability, comprehensive management capability, investment capability, and performance capability. Wei et al. (2019) argued that the level of technological innovation is determined by four key elements: the cultural environment behind innovation, the equipment and support tools for innovation, organizational management, and the injection of technological funds. Focusing on high-tech companies as the research objects, the study used a multi-attribute decision-making model to conduct a detailed analysis and evaluation of the companies' technological innovation levels. From the perspective of technological innovation, Wang et al. (2021) argued that firms should have sufficient strength to realize their value and, more importantly, should emphasize the sustainability of technological innovation. The study designed a technological innovation evaluation framework that comprehensively considers innovation support and innovation subjects, sets various evaluation criteria, and ultimately calculates the company's technological innovation capability indicators through weighted averaging. Zhang and Song (2018) argued that firms equipped with advanced technology control systems can internationalize more rapidly, thereby significantly enhancing their market competitiveness.

2.2.3 External Environment

The external environment, as a critical external driver influencing a firm's technological innovation capability, encompasses multiple dimensions such as policy regulations, market environment, technological trends, and industry competition dynamics. In terms of policy regulations, governments directly incentivize firm innovation input through measures such as tax incentives, research and development subsidies, and intellectual property protection. China's 14th Five-Year Plan explicitly proposes to strengthen national strategic scientific and technological forces and promote the modernization of industrial chains, providing policy dividends and financial support for high-tech firms (Tidstrom, 2021).

The market environment influences innovation direction through demand-pull effects. When consumer demand for intelligent and green products grows, firms are more inclined to increase research and development investment in related fields (Kushwah, 2018). The rapid iteration of technological trends (such as artificial intelligence and quantum computing) forces firms to continuously update their technological reserves, while the intensity of industry competition prompts firms to construct differentiated advantages through innovation via a "threat-incentive" mechanism.

Technological competitions in the smartphone industry have driven continuous upgrades in core components such as cameras and chips. Uncertainty in external environment (such as trade frictions and technological blockades) may inhibit innovation resource investment and increase the trial-and-error costs of firm technological innovation. Geopolitical conflicts leading to supply chain disruptions (such as chip shortages) also force firms to reassess the vulnerability of their globalization layouts. The trend of coexisting globalization and regionalization is reshaping the international cooperation landscape of technological innovation, requiring firms to seek a balance between open innovation and autonomous controllability. The strengthening of environmental regulations is driving firms to incorporate sustainable development into their technological innovation strategies.

2.2.4 Innovation Input

The core elements of innovation input include capital, human resources, and technological cooperation, which together constitute the material foundation for firm technological innovation. research and development funding is the direct driving force for innovation activity, and its scale and allocation efficiency directly affect the possibility of technological breakthroughs. Apple invests 5%-7% of its annual revenue in chip and operating system research and development, supporting its products' continuous leadership in the market. Huawei has obtained more than 30,000 patents through long-term investment in 5G technology, constructing industry technological barriers (Afrifa et al., 2020). Human resource investment enhances innovation efficiency through the knowledge integration capabilities of high-skilled teams.

Innovation input affects firm performance through multidimensional mechanisms, including direct technological outputs as well as indirect market and ecological effects. Innovation input faces three major challenges in practice: resource constraints, globalization conflicts, and sustainable development, which require efficiency optimization and strategic adjustments to address. Due to capital and talent shortages, small and medium-sized enterprises have limited innovation input capabilities, and the participation of venture capital (VC) becomes a key breakthrough by providing capital and strategic support. In the context of globalization, firms integrate global resources through multinational research and development centers.

Sustainability-oriented innovation input is becoming a new trend, with BMW investing €5 billion in developing electric vehicle technology to balance emission reduction targets with market competition. In recent years, the application of digital technologies (such as big data and AI) has further optimized the allocation efficiency of innovation input. Firms can accurately locate research and development directions through predictive analysis, reducing resource waste. The participation of venture capital lowers the threshold for technological innovation in start-ups by providing capital and strategic support (Ge et al., 2022).

2.2.5 Organizational Management

The development of organizational management theory reflects a paradigm shift from structural optimization to dynamic capability construction. Early research focused on organizational structure design, with Fayol proposing five management functions (planning, organizing, commanding, coordinating, and controlling) to provide a framework for organizational operation. As environmental uncertainty increased, scholars gradually shifted their attention to the adaptability and flexibility of organizations (Geller, 2020). For example, contingency theory points out that organizations need to adjust their structures and processes according to external contexts, while learning organization theory emphasizes the critical role of knowledge sharing and continuous learning in innovation. In recent years, Dynamic Capability Theory has become mainstream, arguing that organizations need to maintain competitive advantages in rapidly changing environments through resource integration, reconstruction, and response capabilities. This perspective shifts organizational management from a static efficiency orientation to a dynamic evolutionary orientation.

Leadership and culture are the core drivers of organizational management practices, influencing organizational effectiveness by shaping values and behavior patterns. Leadership research has evolved from trait theory to behavior theory and then to situational theory. Modern perspectives emphasize that leaders need to possess transformational traits, inspiring employee potential through vision, motivation, personalized care, and intellectual stimulation, rather than relying solely on authoritative instructions. Organizational culture, as an implicit rule, guides member behavior through consensus values (such as customer orientation and risk tolerance). Research shows that strong cultural organizations exhibit higher consistency in strategic execution and crisis response but may also inhibit diverse thinking due to excessive cohesion (Hanxi et al., 2017).

Digitization and globalization are reshaping the boundaries and collaboration models of organizational management, producing new governance challenges and opportunities. The penetration of digital technologies makes organizational structures flatter and more networked. The popularization of remote working tools breaks

geographical limitations and promotes virtual teams as the norm, but also raises issues of collaboration efficiency and cultural integration. In the context of globalization, multinational organizations need to balance the uniformity of headquarters' strategies with local adaptability (Qu et al., 2023). The rise of sustainability concepts requires organizations to incorporate environmental and social responsibilities into the core of management, with ESG (Environmental, Social, and Governance) indicators gradually becoming key dimensions for assessing an organization's long-term value.

2.2.6 Innovation Outcome

The connotation and dimensions of innovation outcome exhibit diversified characteristics, covering three levels: technological breakthroughs, market value, and social impact. Technological breakthroughs are the core manifestation of innovation outcome, represented by the development of new products, processes, or materials, and their essence lies in breaking through or reconstructing existing technological paradigms (Dong & Yang, 2019). Market value is realized through the commercialization of innovation outcome, including cost reduction, efficiency improvement, or user experience optimization, thereby creating competitive advantages for firms. Social impact focuses on the contributions of innovation to sustainable development, public welfare, or ethical norms.

The generation mechanism of innovation outcome emphasizes the synergistic effect of internal capabilities and external environment. In terms of internal capabilities, an organization's knowledge absorption capacity, research and development resource integration efficiency, and cross-departmental collaboration level directly affect the quality of innovation outcome. The open innovation model accelerates technological iteration by introducing external knowledge to compensate for internal shortcomings (Songkajorn et al., 2022). Dynamic capability theory points out that organizations need to possess resource reconstruction and rapid response capabilities to adapt to changes in the technological lifecycle. In terms of external environment, policy support, market demand pull, and technological ecosystem maturity jointly constitute the foundation for innovation outcome. Research shows that when internal capabilities and external environment match, the conversion efficiency and impact of innovation outcome significantly improve.

The assessment and feedback mechanisms for innovation outcome need to balance short-term performance and long-term value while paying attention to ethical risks. Traditional assessments have focused on financial indicators, but in recent years, scholars have emphasized the need to incorporate non-financial dimensions such as technological originality, market adaptability, and social acceptance. Disruptive innovations may not be profitable in the short term but can reshape industry landscapes in the long run (Karhade & Dong, 2021). Socially responsible innovations need to assess their actual impact on vulnerable groups. The ethical risks of

innovation outcome are increasingly receiving attention, with cases such as algorithmic bias in artificial intelligence and controversies in gene editing indicating that innovation needs to seek a balance between efficiency and fairness, progress and safety.

2.3 Introduction to Apple’s Beijing Branch

Apple’s Beijing Branch is a crucial strategic layout for Apple in the Chinese market, undertaking core functions in research and development, operations, and regional collaboration. As a crucial node in Beijing Branch 's global R&D network, the Beijing team focuses on the localization innovation of software and services, deeply participating in the Chinese adaptation and functional optimization of operating systems such as iOS and macOS. The Beijing office also undertakes the task of co-building an ecosystem with local developers, supporting Chinese developers' high-quality applications to reach global markets through the App Store review team, and facilitating the diversified development of Apple's software ecosystem.

Apple's Beijing Branch strengthens Apple's supply chain integration and retail network expansion in the Chinese market. On the supply chain side, the Beijing team collaborates closely with manufacturers in the Yangtze River Delta and Pearl River Delta to optimize production processes and improve yield rates, ensuring a stable supply of products such as iPhones and iPads. Apple's Beijing branch promotes the Chinese supply chain towards carbon neutrality goals through participation in Apple's "Supplier Clean Energy Program." On the retail side, Beijing is one of the cities with the densest layout of Apple's direct-operated stores, with flagship stores in Sanlitun and Wangfujing not only undertaking sales functions but also building emotional connections between users and the brand through activity such as Today at Apple courses and developer salons, reinforcing Apple's "high-end innovation" brand image.

Apple's Beijing Branch actively responds to China's digitalization policies and promotes technological inclusivity and social responsibility practices. The company deeply participates in China's construction efforts. Apple's Beijing branch collaborates with medical institutions to develop health management functions, assisting in the digitalization of public health services. Through the "Everyone Can Create" project, Apple's Beijing branch provides iPads and programming education support to rural schools, narrowing the digital divide. The Beijing team also leads multiple environmental protection initiatives, increasing the store's waste recycling rate to over 90% and promoting trade-ins to reduce electronic waste, reflecting Apple's commitment to China's sustainable development goals. These initiatives not only enhance brand local recognition but also provide a demonstration for multinational firms' long-term development in the Chinese market.

2.4 Conceptual Framework

Based on the analysis of relevant research results and combining Dynamic Capability Theory, this study proposes a model of factors influencing technological innovation capability. This model identifies the factors influencing technological innovation capability in four dimensions: external environment, innovation input, organizational management, and innovation outcome. The model is shown in Figure 2.1.

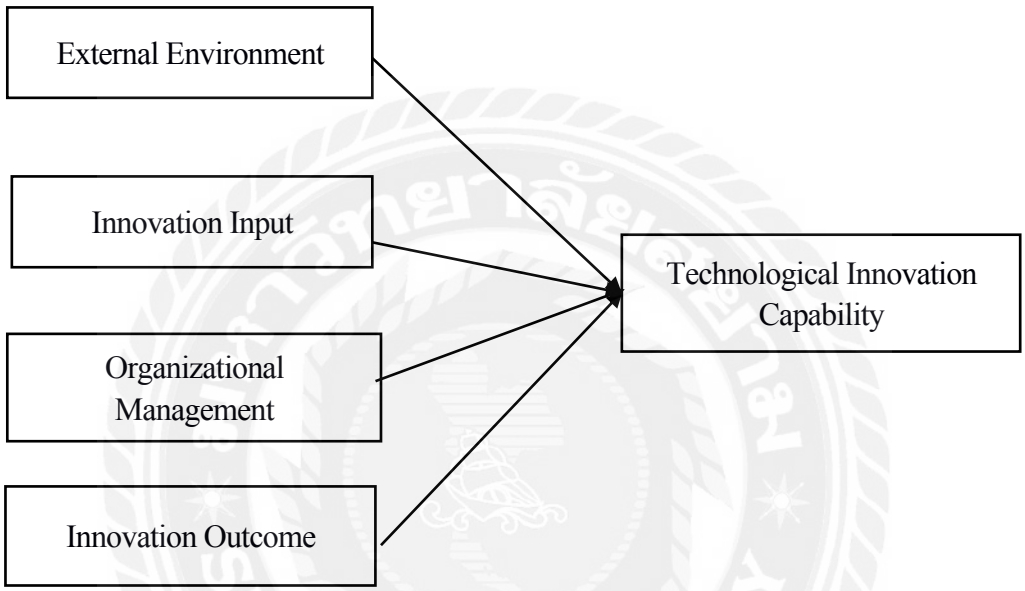

Figure 2.1 Conceptual Framework

Chapter 3 Research Methodology

3.1 Research Design

This study adopted a quantitative research methodology to conduct an in-depth exploration of the factors influencing the technological innovation capability of Apple's Beijing Branch. The research used in the questionnaire survey method, focusing on examining the association mechanisms between external environment, innovation input, organizational management, innovation outcome, and the company's technological innovation capability. Data collection was carried out using a structured questionnaire with a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The scale design drew on previous research to ensure comprehensive coverage of the core dimensions of each variable.

Descriptive statistical analysis presents the demographic characteristics of the sample and the data distribution patterns of the core variables by calculating mean and standard deviation. Correlation analysis employed Pearson's correlation coefficient to test the strength of associations between variables. Multiple regression analysis constructed regression models to quantitatively evaluate the specific impacts of external environment, innovation input, organizational management, and innovation outcome on technological innovation capability. To ensure the scientific rigor of the research method, SPSS software was used to conduct reliability and validity tests on the questionnaire before data analysis, thereby ensuring the reliability and validity of the measurement tools. The research design emphasized the objective revelation of the driving factors for enhancing technological innovation capability through systematic verification.

3.2 Population and Sample

This study focused on all employees of Apple's Beijing Branch. As a benchmark enterprise in the global technology industry, Apple's Beijing Branch boasts a highly diverse and professional workforce, covering core functional areas such as technology research and development, product design, marketing, supply chain management, and customer service. The innovative thinking, cross-departmental collaboration capabilities, and sensitivity to technological trends of employees in different positions collectively form the underlying support for the company's technological innovation capability. Therefore, considering all employees as the research population enabled a systematic capture of the full range of factors influencing technological innovation, from technological breakthroughs to market transformation, and a comprehensive revelation of the dynamic interaction mechanisms among human resource allocation, organizational cultural atmosphere, and technological strategic planning, providing empirical evidence for optimizing the technological innovation management system.

This study selected 400 employees as the research sample. The determination of the sample size was based on a comprehensive consideration of statistical precision, resource constraints, and practical feasibility. From a statistical perspective, with a 95% confidence level and a 5% margin of error, combined with pre-survey data and reference to the sample sizes in similar studies in the technology industry, a sample size of 400 could effectively balance statistical power and resource investment, ensuring that the research results had sufficient explanatory power. From the perspective of resource constraints, sample collection requires coordination of data collection across multiple departments and hierarchical levels. A sample size of 400 enabled controllable management of the entire process, from data cleaning to analysis modeling, within the limited human, time, and financial resources.

To ensure sample representativeness, this study employed a random sampling method. A total of 400 employees was randomly selected from all employees as the research sample. Throughout the sampling process, each employee had an equal opportunity to be selected, thereby ensuring the randomness and objectivity of the sample. This random sampling approach could, to a certain extent, reduce the influence of human factors on sample selection, enabling the sample to better reflect the characteristics and distribution of the population and thus enhancing the reliability of the research results.

3.3 Hypothesis

This study aims to verify, through factor analysis, the specific impacts of external environment, innovation input, organizational management, and innovation outcome on technological innovation capability, providing theoretical support and practical guidance for enhancing technological innovation capability. Therefore, this study proposes the following hypotheses:

H1: External environment has a significant impact on technological innovation capability.

H2: Innovation input has a significant impact on technological innovation capability.

H3: Organizational management has a significant impact on technological innovation capability.

H4: Innovation outcome has a significant impact on technological innovation capability.

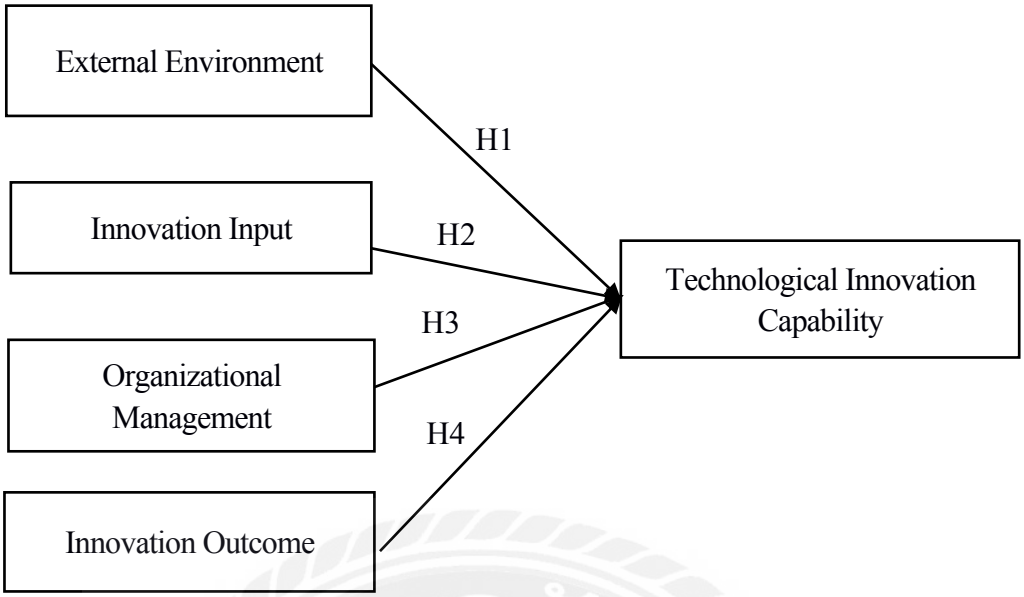

Figure 3.1 Hypotheses

3.4 Research Instrument

This study uses a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) to measure the independent variables (external environment, innovation input, organizational management, innovation outcome) and the dependent variable (technological innovation capability). Each variable is comprehensively evaluated through 5 items. The item design is based on literature review and enterprise interviews to ensure content validity and operability. The external environment refers to the external policy, market, and technological environment that influence the technological innovation of Apple's Beijing Branch, including factors such as policy support, industry competition, and technological trends. Innovation input refers to the resources invested by Apple's Beijing Branch in the process of technological innovation, including hardware support such as research and development funds, talent, and equipment. Organizational management refers to the internal management mechanisms and cultural atmosphere of Apple's Beijing Branch, including the degree of support for technological innovation from leadership style, team collaboration, and decision-making processes. Innovation outcome refers to the direct outputs of Apple's Beijing Branch's technological innovation activity, including quantifiable achievements such as the number of patents, new product development, and technological standard formulation. Demographic variables include gender, age, educational background, and work experience.

The questionnaire consists of a total of 25 items and is divided into two main parts:

The first part contains 4 questions, mainly focusing on the personal basic information of the respondents, including gender, age, educational background, and work experience.

The second part contains 25 questions, focusing on the factors influencing technological innovation capability. Corresponding items are set for external environment, innovation input, organizational management, innovation outcome, and technological innovation capability. The specific content is shown in Table 3.1.

Table 3.1 Measurement Items

Influencing Factor	Measurement Item	NO.
External Environment	The government's tax incentives and subsidies for technology enterprises have effectively reduced our innovation costs.	1
	Fierce market competition in the industry has prompted us to continuously increase our technological research and development investment to maintain our competitive edge.	2
	The rapid development of emerging technologies has provided us with new innovation directions.	3
	The improvement of intellectual property protection regulations has safeguarded our technological innovation achievements from infringement.	4
	The upgrading of consumer demand for high-tech products has accelerated our technological iteration speed.	5
Innovation Input	The company allocates no less than 15% of its annual revenue to technological research and development and product innovation.	6
	We have industry-leading research and development laboratories and testing equipment to support the exploration of cutting-edge technologies.	7
	The company attracts top global technical talent through high salaries and equity incentives.	8
	Cooperation projects with universities and research institutions have significantly enhanced our technological reserves.	9
	The internal training system helps employees continuously update their technical skills to meet innovation needs.	10
Organizational Management	Company executives actively advocate an "innovation-first" culture and encourage employees to propose new ideas.	11

	Cross-departmental collaboration mechanisms accelerate the transformation of technology from research and development to implementation.	12
	The decision-making process for technological innovation projects is efficient and can quickly respond to market changes.	13
	The company has a relatively high tolerance for innovation failures and encourages employees to engage in high-risk technological exploration.	14
	The performance evaluation system takes technological innovation contributions as an important assessment indicator.	15
Innovation Outcome	The number of patents applied for by the company annually remains at the leading level in the industry.	16
	Among the new products launched in the past three years, the proportion of technologically innovative products exceeds 60%.	17
	Our technological standards (such as chip architecture and operating system) are widely adopted in the industry.	18
	Technological innovation achievements have significantly improved the market share and profit margin of the company's products.	19
	Through technology licensing or cooperation, we have achieved commercialization of innovation achievements.	20
Technological Innovation Capability	The company can quickly apply new technologies to product development.	21
	Our technological research and development team has the ability to independently solve complex technical problems.	22
	Technological innovation activity have significantly shortened the product development cycle from concept to market launch.	23
	Through technological innovation, the company continuously leads the industry's technological development direction.	24
	Compared with competitors, our technological innovation achievements are more differentiated and irreplaceable.	25

3.5 Reliability and Validity Analysis of the Scale

3.5.1 Questionnaire Reliability Analysis

Table 3.2 Variable Reliability Test

Variables	Cronbach's Alpha	N of Items
External Environment	0.842	5
Innovation Input	0.826	5
Organizational Management	0.831	5
Innovation Outcome	0.836	5
Technological Innovation Capability	0.829	5
Total	0.833	25

Reliability refers to the degree of consistency in measurement results. It reflects the stability of measurement tools at different time points or with different samples, that is, whether the same measurement object can obtain consistent results under similar conditions. For this purpose, the study used Cronbach's Alpha coefficient, which is widely applied in questionnaire analysis, to evaluate the internal consistency of the questionnaire as a whole and its various sub-items. Cronbach's Alpha is a reliable reliability test method that can assess the degree of intercorrelation among a set of items. Generally, when the Cronbach's Alpha coefficient is higher than 0.7, the reliability of the measurement tool is considered satisfactory; if the coefficient approaches or exceeds 0.8, it indicates that the questionnaire has very good internal consistency.

The overall Cronbach's Alpha coefficient of the questionnaire is 0.833, and the Cronbach's Alpha coefficients of each dimension are all greater than 0.8, indicating that the scale is highly reliable.

3.5.2 Questionnaire Validity Analysis

Table 3.3 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.862
Bartlett's Test of Sphericity	Approx. Chi-Square	4375
	df	339
	Sig.	0.000

The information collected in the questionnaire must be accurate and reliable. In this study, the reliability assessment met the requirements, and the validity of the questionnaire was evaluated. To verify the possibility of validity, KMO (Kaiser-Meyer-Olkin) measurement results are typically used in conjunction with

Bartlett's test of sphericity. If the recorded KMO measurement coefficient is greater than 0.8, it indicates that the questionnaire in question is suitable for data analysis. If the KMO value falls between 0.6 and 0.8, the overall findings of the questionnaire study are generally satisfactory.

The KMO value of the technological innovation capability scale is 0.862, and the result of Bartlett's test of sphericity shows $p < 0.001$, which fully rejects the null hypothesis of Bartlett's test of sphericity and meets the conditions for factor analysis.

3.6 Data Collection

This study adopted a quantitative approach. The employees of Apple's Beijing Branch were selected as the research subjects, and the data collection period was from May 2025 to June 2025. Questionnaire distribution and collection were carried out through the online platform Questionnaire Star to ensure that the sample covered employees of different genders, ages, educational backgrounds, and work experiences. A sample size of 400 was determined, and a total of 400 questionnaires were distributed. During the questionnaire recovery process, the research team conducted strict checks to eliminate invalid questionnaires, including those that were incomplete or had inconsistent answers. A total of 345 valid questionnaires were obtained, with an effective rate of 86.25%.

3.7 Data Analysis

3.7.1 Descriptive Statistics

Descriptive statistical analysis involved analyzing personal background variables to understand the demographic characteristics of Apple's Beijing Branch employees.

3.7.2 Factor Analysis

Exploratory factor analysis was conducted on the survey data using SPSS to extract common factors and determine the common dimensions of the factors influencing technological innovation capability. This confirmed the reliability and validity of the constructed model and provided a theoretical basis for enhancing technological innovation capability.

3.7.3 Multiple Regression

In this study, the multiple regression method is a comprehensive and in-depth exploratory approach that significantly enriches the dimensions and accuracy of the research. By using the multiple regression method, this study overcame the limitations of univariate model analysis, not only enriching the content and layers of the research but also improving its accuracy and practicality, providing strong support and guidance for enhancing technological innovation capability.

Chapter 4 Findings and Discussion

4.1 Findings

4.1.1 Demographic Characteristics of Participants

Table 4.1 Descriptive Statistical Analysis of Participants

Variable	Option	Number	Percentage
Gender	Male	192	55.7
	Female	153	44.3
Age	Under 26 Years Old	62	18.0
	26-35 Years Old	142	41.2
	36-45 Years Old	89	25.8
	Over 45 Years Old	52	15.1
Educational Background	Junior College and Below	31	9.0
	Undergraduate	84	24.3
	Master's Degree	152	44.1
	Doctor	78	22.6
Income Level	Below 3000 Yuan	51	14.8
	3001-8000 Yuan	206	59.7
	8001-10000 Yuan	71	20.6
	Above 10000 Yuan	17	4.9
Total		345	100.0

This study conducted a comprehensive analysis of the demographic characteristics of 345 employees at Apple's Beijing Branch based on survey data. In terms of gender distribution, male employees accounted for 55.7%, slightly higher than female employees (44.3%). This proportion reflects that the technology industry as a whole is male-dominated, but the participation of female employees in positions such as technology research and development and product management is gradually increasing.

Regarding age structure, employees aged 26-35 constituted the largest group, accounting for 41.2%, and formed the core group for the company's innovation activity. Employees aged 36-45 made up 25.8% and mostly held positions as technical experts or middle management. Employees under 25 years old accounted for 18.0% and were mainly newly recruited grassroots technical personnel. Employees over 45 years old accounted for 15.1% and were concentrated in senior technical advisory or strategic decision-making roles. The age distribution exhibited an olive-shaped characteristic, with a high proportion in the middle age groups and lower proportions at both ends.

Data on educational background showed that employees with a master's degree accounted for the largest proportion at 44.1%, followed by those with a doctoral degree (22.6%) and undergraduate (24.3%). Employees with junior college degrees or below accounted for only 9.0%. This indicates that the company relies heavily on high-level technical talent, and the combined proportion of employees with a master's and a doctoral degree reaching 66.7% highlights its emphasis on research and development depth and professionalism.

Income level showed a strong positive correlation with educational attainment. Employees with monthly incomes between 3001 and 8000 yuan accounted for 59.7%, forming the main income group of the company. The high-income group with monthly incomes between 8001 and 10,000 yuan accounted for 20.6%, mostly consisting of technical backbones or project managers. Employees with monthly incomes exceeding 10,000 yuan accounted for only 4.9%, mainly being senior research and development experts or department heads. Employees with monthly incomes below 3000 yuan accounted for 14.8%, mostly being those in internships or junior positions.

Overall, the workforce of Apple's Beijing branch exhibits typical characteristics of being "slightly male-dominated, young, highly educated, and with medium-to-high incomes." This structure not only provides sufficient intellectual capital for technological innovation but also reflects the technology industry's dual reliance on talent quality and knowledge intensity. At the same time, it suggests that the company needs to further focus on gender balance and the construction of a diverse talent echelon.

4.1.2 Correlation Analysis

Table 4.2 Correlation between Variables

	External Environment	Innovation Input	Organizational Management	Innovation Outcome	Technological Innovation Capability
External Environment	1				
Innovation Input	.645**	1			
Organizational Management	.642**	.642**	1		
Innovation Outcome	.646**	.636**	.636**	1	
Technological Innovation Capability	.635**	.644**	.647**	.671**	1

NOTE： *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

An analysis of the correlations between external environment, innovation input, organizational management, innovation outcome, and technological innovation revealed the internal relationships among the influencing factors of technological innovation capability at Apple's Beijing branch through correlation analysis.

Table 4.2 showed that the correlation coefficient between external environment and technological innovation capability was 0.635, indicating that external conditions such as policy support and industry competition have a significant promoting effect on the company's technological innovation, but their impact is slightly weaker compared to other internal factors. Innovation input showed a high positive correlation with technological innovation capability (r = 0.644), suggesting that continuous investment in resources such as research and development funds and talent reserves is a key driving force for enhancing innovation capability. Organizational management had the strongest correlation with technological innovation capability (r = 0.647) and maintained a high correlation with external environment (r = 0.642) and innovation input (r = 0.642). This reflects the core role of efficient management mechanisms and cross-departmental collaboration models in integrating internal and external resources and accelerating technology transfer. Innovation outcome, as the direct output of technological innovation, had the highest correlation coefficient with technological innovation capability (r = 0.671). At the same time, they had significant positive correlations with external environment (r = 0.646), innovation input (r = 0.636), and organizational management (r = 0.636), validating the systematic impact of the "input-management-output" chain on technological innovation. The correlations among all factors were in the high range of 0.635-0.671**, indicating that the technological innovation capability of Apple's Beijing Branch is the result of the combined effects of external environment, resource input, organizational effectiveness, and innovation output. The optimization of any single factor needs to be carried out in coordination with other aspects.

4.1.3 Multiple Regression Analysis

Table 4.3 Multiple Regression Analysis

Item	B	Beta	t	Sig.	VIF	F	Durbin-Watson
C	2.441	-	8.80	0.000		54.41***	1.574
External Environment	0.431	0.466	3.82	0.000	1.12		
Innovation Input	0.324	0.335	3.74	0.000	1.15		
Organizational Management	0.574	0.572	6.56	0.000	1.17		
Innovation Outcome	0.531	0.535	6.74	0.000	1.11		
R Square	0.643						

Adjusted R Square	0.651

NOTE：*P<0.05, **P<0.01, ***P<0.001

This study revealed the influencing mechanism of technological innovation capability at Apple's Beijing branch through regression analysis. The overall fit of the model was good (Adjusted R^2 = 0.651), indicating that the independent variables could explain 65.1% of the variation in technological innovation capability, demonstrating strong explanatory power. The F-value (54.41***) was significant, suggesting that the model as a whole passed the test and the joint impact of the variables on technological innovation capability was statistically significant. The Durbin-Watson value was 1.574 (close to 2), indicating strong independence of the residuals and further validating the reliability of the regression results.

The standardized regression coefficient (Beta = 0.572) and t-value (6.56) of organizational management were the highest, and the significance level reached 0.000, highlighting its core position in the innovation system. This result indicates that efficient management mechanisms, flexible organizational structures, and an open innovation culture can significantly promote the integration and transfer of technological knowledge and are key driving forces for the company's technological innovation. Its contribution far exceeds that of other variables, suggesting that organizational optimization is the primary breakthrough for enhancing innovation capability.

The impact of innovation outcome (Beta = 0.535, t = 6.74) on technological innovation capability was second only to that of organizational management, validating the direct reinforcing effect of technological output on innovation capability and forming a virtuous cycle of "input-transformation-output." Although external environment (Beta = 0.466, t = 3.82) and innovation input (Beta = 0.335, t = 3.74) had relatively lower contributions, they both showed significant positive impacts, reflecting that external conditions such as policy support and industry competition, as well as investment in research and development resources, are basic guarantees for innovation activity.

The variance inflation factors (VIFs) were all less than 2, indicating that there was no multicollinearity problem among the variables, and the model parameter estimates were robust and reliable. Comprehensive analysis shows that the technological innovation capability of Apple's Beijing branch is the result of the combined effects of organizational management, innovation outcome, external environment, and innovation input.

Therefore, according to the results of the data analysis, external environment has a significant impact on technological innovation capability, which supports Hypothesis 1. Innovation input has a significant impact on technological innovation capability, which supports Hypothesis 2. Organizational management has a significant

impact on technological innovation capability, which supports Hypothesis 3. Innovation outcome has a significant impact on technological innovation capability, which supports Hypothesis 4.

4.2 Discussion

4.2.1 External Environment Has a Significant Impact on Technological Innovation Capability

Regression analysis showed that the standardized regression coefficient of external environment on technological innovation capability (Beta = 0.466) was significant ($t = 3.82$, $p < 0.000$), supporting Hypothesis H1. This indicates that external factors such as policy support, industry competition intensity, and technological development trends have a significant positive impact on the technological innovation capability of Apple's Beijing branch. The external environment directly or indirectly drives enterprises to increase innovation input and optimize management processes by providing market opportunities, competitive pressure, or policy incentives, ultimately leading to technological breakthroughs.

Policy support can reduce enterprise innovation costs and enhance their risk-taking ability. Industry competition, through the "reverse forcing effect," prompts enterprises to accelerate technology iteration to maintain their market positions. Intense market competition in the technology industry may drive Apple's Beijing branch to shorten the new product development cycle and improve technological differentiation. The formulation of technical standards and participation in industry alliances can also provide enterprises with external resources for technology cooperation and knowledge sharing.

The impact of external environment does not exist in isolation, and its effects may vary depending on the enterprise's endogenous capabilities. In areas with strong policy support, if an enterprise has inefficient organizational management, external resources may not be effectively converted into innovation outcome. The external environment needs to form a synergistic effect with internal management and resource input to maximize its promoting effect on technological innovation capability.

Apple's Beijing branch should closely monitor policy orientations and industry dynamics and actively adapt to changes in external environment. The enterprise can obtain resource support by participating in government-led technology projects or by formulating differentiated innovation strategies based on competitors' technological weaknesses. The enterprise needs to establish an external environment monitoring mechanism, dynamically adjust innovation directions, and avoid technological path deviations from market demands due to sudden environmental changes.

4.2.2 Innovation Input Has a Significant Impact on Technological Innovation Capability

The standardized regression coefficient of innovation input on technological innovation capability (Beta = 0.335) was significant ($t = 3.74$, $p < 0.000$), supporting Hypothesis H2. This indicates that resource inputs such as research and development funds, talent reserves, and equipment upgrades are important foundations for enhancing the technological innovation capability of Apple's Beijing branch. Innovation input increases the breadth and depth of technological exploration, accumulates knowledge capital for the enterprise, and ultimately transforms into innovation outcome such as patents and new products.

Technological innovation capability has path dependency, and long-term continuous innovation input can reduce unit research and development costs and improve efficiency. If Apple's Beijing branch continues to invest in the field of artificial intelligence, it may gradually build technological barriers and form a competitive advantage. The structure of innovation input also affects innovation quality and needs to be dynamically adjusted according to the enterprise's strategy.

Although innovation input significantly affects innovation capability, its marginal benefits may decline. If an enterprise lacks efficient management mechanisms or market orientation, excessive input may lead to resource waste. If an enterprise blindly pursues technological advancement while ignoring market demands, its innovation outcome may be difficult to commercialize. Innovation input needs to form a closed loop with organizational management and market feedback to ensure that resources are concentrated in high-value areas.

Apple's Beijing branch should establish a strategy-oriented innovation input mechanism and prioritize support for core areas in line with long-term technology planning. The enterprise can expand resource acquisition channels through industry-university-research cooperation and open innovation to reduce the risks of a single input. The enterprise needs to regularly evaluate the input-output ratio and optimize resource allocation to avoid blind expansion.

4.2.3 Organizational Management Has a Significant Impact on Technological Innovation Capability

The standardized regression coefficient of organizational management on technological innovation capability (Beta = 0.572) was significant ($t = 6.56$, $p < 0.000$),

and its contribution was the highest, strongly supporting Hypothesis H3. This indicates that management factors such as organizational structure, cross-departmental collaboration, and innovation incentive mechanisms are core driving forces for the technological innovation capability of Apple's Beijing branch. Efficient management mechanisms can integrate internal and external resources, break through departmental barriers, and accelerate the transfer of technology from research and development to commercialization.

Organizational management significantly enhances technological innovation capability by optimizing resource allocation, stimulating employee creativity, and reducing innovation risks. A flat organizational structure can shorten decision-making chains, enabling research and development teams to respond to market changes. Cross-departmental project systems can promote collaboration among technology, marketing, and production departments. Innovation incentive policies, such as equity incentives and fault-tolerant mechanisms, can improve employee innovation enthusiasm and create a continuous innovation culture.

In a rapidly changing technological environment, traditional organizational management models may face the risk of rigidity. An overly centralized decision-making system may suppress grassroots innovation vitality, and inter-departmental interest conflicts may hinder technology integration. Organizational management needs to have dynamic adjustment capabilities, use digital tools to improve management flexibility, and build an open and inclusive innovation culture to adapt to technological iteration requirements.

Apple's Beijing branch should continuously optimize organizational management processes. The enterprise can shorten the research and development cycle or establish cross-departmental innovation centers to promote technology sharing. The enterprise needs to improve innovation incentive mechanisms, link employee performance with innovation outcome, and encourage innovation. The enterprise can learn from industry best practices by introducing external management consulting or benchmarking to enhance organizational management effectiveness.

4.2.4 Innovation Outcome Has a Significant Impact on Technological Innovation Capability

The standardized regression coefficient of innovation outcome on technological innovation capability (Beta = 0.535) was significant ($t = 6.74$, $p < 0.000$), supporting Hypothesis H4. This indicates that innovation outcome such as patent quantity, new product revenue, and technical standard formulation not only reflects innovation capability but also further strengthens subsequent innovation activity through feedback effects. The success of innovation outcome can enhance an enterprise's

reputation, attract high-end talent, and obtain more resources, forming a virtuous cycle.

Innovation outcome provides dual feedback to the enterprise through market validation and technological accumulation. On the one hand, commercial success can prove the correctness of the technological direction and enhance internal innovation confidence. On the other hand, a patent portfolio or technical standard formulation can consolidate an enterprise's industry position and lay the foundation for subsequent technology cooperation or monopoly gains. If Apple's Beijing branch holds core patents in the 5G field, it can obtain continuous income through technology licensing to support research and development innovation.

Although innovation outcome significantly affects innovation capability, an excessive pursuit of short-term outcomes may lead to "innovation myopia." If an enterprise sacrifices technological maturity to launch products, it may damage its brand reputation. Therefore, the enterprise needs to balance short-term market returns with long-term technological accumulation, support high-risk and long-cycle projects, and avoid interrupting technology iteration due to short-term pressures.

Apple's Beijing branch should establish a "result-oriented" innovation evaluation system, incorporate indicators such as patent quality and new product market share into assessments, and at the same time pay attention to the long-term potential of technological outcomes. The enterprise can identify core and peripheral technologies through patent portfolio analysis and prioritize investment in high-value areas. The enterprise needs to strengthen the commercialization capabilities of innovation outcome, optimize product functions through market research, or expand technological influence through ecological cooperation to maximize innovation value.

Table 4.4 Hypothesis Test Results

NO.	Hypothesis	Result
H1	External environment has a significant impact on technological innovation capability.	Supported
H2	Innovation input has a significant impact on technological innovation capability.	Supported
H3	Organizational management has a significant impact on technological innovation capability.	Supported
H4	Innovation outcome has a significant impact on technological innovation capability.	Supported

Chapter 5 Conclusion and Recommendation

5.1 Conclusion

(1) Overall Verification of Research Hypotheses

This study proposed four hypotheses regarding the influencing mechanism of technological innovation capability at Apple's Beijing Branch. Regression analysis provided significant support for all of them. The results indicate that external environment, innovation input, organizational management, and innovation outcome all have a significant positive impact on technological innovation capability. Among them, organizational management contributes the most (Beta = 0.572), followed by innovation outcome (Beta = 0.535). The effects of external environment and innovation input are relatively weaker but equally crucial. This finding reveals that technological innovation capability is the result of the synergistic effect of internal and external factors, providing a theoretical basis for technology companies to optimize their innovation strategies.

(2) Indirect Effects of External Environment and Innovation Input

Although the direct effects of external environment and innovation input are weaker than those of organizational management and innovation outcome, they play important roles through indirect pathways. The external environment (such as policy support and industry competition) drives enterprises to optimize management processes and increase innovation input through "reverse forcing effects" or "resource empowerment." Innovation input, in turn, relies on the improvement of organizational management efficiency to be transformed into actual innovation results. If Apple's Beijing Branch only increases research and development investment while neglecting cross-departmental collaboration, it may lead to inefficient technological breakthroughs due to resource dispersion. Therefore, external adaptation and resource integration need to form a closed loop with internal management to maximize innovation efficiency.

(3) Core Driving Role of Organizational Management

Organizational management is the core driving force for technological innovation capability, and its influencing mechanism is reflected in three aspects: resource integration, process optimization, and culture shaping. Efficient management mechanisms can break down departmental barriers and accelerate the transformation of technology from research and development to commercialization. Innovation incentive mechanisms can stimulate employees' creativity and form a "bottom-up" micro-innovation ecosystem. To maintain a leading position in the fierce technological competition, Apple's Beijing Branch needs to continuously optimize its organizational management processes and build a dynamic balance system.

(4) Feedback Reinforcement Effect of Innovation Outcome

Innovation outcome not only reflects innovation capability but also further strengthens subsequent innovation activity through feedback effects. Successful innovation results can enhance a company's reputation, attract high-end talent, and obtain more resources, forming a virtuous cycle. If Apple's Beijing Branch holds core patents in the field of artificial intelligence, it can generate continuous income through technology licensing, which can then be reinvested in research and development innovation. Therefore, enterprises need to establish an innovation evaluation system to balance short-term market returns and long-term technological accumulation, avoiding the interruption of technological iteration due to short-term pressures.

5.2 Recommendation

(1) Strengthen Environmental Monitoring to Seize Innovation Opportunities

Apple's Beijing Branch needs to establish a cross-departmental environmental monitoring team that integrates policy research, market analysis, and technology tracking functions to develop a systematic perception capability of external environment. The team should regularly sort out national and local science and technology innovation policies, establish a policy database, and update it dynamically, focusing on tracking subsidies, tax incentives, and industrial plans related to core businesses such as semiconductors and artificial intelligence. The company can proactively plan chip research and development projects to secure national special fund support. The team should also build a market competition intelligence network, using industry reports, patent data analysis, and competitor tracking to keep abreast of competitors' technology roadmaps and market expansion strategies, providing data support for adjusting innovation directions.

Government support policies are important external resources for reducing innovation costs. Apple's Beijing Branch should set up a dedicated policy research position to interpret policy terms and select suitable projects based on its technological advantages. For instance, when a region implements research and development expense addition and deduction policies for artificial intelligence companies, the organization can refine its financial processes to ensure that research and development expenditures comply with policy requirements and optimize tax deductions. The company should actively participate in the policy-making process, using industry associations or expert committees to provide feedback on enterprise needs and promote policies that favor its technological fields. During the revision of data security regulations, the company can propose suggestions that balance technological innovation and compliance to create policy space for subsequent product launches.

Grasping technological development trends requires considering both short-term hotspots and long-term transformations. The company should pay attention to technology convergence areas, such as the integration of AI and biotechnology, and explore innovative application scenarios through interdisciplinary teams to avoid missing transformation opportunities due to technological path dependence. Given the uncertainty of changes in external environment, the company should establish a rapid response closed loop of "monitoring-evaluation-decision-making-execution." It should regularly review the effectiveness of environmental monitoring and optimize the monitoring process through key indicator adjustments.

(2) Optimize Innovation Input Allocation to Improve Innovation Efficiency

Innovation input should be closely aligned with the company's long-term technological planning. Apple's Beijing Branch should develop a three-tier investment strategy. The foundation layer focuses on underlying technologies, the application layer supports product iteration, and the exploration layer explores frontier areas. The company can allocate 50% of its annual research and development budget to the foundation layer to ensure technological autonomy, 30% to the application layer to maintain market competitiveness, and 20% to the exploration layer to cultivate future growth points. Enterprises need to establish a project priority evaluation model that quantitatively scores projects based on dimensions such as technological feasibility, market potential, and resource matching to avoid resource dispersion.

The management of special innovation funds should balance flexibility and standardization. Enterprises need to introduce external auditing institutions to regularly evaluate the efficiency of fund usage and promptly halt or adjust the direction of low-efficiency projects. If an AI algorithm project fails to achieve the expected accuracy for an extended period, the enterprise can reduce investment and shift to a better technology route. High-end research and development talent is the core element of innovation input. The company should develop a plan to attract overseas top talent in scarce fields through high salaries, equity incentives, and an international research and development environment. For internal employees, the company should establish a technical promotion channel. It should also improve the innovation failure tolerance system, not holding individuals responsible for project setbacks caused by technological risks, but instead summarizing experiences through debriefing meetings.

Advanced research and development equipment is the material basis for technological breakthroughs. The company should develop an equipment update schedule and dynamically adjust procurement plans based on the speed of technological iteration. It should strengthen the construction of an equipment sharing platform, using a digital management system to achieve cross-team and cross-regional equipment allocation and improve utilization. The company should establish strategic

partnerships with equipment suppliers to obtain priority supply rights and customized development support, ensuring equipment compatibility.

(3) Improve Organizational Management to Stimulate Innovation Vitality

The front office consists of project-based teams that directly respond to market demands, the middle office provides technical sharing services, and the back office is responsible for strategic planning and resource coordination. The company should incorporate innovation values into its employee handbook, specifying clauses such as "encouraging out-of-the-box ideas" and "allowing 10% of research and development time for free exploration."

Material and spiritual incentives should work in tandem. The company can implement a "pyramid-style" reward system. The base layer consists of project bonuses linked to short-term goals. The middle layer is equity incentives, granting restricted stocks to core technical personnel to bind long-term interests. The top layer is an honor system, such as an "Innovation Hall of Fame," which publicizes the achievements of outstanding innovators through company newsletters and official website columns to satisfy their need for achievement.

Departmental barriers are the main source of inefficiency in innovation. The company should establish standardized collaboration processes, clearly defining the responsibilities and time nodes of each link. It should deploy digital collaboration tools, such as using Confluence to build a knowledge-sharing platform, ensuring real-time updates of technical documents. The company should regularly organize cross-departmental team-building activity to enhance team trust, allowing employees from different departments to showcase their work results and promote the transfer of tacit knowledge.

(4) Accelerate Innovation Outcome Transformation to Realize Commercial Value

Innovation outcomes should be evaluated from both technical and market value dimensions. The company should establish a three-tier evaluation model. The first-tier evaluation focuses on technological advancement, scored by a technical expert committee. The second-tier evaluation analyzes commercialization potential, jointly calculated by the marketing and finance departments. The third-tier evaluation considers strategic alignment, decided by senior management. Innovation outcomes need to be improved through market validation. The company should rapidly transform technologies under development into testable prototypes and launch them in niche markets to collect feedback. It should build a user co-creation platform, inviting core customers to participate in product definition.

The company should establish a joint working group with the marketing department to design differentiated messaging for different customer groups. When

targeting enterprise customers, it should emphasize how new technologies can improve production efficiency and reduce costs. When targeting consumers, it should highlight the product's enhanced experience. The company should use industry summits, technical white papers, and other channels to shape its image as a technology leader, enhancing brand authority and supporting product premiums. Intellectual property is the core asset of innovation outcome. The company should conduct patent mining during the research and development stage to ensure coverage of key technological points. It should complete core patent applications before product launches to form technological barriers. It should monitor infringement during market promotion and protect its rights through legal means.

5.3 Further Study

The findings of this study provide a preliminary framework for understanding the influencing factors of technological innovation capability at Apple's Beijing Branch. However, there are still directions worthy of in-depth exploration. Future research can attempt to conduct comparative analyses across a broader region, such as comparing the technological innovation performance of Apple's Beijing Branch's research and development center with that of Apple's branches in other key domestic cities like Shanghai and Shenzhen, or with its Silicon Valley headquarters and other major international research and development centers. Such cross-regional comparisons can help reveal the differentiated influencing mechanisms of different regional environments on the technological innovation capability of the same multinational company's branches.

Subsequent research should focus on deepening the analysis of specific key factors. Researchers need to design more refined empirical research plans. For example, they can adopt in-depth case studies to more clearly depict how knowledge effectively flows and transforms across different cultural backgrounds and organizational levels and ultimately serves the specific needs of the local market, thereby quantitatively or qualitatively verifying its specific contribution pathways to technological innovation outputs.

Further research is necessary to explore how Apple's Beijing Branch balances technological breakthroughs with ethical norms, environmental protection, and social responsibility when promoting innovation in frontier fields such as artificial intelligence, privacy computing, and environmentally friendly materials. These factors are increasingly becoming key indicators for measuring the innovation quality and sustainability of global technology companies, and analyzing their practical models in specific local contexts is of great value.

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Appendix

Dear Sir/Madam,

Thank you for your participation in this questionnaire survey. The survey will be conducted anonymously, and your relevant information will be kept confidential. Thank you again for your cooperation.

Part Ⅰ：

Please fill in the following basic information:
1. Your Gender
A Male
B Female
2. Your Age
A Under 26 Years Old
B 26-35 Years Old
C 36-45 Years Old
D Over 45 Years Old
3. Your Educational Backgrounds
A Junior College and Below
B Undergraduate
C Master's Degree
D Doctor
4. Your Income Levels
A Below 3000 Yuan
B 3001-8000 Yuan
C 8001-10000 Yuan
D Above 10000 Yuan

Part Ⅱ：

Please judge to what extent you agree with the following statement; choose the most appropriate option, and mark the corresponding number "√. " The questionnaire used a Likert scale, ranging from 1 to 5 in which one indicates strongly disagree, two indicates relatively disagree, three indicates neutral, four indicates relatively agree , and five indicates strongly agree

Measuring Item	Strongly Disagree	Relatively Disagree	Neutral	Relatively Agree	Strongly Agree
External Environment					
The government's tax incentives and subsidies for					

technology enterprises have effectively reduced our innovation costs.					
Fierce market competition in the industry has prompted us to continuously increase our technological research and development investment to maintain our competitive edge.					
The rapid development of emerging technologies has provided us with new innovation directions.					
The improvement of intellectual property protection regulations has safeguarded our technological innovation achievements from infringement.					
The upgrading of consumer demand for high-tech products has accelerated our technological iteration speed.					
Innovation Input					
The company allocates no less than 15% of its annual revenue to technological research and development and product innovation.					
We have industry-leading research and development laboratories and testing equipment to support the exploration of cutting-edge technologies.					
The company attracts top global technical talent through high salaries and equity incentives.					
Cooperation projects with					

universities and research institutions have significantly enhanced our technological reserves.					
The internal training system helps employees continuously update their technical skills to meet innovation needs.					
Organizational Management					
Company executives actively advocate an "innovation-first" culture and encourage employees to propose new ideas.					
Cross-departmental collaboration mechanisms accelerate the transformation of technology from research and development to implementation.					
The decision-making process for technological innovation projects is efficient and can quickly respond to market changes.					
The company has a relatively high tolerance for innovation failures and encourages employees to engage in high-risk technological exploration.					
The performance evaluation system takes technological innovation contributions as an important assessment indicator.					
Innovation Outcome					
The number of patents applied for by the company annually remains at the					

leading level in the industry.					
Among the new products launched in the past three years, the proportion of technologically innovative products exceeds 60%.					
Our technological standards (such as chip architecture and operating system) are widely adopted in the industry.					
Technological innovation achievements have significantly improved the market share and profit margin of the company's products.					
Through technology licensing or cooperation, we have achieved commercialization of innovation achievements.					
Technological Innovation Capability					
The company can quickly apply new technologies to product development.					
Our technological research and development team has the ability to independently solve complex technical problems.					
Technological innovation activity have significantly shortened the product development cycle from concept to market launch.					
Through technological innovation, the company continuously leads the industry's technological development direction.					
Compared with					

competitors, our technological innovation achievements are more differentiated and irreplaceable.					