



Research Paper

Analyzing the Key Success Factors of Huawei from the Perspective of the China-US Tech War

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Abstract: This study seeks to examine the strategic responses of Huawei Technologies Co., Ltd. to intense external pressures in the macro context of the China-US tech war and to identify its key success factors. Since 2018, the United States has implemented multiple rounds of severe sanctions against Huawei, ranging from supply chain cuts to technology blockades, intending to curb its rise in the global telecommunications technology sector. However, instead of collapsing, Huawei has demonstrated remarkable resilience, achieving technological breakthroughs and business restructuring in certain fields. Through literature analysis, financial data, and case studies, this research identifies three core keys to Huawei's success: **Forward-Looking Strategic Leadership and Extreme Survival Assumptions, Sustained High-Intensity R&D Innovation and Technological Self-Reliance, and a Powerful Organizational Culture and Talent Management System.** This paper integrates Huawei's operational data to analyze how it transformed external pressure into an internal driving force for change, establishing a viable pathway for survival and development amidst the tech war.

Keywords: China-US Tech War, Huawei, Sanctions, Key Success Factors, R&D Innovation, Organizational Resilience

I. Introduction

1.1 Research Background and Motivation

The international competitive landscape of the 21st century is undergoing profound changes, with the technology sector becoming the central arena for great power rivalry. The China-US tech war, as the main axis of strategic competition between the two nations, has escalated continuously since 2018, unprecedented in its scale and depth. This conflict spans trade, technology standards, and supply chain security, essentially representing a struggle for future technological dominance and control over the global digital order (Lee & Malerba, 2021).

Huawei Technologies Co., Ltd., a benchmark for the globalization of Chinese high-tech companies, naturally became the focus and "eye of the storm" in this tech war due to its leading position in cutting-edge fields like 5G communications. The US government accused Huawei of posing national security threats, violating Iran sanctions, and intellectual property theft, among other charges, and imposed a series of escalating sanctions aimed at fundamentally dismantling Huawei's global operations and technological innovation capabilities (U.S. Department of Commerce, BIS, 2019-2021).

Contrary to expectations, after initial severe pain, Huawei demonstrated strong survival capability and adaptability. It not only maintained the stability of its carrier business but also found new growth points in enterprise business and cloud computing, and even staged a "return to the market" in the smartphone business. This counterintuitive phenomenon has sparked widespread interest in global academic and industrial circles: why has Huawei not collapsed under such harsh external pressure? What are the deep-seated key factors for its success? How are these factors activated and strengthened in the specific context of the China-US tech war?

This research is based on the above background and questions, attempting to systematically analyze Huawei's "resilience code" to provide valuable lessons for high-tech companies in China and worldwide navigating an increasingly complex and volatile international environment.

1.2 Research Questions and Objectives

The core research question is: What are the key success factors that have enabled Huawei to survive and seek breakthroughs under the impact of the China-US tech war?

To answer this question, this study sets the following specific objectives:

1.2.1 To outline the evolution of the China-US tech war and accurately assess its specific impact on Huawei's

various business segments.

1.2.2. To identify and deeply analyze the key internal success factors of Huawei from multiple theoretical perspectives such as strategic management, technological innovation, and organizational behavior.

1.2.3. To empirically test these key factors using Huawei's recent financial data, R&D investment, and market performance.

1.2.4. To summarize the universality and particularity of the "Huawei model" and provide strategic insights for the development of China's high-tech industry.

1.3 Research Methods and Structure

This research primarily adopts the case study method, focusing on Huawei as a single but critically important subject. This is achieved through:

1.3.1. Literature Analysis: Systematically reviewing and colligating relevant theories such as corporate resilience, innovation management, and global value chains, as well as existing research on Huawei.

1.3.2. Data Analysis: Collecting and analyzing publicly available annual reports, financial data, and sustainability reports from Huawei from 2017 to 2023 to support arguments with quantitative indicators.

1.3.3. Secondary Data Analysis: Integrating authoritative media reports, industry analysis reports (e.g., from IDC, Canalys), and think tank research to build a complete chain of evidence.

The paper's structure, besides the introduction and conclusion, consists of a literature review, an analysis of the impact of the China-US tech war on Huawei, a multidimensional analysis of Huawei's key success factors, and an empirical analysis based on operational data.

1.4 Research Scope and Limitations

The temporal scope of this research focuses primarily on the period from the outbreak of the China-US tech war in 2018 to 2023. The focus is on Huawei itself; although it will involve the policies of both China and the US, it will not conduct an in-depth political science analysis. A major limitation is that, as external researchers, we rely solely on publicly available information and cannot access non-public information such as Huawei's internal decision-making processes or core technical details, which may limit the depth of the conclusions.

II. Literature Review and Theoretical Framework

2.1 Corporate Resilience and Crisis Management Theory

Corporate resilience refers to an organization's ability to anticipate, prepare for, respond to, and adapt to environmental changes when facing major adversity and disruptive shocks, ultimately recovering or even achieving a state beyond the original (Tao et al., 2021). Its construction relies on dynamic capabilities, which are the firm's ability to integrate, build, and reconfigure internal and external resources to address rapidly changing environments (Teece, 2018). Huawei's case is an excellent sample for testing corporate resilience theory. Sanctions, as an extreme external shock, tested Huawei's strategic foresight (Plan B), resource redundancy (R&D reserves), and rapid response capability (business transformation).

2.2 Innovation Theory and Technological Catch-Up Pathways

For latecomer firms, technological catch-up typically follows a path from imitation, digestion, and absorption to independent innovation (Lee & Lim, 2001). Huawei's development history perfectly fits this path. However, the China-US tech war led to "technological decoupling," forcing Huawei to shift from its past "open innovation" and "integrated innovation" models to a more urgent independent innovation and basic theoretical breakthrough (Gao & Yu, 2023). This involves a fundamental shift in the innovation paradigm, from application-oriented to tackling underlying "root technologies."

2.3 Global Value Chain and Supply Chain Restructuring Theory

In the context of globalization, firms are deeply embedded in Global Value Chains (GVCs), achieving efficiency maximization through specialized division of labor. However, the China-US tech war exposed the fragility of GVCs. Political risks can instantly sever supply chains, forcing companies to rethink their global layout. Huawei's coping strategy is the "diversification" and "localization" of the supply chain, that is, by cultivating non-American suppliers and the local Chinese supply chain to build a more resilient "backup chain" system (Zhang & Zhong, 2023). This process drives the restructuring of value chains within specific regions.

2.4 Existing Literature on Huawei's Success Factors

Existing literature generally attributes Huawei's success to: sustained high-intensity R&D investment (Liu & Smith, 2020), a customer-centric and hard-working corporate culture (Wu & Zhao, 2020), and a unique

employee shareholding incentive system (Fan & Liu, 2020). However, most studies were published before the full-scale outbreak of the China-US tech war or did not systematically analyze this extreme condition as a core variable. This research aims to fill this gap by exploring how these inherent factors are activated, strengthened, and interact during a crisis, thereby forming a unique "wartime survival mode."

III. The Evolution of the China-US Tech War and Its Impact on Huawei

3.1 Origins and Development of the China-US Tech War

The root of the China-US tech war lies in the increasingly acute structural contradictions between the two countries' techno-economic models. The US perceives China's industrial policies, such as "Made in China 2025," and its state-led innovation system as a long-term challenge to its technological hegemony (Allan, 2019). Huawei, as a symbol of China's technological prowess and its leading position in the 5G field, was seen by the US as a direct threat to its national security and technological monopoly, thus becoming one of the first targets.

3.2 Analysis of the Evolution of US Sanctions Against Huawei

US sanctions against Huawei represent a carefully designed, escalating "combination punch," with the core goal of systematically depriving Huawei of access to advanced technology.

Table 1: Chronology and Content of Major US Sanctions Against Huawei

Time	Event/Measure	Main Content	Potential Impact on Huawei
Dec 2018	Arrest of Meng Wanzhou in Canada	US accused Huawei of violating Iran sanctions, requested extradition.	Initiated the tech war, damaging Huawei's international image and senior management.
May 2019	Added to the "Entity List" by Commerce Department	Prohibited US companies from selling technology and products to Huawei without a license.	Directly cut off key US software (Google GMS), chips (Qualcomm), and semiconductor equipment.
May 2020	Tightening of Foreign Direct Product Rule.	Restricted global semiconductor manufacturers using US tech/equipment from fabricating chips for Huawei.	Completely blocked the manufacturing path for Huawei's self-designed chips (Kirin series), striking at its core business.
Aug 2020	Further restrictions on access to US technology.	Added 38 Huawei subsidiaries in 21 countries to the Entity List.	Blocked loopholes for Huawei to acquire US technology through third parties.
2021-Present	Sustained pressure and expanded bans.	Lobbied allies to exclude Huawei 5G equipment, signed the "Secure Equipment Act," etc.	Compressed Huawei's overseas market space, especially in developed countries.

(Source: Compiled from U.S. Department of Commerce, Bureau of Industry and Security announcements and public news reports)

3.3 Direct Impact of Sanctions on Huawei's Global Business and Finances

The impact of the sanctions was immediate, particularly on its once-booming consumer business (smartphones).

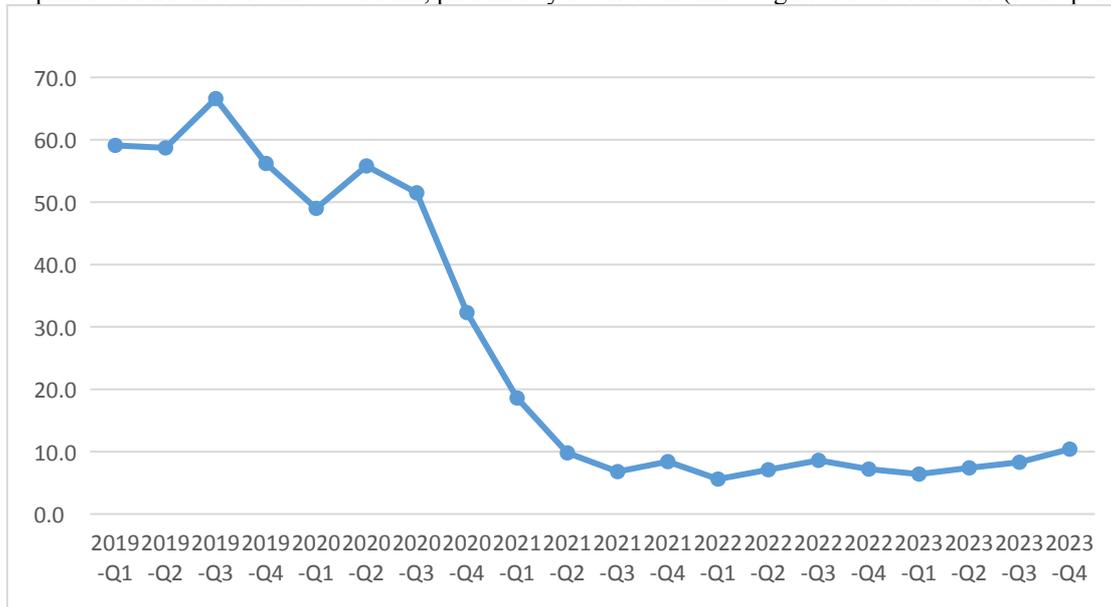


Figure 1: Huawei's Global Smartphone Shipments (2019-2023)

Huawei's global smartphone shipments plummeted after peaking in the second quarter of 2020.

Data Sources:

IDC Worldwide Quarterly Mobile Phone Tracker, various releases (2019-2024).

Canalys Worldwide Smartphone Market Analysis, various releases (2019-2024).

This drastic decline directly led to a sharp drop in its consumer business revenue, subsequently dragging down the company's overall revenue in 2021 (see Table 2 below).

IV. Analysis of Huawei's Key Success Factors

4.1 Key Factor One: Forward-Looking Strategic Leadership and Extreme Survival Thinking

4.1.1 Ren Zhengfei's Leadership Philosophy and Crisis Awareness

Huawei founder Ren Zhengfei is a preacher of "crisis awareness." In Huawei's Winter (2001), he wrote: "For over a decade, I have thought about failure every day. I remain oblivious to success and feel no sense of honor or pride, only crisis." This profound sense of urgency has shaped Huawei's strategic DNA, always preparing for the worst-case scenario.

4.1.2 Plan B and Supply Chain Diversification Strategy

The "Plan B" is the ultimate embodiment of extreme survival thinking. The establishment of HiSilicon in 2004 was precisely to prepare for the extreme scenario where "one day, all advanced American chips and technology will be unavailable" (Ren Zhengfei, 2019). When the 2019 sanctions hit, HiSilicon was "promoted" overnight, ensuring the continuity of Huawei's carrier and network equipment business. Simultaneously, Huawei actively sought non-American suppliers worldwide and vigorously supported the local Chinese supply chain, achieving the "de-Americanization" of key components.

4.1.3 Strategic Adjustment of Business Structure: From Carrier to Enterprise and Cloud Services

Facing the cliff-like drop in the consumer business, Huawei quickly shifted resources towards the more resilient enterprise business and cloud computing services. By providing digital transformation solutions for key industries like government, finance, transportation, and energy, Huawei opened up new growth avenues. Huawei Cloud, as the underlying computing base, saw its importance elevated to a strategic level, becoming a new engine for future development.

4.2 Key Factor Two: Sustained High-Intensity R&D Innovation and Technological Self-Reliance

4.2.1 The "Forceful Application of Pressure" Principle and R&D Investment Analysis

Huawei believes in the "Forceful Application of Pressure" principle, which involves concentrating resources more intensively than competitors on key success factors and selected strategic growth points, aiming for breakthroughs. This principle is reflected in its staggering, sustained high R&D investment over decades.

Table 2: Huawei's R&D Investment vs. Revenue (2017-2023)

Year	Annual Revenue (CNY bn)	R&D Expenditure (CNY bn)	R&D as % of Revenue
2017	603.6	89.7	14.9%
2018	721.2	101.5	14.1%
2019	858.8	131.7	15.3%
2020	891.4	141.9	15.9%
2021	636.8	142.7	22.4%
2022	642.3	161.5	25.1%
2023	704.2	164.7	23.4%

(Data source: Huawei Annual Reports)

A key observation from Table 2 is that in 2021, when revenue fell sharply by 28.9% due to sanctions, Huawei's R&D investment not only did not decrease but actually increased, with the ratio historically breaking 22%. This clearly indicates that Huawei views R&D innovation as the only way through the crisis, not a cost to be cut.

4.2.2 Case Studies of HiSilicon and Harmony OS

HiSilicon: Before the sanctions, HiSilicon had already designed Kirin mobile chips rivaling Qualcomm and Apple. After the sanctions, although manufacturing was blocked, HiSilicon was not dissolved but pivoted to chip architecture research, EDA tool development, and long-term technology reserves, awaiting breakthroughs in the supply chain.

HarmonyOS: Developed to replace Android, HarmonyOS was designed for the era of the Internet of Things from the outset, featuring a distributed architecture, low latency, and high security. By the end of 2023,

the number of HarmonyOS-powered devices exceeded 800 million, successfully breaking dependence on a single mobile OS (Huawei Annual Report, 2023).

4.2.3 From 5G Leader to Future Layout Seeking Breakthroughs

Despite market obstacles, Huawei's patent advantage in 5G remains solid. According to IPlytics, Huawei still holds the largest number of 5G standard-essential patents (SEPs) globally (Feng, 2022). This allows it to generate revenue through patent cross-licensing and even reverse licensing. Meanwhile, Huawei is actively laying out 6G, AI, and optical computing, striving to maintain leadership in the next generation of technological competition.

4.3 Key Factor Three: Powerful Organizational Culture and Talent Management System

4.3.1 "Wolf Culture" and "Customer-Centric" Values

"Wolf Culture" is often interpreted externally as aggressive market offensiveness, but its core is acute factory, indomitable offensive spirit, and collective struggle (Wu & Zhao, 2020). During the sanctions period, this culture translated into powerful execution and company-wide unity in overcoming adversity. Simultaneously, the core value of being "customer-centric" ensured that even in the most difficult times, Huawei could concentrate resources to guarantee the stable operation of customer networks, thereby maintaining the core carrier business and customer trust.

4.3.2 Employee Shareholding Plan and Incentive Mechanisms

Huawei's unique ownership structure, with nearly 100% of shares held by employees, is the institutional cornerstone of its cohesion. Employees are not just workers but also owners of the company. This profit-sharing mechanism effectively binds core talent during crises, reducing attrition and motivating employees to strive for the common cause (Liu & Smith, 2020). During the revenue decline, Huawei adjusted its compensation structure to increase incentives for those on the front lines, ensuring the vitality of its strivers.

4.3.3 Open Cooperation and Establishment of a Global R&D Network

Even after being sanctioned, Huawei has adhered to the concept of "open cooperation." Its dozens of research institutes and joint innovation centers worldwide are not only for leveraging global intellectual resources but also for integrating into the global tech ecosystem and signaling that it does not seek to be an "island." This open posture has won it space to maintain partnerships in non-US markets.

V. Empirical Analysis: Huawei's Operational Data and Cases

5.1 Financial Performance Analysis (Revenue, Net Profit, Cash Flow)

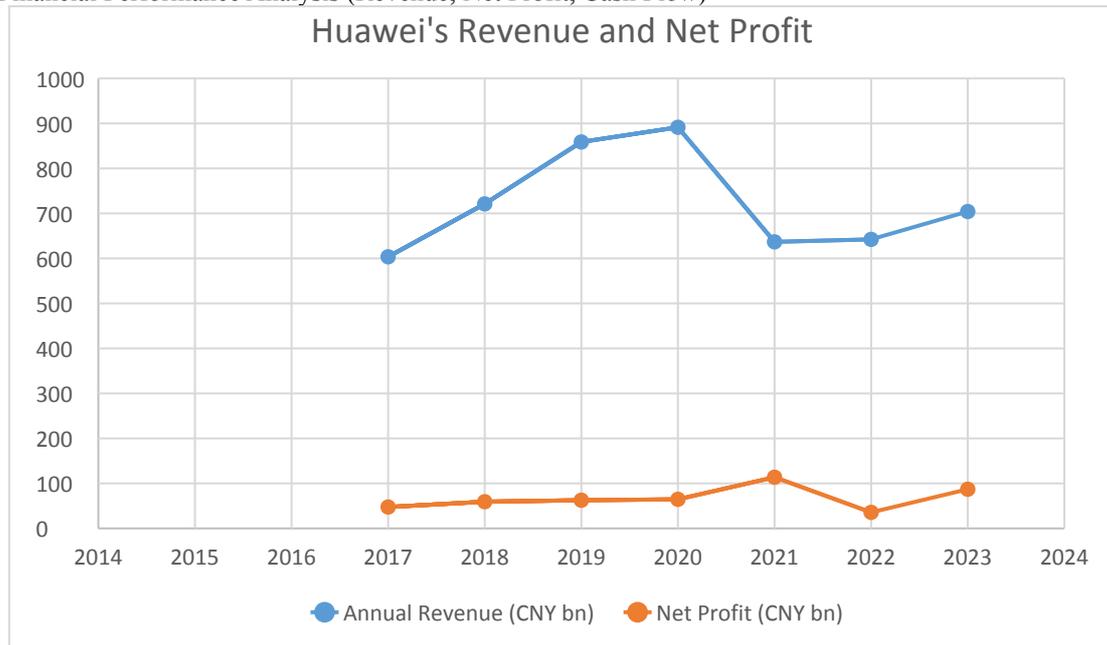


Figure 2: Huawei's Revenue and Net Profit (2017-2023)

Data Source: Huawei Investment & Holding Co., Ltd. Annual Report 2017, 2018, 2019, 2020, 2021, 2022, 2023.

The data shows that Huawei's revenue peaked in 2020, experienced a deep "V-shaped" trough in 2021-2022, but achieved a significant recovery in 2023, with a year-on-year growth of 9.6%, signaling the company's stabilization from the shock of sanctions. Although net profit fell sharply in 2021, it remained positive, and the net profit margin stabilized in subsequent years, demonstrating strong cost control and operational resilience.

Notes on Figure 2 Data:

2021: Revenue fell sharply due to the sale of the Honor business and the decline in the consumer business, but net profit was high at CNY 113.7 bn, mainly due to proceeds from the sale of Honor.

2022: The net profit margin dropped to 5.5%, reflecting profit pressure from sustained high R&D investment under constrained revenue scale.

2023: Revenue rebounded significantly, and net profit and net profit margin improved substantially, marking the company's stabilization and recovery in the new normal under sanctions, with improved operational efficiency.

5.2 Analysis of R&D Investment and Patent Portfolio

Beyond the massive R&D investment shown in Table 2, the results are reflected in patents. According to the World Intellectual Property Organization (WIPO), Huawei has consistently ranked among the top global filers of PCT international patent applications for many years (WIPO, 2023). The vast patent portfolio not only constitutes a technological barrier but has also become an important asset and revenue source. In 2023, Huawei signed nearly 200 patent licensing agreements and received considerable royalty income globally.

5.3 Performance Comparison of Business Segments (CNBG, EBG, CBG)

Table 3: Huawei's Business Segment Revenue Share Change (%) (Illustrative)

Year	Carrier Business (CNBG)	Enterprise Business (EBG)	Consumer Business (CBG)
2019	~34%	~10%	~54%
2021	~44%	~16%	~38%
2023	~40%	~21%	~37%

(Data source: Estimates based on Huawei annual report data)

From Table 3, it is evident that the revenue share of the consumer business (CBG) has significantly decreased from its peak in 2019, while the shares of the carrier business (CNBG) and enterprise business (EBG) have relatively increased. This clearly reflects the strategic outcome of Huawei's proactive adjustment of its business structure from reliance on consumer electronics towards a more balanced B2B orientation under sanction pressure.

5.4 Case Study: The Decline and Return of the Smartphone Business

The "return" of Huawei's smartphones is a concentrated reflection of its technological self-reliance and strategic resilience.

1. Decline Phase (2020-2022): Loss of GMS and advanced process chips nearly zeroed out its overseas market, with shipments falling out of the global top five.

2. Preparation Phase (2022-2023): Full efforts to build the Harmony OS ecosystem, develop HMS (Huawei Mobile Services), and maintain a certain market presence through 4G version phones.

3. Return Phase (H2 2023): In August 2023, Huawei suddenly started selling the Mate 60 Pro phone without an official announcement. Industry analysis suggested that the Kirin 9000S chip it carried marked a major breakthrough in the localization of 7nm advanced process technology (Chen, 2023). This event not only triggered a buying frenzy and sense of national pride within China but also announced to the world that Huawei still possessed strong technological capabilities to overcome difficulties even under extreme pressure. The success of the Mate 60 series directly contributed to the recovery of consumer business revenue in 2023, as reflected in the shipment data in Table for Figure 1.

VI. Chapter 6: Conclusion and Recommendations

6.1 Summary of Findings

This study, through systematic analysis, confirms that under the extreme pressure test of the China-US tech war, Huawei's success lies in a dynamic system of three interconnected and mutually reinforcing core factors:

1. "Foresight" at the Strategic Level and "Extreme Survival Assumptions": Guided by Ren Zhengfei's crisis philosophy, concrete measures like the "Plan B" prepared the company both materially and psychologically for a "black swan" event.

2. "Saturation Investment" at the Technological Level and "Root Technology Breakthroughs": Through an almost obsessive, sustained high-intensity R&D investment, it built a deep reservoir of technology and IP, and was forced—yet determined—to advance towards the most fundamental "root technologies" in the industrial

chain under sanctions.

3. "Profit Sharing" and "Value Identification" at the Organizational Level: Through the Employee Shareholding Plan and "Wolf Culture," it forged a highly loyal and combative team, creating organizational resilience capable of withstanding immense external pressure.

Together, these three factors enabled Huawei to transform a "crisis" designed to destroy it into an "opportunity" driving deep strategic transformation and organizational change.

6.2 Theoretical and Practical Implications

Theoretically, the Huawei case enriches Corporate Resilience and Dynamic Capabilities theory, demonstrating how these capabilities are activated and operate in a real-world extreme scenario. It also revises traditional Technological Catch-Up theory, suggesting that under certain conditions, external blockade may instead accelerate the autonomous innovation process of latecomer firms.

Practically, Huawei's experience offers valuable lessons for global enterprises, especially high-tech companies in complex international environments:

Crisis awareness should be normalized: Companies need to establish routine risk assessment and contingency planning mechanisms, making counter-cyclical layouts even during prosperous times.

R&D innovation is the foundation of survival: Continuous, long-term technological investment oriented towards the future is essential to build one's own core technology system.

Talent and culture are the ultimate barrier: Establishing incentive mechanisms that share results with employees and a resilient corporate culture is the deepest foundation for resisting risks.

6.3 Implications for China's High-Tech Industry

For China's high-tech industry, Huawei's experience highlights the extreme importance of achieving technological self-reliance and supply chain security. At the national level, there is a need to strengthen support for basic scientific research, common technology platforms, and the local industrial chain. At the enterprise level, companies should learn from Huawei, abandon the shortcut thinking of "building is worse than buying, buying is worse than renting", dare to invest heavily in core technologies, and build a self-controlled industrial ecosystem.

6.4 Research Limitations and Suggestions for Future Research

The main limitation of this study is its reliance on public secondary data. Future research could attempt to interview former Huawei employees and partners to gain more internal perspectives. Furthermore, as the China-US tech war continues, Huawei's long-term performance still requires observation. Future research could continuously track Huawei's progress in new businesses like AI and smart car solutions, and how it balances the long-term strategic contradiction between "autonomy and controllability" and "global openness".

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