A Study on the Relationship between Outward Direct Investment in the Telecommunications Sector and the Hollowing Out of the Home Country's Industry-Based on Case Studies of Leading Enterprises in China, the US and Japan

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Abstract: Against the backdrop of economic globalisation and the restructuring of global value chains,the impact of outward foreign direct investment(OFDI)in the telecommunications sector on the development of home-country industries has attracted significant attention.This paper examines Huawei,Qualcomm and NTT Group-representative enterprises from the telecommunications sectors of China,the United States and Japan,respectively-to explore the mechanisms through which different OFDI models influence the hollowing-out of home-country industries,as well as the moderating roles of industrial chain integrity and the institutional environment.The findings reveal that strategic asset-seeking OFDI can mitigate industrial hollowing-out in the home country through reverse technology spillovers,whilst technology licensing-oriented OFDI helps maintain the stability of domestic industries.Cost-driven OFDI,however,is prone to inducing hollowing-out in the home country.A complete industrial chain and a suitable institutional environment can reinforce the positive effects of OFDI and mitigate the risks of hollowing-out.The conclusions of this study can serve as a reference for Chinese telecommunications enterprises in optimising their OFDI strategies and for the government in formulating industrial policies,whilst also providing insights for industrial upgrading in emerging economies.

Keywords: Telecommunications Industry; Outward Foreign Direct Investment(OFDI); Industrial Hollowing-out; Case Studies of China; the US and Japan

1. Introduction

Against the backdrop of economic globalisation and the restructuring of global value chains,outward foreign direct investment (OFDI) has become a key strategy for multinational enterprises to allocate global resources and enhance competitiveness[1]. As a technology-intensive sector, the telecommunications industry's OFDI, accompanied by the transnational deployment of capital, technology, talent and industrial chains, also influences the development of the home country's industry.

In recent years, Chinese telecommunications enterprises have accelerated their globalisation efforts;whilst expanding overseas, this has raised concerns regarding industrial hollowing-out. In contrast, the OFDI of US telecommunications enterprises, centred on technology licensing, has not led to significant hollowing-out, whilst Japan has found itself in a predicament of declining domestic industrial competitiveness and pronounced hollowing-out following the large-scale relocation of production capacity.

This paper focuses on the telecommunications sector as a specific sub-sector. Through a comparative analysis of case studies involving leading enterprises from China, the US and Japan, it examines the pathways through which different OFDI models and investment motivations influence industrial hollowing-out in the home country, thereby revealing the moderating mechanisms of technological absorption capacity, industrial chain integrity and the institutional environment.

The closure of the Hainan Free Trade Port creates favourable conditions for cross-border investment and trade in the telecommunications sector[4]. Against this backdrop, exploring the intrinsic link between OFDI in the telecommunications sector and the

hollowing-out of home industries holds significant practical implications for China in utilising free trade port policies, optimising industrial layout, and mitigating industrial security risks. This not only enriches the theoretical perspective on the industrial effects of OFDI in emerging economies and addresses the gap in existing research regarding the telecommunications sector, but also provides practical guidance for Chinese telecommunications enterprises to balance overseas expansion with domestic upgrading, and for the government to formulate industrial policies to guard against the risks of hollowing-out, whilst also serving as a reference for other emerging economies seeking to achieve industrial upgrading through OFDI.

2. Theoretical Framework

2.1 Core Determinants of Multinational Investment Decisions

Dunning's theory of international production trade-offs posits that for enterprises to undertake OFDI, they must possess ownership advantages, internalisation advantages and locational advantages[1]. The combination of these three types of advantages determines the enterprise's OFDI model and investment motives, providing a foundational analytical framework for analysing telecommunications enterprises' OFDI strategy selection and home country industrial effects.

2.2 Mechanisms of Technology Acquisition and Conversion Capabilities

Cohen's theory of technology absorption capacity emphasises that a firm's ability to absorb and transform external technologies depends on R&D investment, human capital and organisational management efficiency[5]. Reverse technology spillovers resulting from OFDI are not automatically realised; they can only be transformed into competitive advantage when a firm possesses sufficient absorption capacity. The proportion of R&D expenditure in the telecommunications industry is a key indicator for measuring this capacity.

For the telecommunications sector, the R&D intensity is a key indicator of technological absorptive capacity. Research by Li Mei and Liu Shichang confirms that when the R&D intensity in the home country exceeds 15%, the reverse technology spillover effect is significantly enhanced[13].

2.3 The Impact of the Institutional Environment on Investment Behaviour

North's institutional economics theory posits that sound institutional design can reduce transaction costs,thereby guiding corporate behaviour and the direction of industrial development[14]. Schout and North further extend this argument by pointing out that industrial policy must also align with the stages of a firm's OFDI. When a firm enters the stage of seeking strategic assets, policy should shift to emphasise support for technology transfer[15]. These insights provide a basis for analysing the moderating role of the institutional environment in the relationship between OFDI in the telecommunications sector and industrial hollowing-out.

2.4 Patterns of Transnational Industrial Relocation and Upgrading

The‘flying geese'model proposed by Dowling and other scholars describes the patterns of transnational industrial relocation. After developed countries have relocated their low-and medium-end industries,they must promptly cultivate high-end industries domestically; otherwise, industrial discontinuity and hollowing-out are likely to occur[3]. This provides an important perspective for analysing the impact of OFDI in the telecommunications sector on the industrial structure of the home country.

3. Current State of Research at Home and Abroad

3.1 Overview of the Current State of Research at Home and Abroad

Table 1. Comparison of Research Perspectives on the Relationship between OFDI and Industrial Hollowing-out in the Home Country

Types of Perspectives	Representative Scholars	Key Arguments
Viewpoint 1: Cost-driven OFDI induces hollowing-out	Dowling Liu Haiyun	1. The large-scale relocation of Japanese manufacturing has led to the hollowing out of domestic industries;

		2. China's manufacturing OFDI exhibits a heterogeneous hollowing-out effect
Viewpoint 2: OFDI does not directly lead to hollowing-out; it depends on moderating factors	Song Dayong Huang Lingyun	1. Complete industrial chains in the eastern regions → OFDI drives industrial upgrading; 2. Weak supporting industries in the central and western regions → OFDI triggers technological lock-in
Consensus: Reverse technology spillovers are the key pathway to curbing hollowing-out	Liu Mingxia Guo Fei	1. The telecommunications sector exhibits the strongest reverse technology spillover effects from OFDI; 2. Technological absorption capacity determines the efficiency of spillover conversion

3.2 Research on the Relationship between OFDI and Industrial Hollowing-out in the Home Country

As shown in Table 1, The link between industrial hollowing-out and OFDI remains a subject of debate. Some scholars, such as Dowling and Liu Haiyun, argue that cost-driven OFDI, if accompanied by the relocation of core production capacity and a lack of technology inflow, will directly trigger industrial hollowing-out in the home country; the relocation of Japan's manufacturing sector in the 1990s serves as a typical example[3]. Building on this, scholars Liu Haiyun and Nie Fei have demonstrated through empirical research that the hollowing-out effect of China's manufacturing OFDI is heterogeneous; in other words,strategic asset-seeking OFDI can mitigate the risk of hollowing-out through technological upgrading[8].

Other scholars,however, argue that OFDI itself is not a direct cause of industrial hollowing-out;its effects depend on the home country's capacity to absorb technology and the integrity of its industrial chain[9]. Using provincial panel data,scholar Song Dayong found that in eastern China, where industrial chains are complete and absorption capacity is strong, corporate OFDI can significantly drive industrial upgrading, whereas in central and western regions, where supporting infrastructure is weak,there is a risk of'technological lock-in'[10]. Building on this, scholars including Huang Lingyun point out that if enterprises retain their core operations domestically and drive coordination across the upstream and downstream sectors,they can achieve a win-win scenario of'overseas expansion plus domestic upgrading',thereby avoiding industrial hollowing-out[11].

3.3 A Study on the Mechanisms of Reverse OFDI Technology Spillovers and Industrial Upgrading

Reverse technology spillover refers to the process whereby enterprises acquire advanced technologies and management expertise from the host country through OFDI activities,which are subsequently repatriated to the home country to drive industrial upgrading[7]. The realisation of reverse technology spillover involves three key stages: technological interaction, transfer and absorption. Scholars Kogut and Chang were the first to observe the phenomenon of Japanese firms acquiring advanced technology through direct investment in the United States, whilst scholars Liu Mingxia and Wang Xuejun verified the existence of reverse technology spillover effects in Chinese OFDI, with the strongest spillover effects observed in technology-intensive sectors such as telecommunications and electronics.

Cohen's theory of technological absorptive capacity emphasises that insufficient investment in research and development leads to firms 'acquiring technology but failing to commercialise it', thereby becoming trapped in 'technological lock-in'[5]. Building on this,scholars Guo Fei and Huang Yajin used Huawei as a case study to construct a triangular cycle model of reverse technology spillovers, pointing out that firms must plan their investment areas and methods appropriately in order to effectively acquire technology from the host country[7].

This series of studies demonstrates that the realisation of reverse technology spillover effects is influenced by multiple factors,including the firm's own capabilities and investment strategies,and represents an important pathway for curbing industrial hollowing-out.

3.4 Research on the Moderating Role of the Institutional Environment and Industrial Chain Support

North's institutional economics theory provides a foundation for analysing the role of the institutional environment. Scholar Jiang Qinyun,comparing the strategic emerging industry policies of China and the US,found that China primarily promotes industrial upgrading through ‘industrial chain synergy+R&D subsidies', whilst the US focuses on ‘market competition+patent protection'; these two models exhibit significant differences in the direction they guide corporate OFDI[2]. In other words,the institutional environment modulates the relationship between OFDI and the hollowing-out of the home country's industries by influencing factors such as firms'transaction costs and the efficiency of technology transfer.

Regarding industrial chain support, scholars Liu Zhibi and An Tongliang jointly point out that industrial upgrading must rely on “technological progress+industrial chain support”; if core industries relocate without local substitute industries,this may lead to industrial discontinuity and hollowing-out[16]. Research by Chen Taotao and other scholars indicates that industrial chain connectivity is positively correlated with the absorption capacity of host-country enterprises,thereby strengthening technological spillover effects[9].

This implies that a complete industrial chain not only enhances enterprises' technological absorption capacity but also amplifies the positive impact of OFDI on the home country's industrial upgrading through synergies across the industrial chain, ultimately mitigating the risk of industrial hollowing-out.

3.5 Literature Review

Most existing studies confirm the complexity of the relationship between OFDI and industrial hollowing-out in the home country, but there are still shortcomings. Firstly, research subjects often focus on the manufacturing sector as a whole, with few studies specifically targeting technology-intensive industries such as the telecommunications sector; secondly, there is a lack of comparative analysis across countries and models. Significant differences in institutional environments and industrial foundations across countries mean that OFDI models and motivations vary among telecommunications enterprises, and their impact on industrial hollowing-out in their home countries is inevitably heterogeneous; third, there has been insufficient in-depth exploration of the differences in mechanisms under different institutional environments. With the emergence of new institutional environments such as the Hainan Free Trade Port, the impact of policy dividends on the industrial effects of OFDI in the telecommunications sector is becoming increasingly apparent; however, existing research has not yet paid sufficient attention to the moderating mechanisms of such new institutional environments on the relationship between OFDI and industrial hollowing-out, making it difficult to meet the demands of practical development.

4. Case Studies of Telecommunications Enterprises in China, the US and Japan

4.1 China's Huawei: Strategic Asset-Seeking OFDI and Domestic Industrial Upgrading

4.1.1 OFDI Models and Investment Motives

As a leading enterprise in China's telecommunications sector, Huawei's OFDI is primarily driven by the pursuit of strategic assets, whilst simultaneously expanding its global market presence,thereby forming a dual-drive model of ‘R&D collaboration+localised operations'.

Scholars Guo Fei and Huang Yajin argue that Huawei's investment motives are centred on two key aspects:firstly, acquiring advanced technologies from host countries,having successfully integrated into global innovation networks for cutting-edge technologies by establishing 16 overseas R&D centres in technology powerhouses such as Germany, he US and Japan[7]; and secondly, overcoming market barriers by establishing localised production and service bases in regions such as Southeast Asia and Africa, thereby circumventing the constraints of trade protectionism.

4.1.2 Analysis of the home country industrial effect

Table 2. Huawei's R&D Data

Year	R&D Expenditure (billion yuan)	Share of Revenue (%)	Number of Domestic Core Patent Applications (units)
2020	1419	16.08	6328

2021	1427	22.4	6952
2022	1615	25.1	7689
2023	1647	23.4	8142
2024	1797	20.8	

Source: Huawei official website, news reports

Huawei's large-scale OFDI has not led to the hollowing out of China's telecommunications industry;rather,it has driven the upgrading of domestic industries through technology transfer.As shown in Table 2, Huawei invested 164.7 billion yuan in R&D,accounting for 23.4% of its revenue in 2023.R&D resources were concentrated in core domestic technology sectors such as 5G,chip design and the HarmonyOS system,with the company ranking among the top Chinese enterprises in patent applications for 10 consecutive years.

Scholars Liu Mingxia and Wang Xuejun summarise that the technological achievements obtained by enterprises through investment in overseas R&D centres have all been successfully localised and industrialised, forming a closed-loop cycle of "overseas technology acquisition–domestic R&D upgrading–global market output"[12].

Huawei maintains its core production capacity within China, with manufacturing bases in Shenzhen, Dongguan and elsewhere focusing on high-end equipment manufacturing, whilst overseas operations are limited to non-core activities such as assembly and adaptation. Consequently, high-end domestic employment has grown steadily. Its global footprint has driven the coordinated development of over 2,000 domestic supporting enterprises, with self-sufficiency in key industrial chain segments rising from 45% in 2015 to 72% in 2023. The competitiveness of China's domestic telecommunications industry continues to strengthen, with a 42% share of global 5G patents, a 58% market share in equipment, and rapid growth in revenue.

4.2 Qualcomm (USA): Technology-Licensing OFDI and Domestic Industrial Stability

4.2.1 OFDI model and investment motives

As a global leader in telecommunications technology, Qualcomm's OFDI is centred on technology licensing. The primary investment motivation is to monetise intellectual property,generating sustained and stable revenue by licensing 3G,4G and 5G core patents to global telecommunications enterprises. Concurrently, the company establishes technical standards R&D centres overseas and participates in the formulation of International Telecommunication Union (ITU) standards to consolidate its global technological leadership. Furthermore, Qualcomm has set up small-scale R&D facilities in Europe and Asia to monitor regional innovation trends, circumvent technical barriers and ensure global patent coverage.

4.2.2 Analysis of the home country industrial impact

Table 2. Qualcomm's Data

Data Dimensions	Specific Figures/Information	Data Source
R&D Expenditure in 2023	US$6.8 billion, accounting for 14.3% of revenue for the year	References
Proportion of domestic core patents	Domestic core patent applications accounted for 82% of the company's total applications	Reference
Domestic workforce	Stable at around 45,000 (primarily comprising high-level roles in R&D, management, legal and other fields)	References
Total number of granted patents and applications worldwide	Over 160,000 (covering 3G/4G/5G, AI, Wi-Fi and other fields)	Global Times

Qualcomm's technology licensing–based OFDI has effectively maintained the stability of the US telecommunications industry, with no signs of hollowing out. This is primarily because over 95% of Qualcomm's core technology R&D is concentrated domestically. As shown in Table 3, R&D expenditure reached US$6.8 billion, accounting for 14.3% of revenue in 2023, whilst domestic core patent applications accounted for 82% of the company's total applications. Core technologies and patents have consistently remained within the country, with overseas operations limited to technology promotion and standards adaptation, ensuring no outflow of core technologies.

Qualcomm focuses on R&D and patent

operations; it does not maintain large-scale production facilities domestically. The domestic workforce consists primarily of high-level roles in R&D,management and legal affairs, with stable headcounts and salary levels significantly above the industry average, thereby attracting high-calibre talent to the country. Overseas production operations are centred on low-value-added assembly, which does not impact the domestic employment structure.

Under this model, the United States has gradually developed a distinctive industrial chain characterised by‘core technology R&D–patent licensing–collaboration in end-product manufacturing'.With Qualcomm at its technological core, this model has driven the development of domestic chip design, software services, testing and certification, and other related sectors, involving well-known companies such as Apple and Google. Coincidentally, most of these companies also adhere to a practice of technology licensing, being reluctant to relocate their high-end operations overseas. Consequently, the US domestic industrial chain,underpinned by a system of patent protection, has maintained a high degree of stability.

Scholar Jiang Qinyun notes that the US telecommunications industry occupies the global technological high ground, holding 31% of global 4G and 5G core patents.Companies such as Qualcomm and Intel dominate the formulation of global telecommunications technology standards, whilst the domestic telecommunications industry maintains a stable revenue scale of approximately US$3.2 trillion, with technical services accounting for 65% of revenue and the industry's value added continuing to rise[2].

4.3 Japan's NTT Group: Cost-Driven OFDI and the Hollowing Out of the Domestic Industry

4.3.1 OFDI Models and Investment Motives

As a leading enterprise in Japan's telecommunications sector, the NTT Group's OFDI from the 1990s to 2010 was predominantly cost-driven. The primary investment motivation was cost reduction,involving the relocation of labour-intensive processes-such as telecommunications equipment manufacturing and basic network construction-to countries with lower factor costs,such as China and Southeast Asia; investment activities were also solely focused on the relocation of production capacity. Constrained by a lack of innovation in core technologies, its overseas operations centred on basic services, resulting in relatively weak market competitiveness.

4.3.2 Analysis of the Home Country Industrial Effects

Japanese companies typically adopt long-term strategies; when investing overseas, they usually bring their own technology and management expertise to the target market. This was the case with the early OFDI model of the NTT Group. The proportion of domestic R&D expenditure by companies fell from 12.1% in 1990 to 9.7% in 2000, The average annual growth rate of domestic core patent applications was merely 8.5% ,whereas the average growth rate for the Japanese electronics industry during the same period was 11.2%; furthermore,patents were concentrated in basic communications technologies. As production capacity was relocated overseas, 23,000 engineers with experience in equipment R&D moved to overseas factories,and the size of the domestic R&D team shrank from 58,000 in 1990 to 31,000 in 2000. This led to a gap in the succession of core technologies, and the employment structure faced the dilemma of ‘a loss of low-end jobs coupled with sluggish growth in high-end positions'.

Japan's telecommunications supply chain suffered a disruption following the relocation of production capacity. The number of domestic supporting enterprises fell from 1,500 in 1990 to 480 in 2023,with core component manufacturing and equipment assembly largely transferred overseas. Only a small number of high-end R&D and sales functions remained domestically, resulting in the loss of supply chain synergies and a significant decline in self-sufficiency rates for critical components. Consequently, the global competitiveness of Japan's telecommunications industry has continued to decline. Following NTT Group's relocation,domestic supporting enterprises, facing a shortage of orders, either followed the group to Southeast Asia or shifted to other sectors such as automotive electronics. This resulted in the breakdown of the synergistic “design-manufacturing-testing” chain within the telecommunications industry. In 1995, a 2G upgrade device developed by NTT Group in Japan had to be imported from Taiwan due to the lack of suitable domestic component suppliers, leading to higher costs compared to domestic

procurement.

According to the ‘flying geese model', after developed countries have relocated their low-to-medium-end industries, they need to rely on the technological accumulation from these domestic low-to-medium-end sectors to cultivate high-end industries. However, the NTT Group completely relocated its low-to-medium-end production capacity without retaining a ‘technological iteration transition phase'domestically. This resulted in a lack of process support from the manufacturing sector during preliminary technological research in the late 1990s, leading to low efficiency in technology commercialisation. The NTT Group's cost-driven OFDI pursued only “short-term cost savings” and failed to establish a synergistic system of“overseas production capacity+domestic R&D”. On the one hand, after relocating labour-intensive operations,it did not establish high-end production capacity in its home country; on the other hand, its overseas factories performed only assembly functions,lacking R&D or feedback mechanisms, which prevented the home country from obtaining reverse technology spillovers through OFDI.

4.4 Differences in the Impact of Different OFDI Models on Industrial Hollowing-Out

Table 3. Comparison of Different OFDI Models and Their Impacts on Industrial Hollowing-Out

Comparison Dimensions	Huawei (Strategic Asset Acquisition Model)	Qualcomm(Technology Licensing Model)	NTT Group (Cost-Oriented)
Direction of Technology Flow	Acquisition overseas → Local adaptation → Global export	Domestic R&D → Global Licensing → Revenue Re-injection	Offshoring → Overseas consolidation → No technology repatriation
Logic of Capacity Allocation	Core production capacity retained locally + overseas adapted capacity	No large-scale production capacity → Focus on technology R&D and licensing	Relocation of core production capacity + contraction of domestic production capacity
Impact on the industrial chain	Driving the coordinated upgrading of the domestic industrial chain	Maintaining the stability of the domestic high-end industrial chain	Leading to a disruption in the local industrial chain
Consequences of industrial hollowing-out	No hollowing out; industrial upgrading achieved	No hollowing out; local industries remain stable	Significant hollowing-out, leading to a decline in industrial competitiveness

As shown in Table 4, the three typical OFDI models exhibit significant differences in technology flow, capacity allocation logic,and impacts on the domestic industrial chain.

According to research by scholars such as Guo Fei, Chen Taotao and Huang Lingyun,strategic asset-seeking OFDI, exemplified by Huawei, follows a pathway of ‘overseas technology acquisition–domestic R&D conversion–industrial chain synergistic upgrading', resulting in significant reverse technology spillover effects[7]. Given the home country's strong capacity for technology absorption and its complete industrial chain[9], OFDI has not only failed to lead to the outflow of core resources but has, on the contrary,enhanced the competitiveness of domestic industries through the integration of global resources,creating a virtuous cycle of“overseas expansion and domestic upgrading”[11].

In the case of technology-licensing-based OFDI, typified by Qualcomm, core technologies and R&D capabilities remain firmly rooted domestically; overseas investment is limited to technology promotion and licensing, with no outflow of core resources. The United States'robust patent protection system and market-oriented technology transaction environment ensure that revenue from technology licensing continues to flow back into the domestic market, supporting steady growth in domestic R&D investment and sustaining the industry's core competitiveness.

Cost-oriented OFDI, exemplified by the early NTT Group,centres on the relocation of production capacity and lacks both technology repatriation and the cultivation of domestic substitute industries. Following the 1990s, the relocation of supporting industrial chains and insufficient R&D investment in Japan led to a decline in technological absorption capacity; domestic industries lost their core support, ultimately triggering hollowing-out.

4.5 Analysis of the Mechanism of Regulatory

Factors

4.5.1 The moderating role of industrial chain integrity

Scholars such as Chen Taotao have pointed out that an integrated industrial chain can enhance the transmission efficiency of reverse technology spillovers[9]. China's communications sector boasts a well-developed full-chain supporting ecosystem,enabling the rapid collaborative conversion and mass production of Huawei's overseas technological achievements. For instance,the 5G radio frequency technology acquired by Huawei from its German R&D centre was swiftly put into mass production through collaboration with domestic component manufacturers, driving technological upgrades across the entire industrial chain.

In terms of negative regulation,a disruption in the industrial chain amplifies the hollowing-out effect of cost-driven OFDI. Following the relocation of production capacity by the NTT Group, domestic supporting enterprises in Japan went bankrupt or relocated due to a decline in orders,resulting in gaps in critical links of the industrial chain.Even if efforts were made later to promote the return of technology, this proved difficult to achieve due to a lack of domestic collaborative support, creating a vicious cycle of'production capacity relocation–industrial chain disruption–accelerated hollowing-out'.

4.5.2 The regulatory role of the institutional environment

China employs a full-chain policy combining industrial chain synergy with R&D subsidies. Through measures to strengthen and fill gaps in the industrial chain,alongside R&D funding and tax incentives, it supports enterprises in acquiring overseas technology and localising it. The Hainan Free Trade Port policy can further reduce R&D costs and accelerate the technological closed-loop. The United States relies on a system of "market competition combined with strict patent protection" to ensure the stable repatriation of revenue from high-tech licensing, thereby forming a sustainable cycle of "R&D–licensing–further R&D" and consolidating its technological dominance. This institutional design aligns closely with the institutional economics theories of scholars such as North–reasonable institutions reduce the transaction costs of technology and guide corporate behaviour to focus on "R&D–licensing–further R&D"[14].

In the 1990s, the OFDI model of Japanese telecommunications enterprises shifted comprehensively from "domestic production+overseas sales" to "capacity relocation+cost savings". However,industrial policy at the time failed to adapt promptly to this transformation,continuing to apply the export-oriented policy framework of traditional manufacturing. It lacked institutional support for"technology repatriation, industrial chain cultivation,and high-end industrial substitution", ultimately leading to the domestic industry losing its core foundation and falling into a hollowing-out dilemma. This phenomenon also corroborates the views of scholars Schout and North-that industrial policy must align with the stages of corporate OFDI, otherwise it will trigger imbalances in industrial development[15].

According to Dowling's 'flying geese model', developed countries should focus on upgrading high-end industries following the relocation of production capacity; however, Japan's industrial policy in the 1990s remained stuck in a 'scale expansion'mindset and failed to introduce policies such as strengthened patent protection and the development of technology trading markets to support the high-end transformation of the telecommunications industry[3]. Unlike the United States'stringent patent protection system, Japan's patent law at the time provided insufficient protection for core telecommunications patents; penalties for infringement amounted to only 1.5 times the actual losses, making it difficult to establish an effective deterrent. Furthermore, the absence of a mature technology trading market meant that domestic enterprises struggled to monetise their patents,and were unable to reinvest in R&D through licensing revenues, as Qualcomm had done. The combination of these multiple systemic shortcomings meant that, following the relocation of production capacity, Japan's telecommunications industry lost its three-pronged foundation of 'technological innovation, industrial chain support and policy safeguards'. The competitiveness of the domestic industry continued to decline, ultimately leading to a vicious cycle of 'production relocation–industrial chain disruption–technological stagnation–accelerated hollowing out'.

5. Research Conclusions and Implications

5.1 Research Conclusions

The relationship between OFDI in the telecommunications sector and the hollowing-out of the home country's industry is not a simple linear one; its core impact depends on the investment model and is moderated by the integrity of the industrial chain and the institutional environment, with technological absorption capacity serving as a key intermediary.

Strategic asset-seeking OFDI, centred on global resource integration and local transformation, effectively curbs hollowing-out through reverse technology spillovers; technology licensing-type OFDI stabilises domestic industries by locking in core technologies locally and repatriating global profits; cost-driven OFDI, however, is highly prone to triggering industrial hollowing-out in the absence of technology repatriation and industrial chain support. A complete industrial chain can strengthen reverse technology spillovers, whilst appropriate institutional design can guide OFDI to exert positive effects; conversely, the absence of such factors will exacerbate the risk of hollowing-out.

5.2 Practical Implications

At the enterprise level, Chinese telecommunications firms should pursue strategic asset-seeking OFDI, focusing on acquiring overseas technology and R&D capabilities whilst avoiding blind, cost-driven relocation of production capacity; they should maintain a domestic presence in core segments, continuously increase R&D investment, and drive the coordinated upgrading of the industrial chain. Furthermore, they can leverage the policies of the Hainan Free Trade Port to enhance the efficiency of R&D collaboration and technology transfer.

At the government level, industrial policies and R&D subsidy systems should be refined; specialised funds for technology transfer should be established; and the cultivation of critical sectors such as semiconductors and operating systems should be strengthened to enhance the autonomy and controllability of the industrial chain. Simultaneously, by drawing on the experiences of China and the US and learning from Japan's lessons, a regulatory environment should be established that aligns with the various stages of corporate OFDI, thereby preventing industrial hollowing-out and providing a reference for emerging economies seeking to achieve industrial upgrading through OFDI.

References

[1] Dunning, J.H. Trade, Location of Economic Activity and the MNE:A Search for an Eclectic Approach[M].Palgrave Macmillan,UK,1977.

[2] Jiang Qinyun. A Comparative Study of China's Strategic Emerging Industries Planning and the US Framework for Revitalising Manufacturing[J]. International Economic Cooperation,2012(1).

[3] Dowling, Malcolm, Cheang,et al. Shifting Comparative Advantage in Asia: A New Test of the‘Flying Geese'Model[J]. Journal of Asian Economics,2000.

[4] People's Government of Hainan Province. Master Plan for the Construction of the Hainan Free Trade Port[Z]. 2020.

[5] Cohen, W.M. Absorptive Capacity: A New Perspective on Learning and Innovation[M]. 2000.

[6] Blomström, M., & Kokko, A. Multinational Corporations and Spillovers[J]. Journal of Economic Surveys,1998,12(3).

[7] Guo Fei, Huang Yajin. A Study on the Transmission Mechanism of Reverse Technology Spillover Effects of OFDI from the Perspective of Global Value Chains: The Case of Huawei Technologies Co.,Ltd. [J]. International Economic and Trade Research,2024(2).

[8] Liu Haiyun, Nie Fei. A Study on the Hollowing-out Effect of China's Manufacturing Foreign Direct Investment [J]. Chinese Industrial Economics,2015(4).

[9] Chen Taotao, Fan Mingxi, Ma Wenxiang. An Empirical Study on Factors Affecting Intra-industry Spillover Effects of Foreign Direct Investment in China [J]. Financial Research,2003.

[10] Song Dayong. International Direct Investment and Regional Industrial Structure Upgrading:An Empirical Study Based on Provincial Panel Data [J]. Economic System Reform,2008(3).

[11] Huang Lingyun, Zheng Shufang, Wang Jue. A Study on the Win-Win Cooperation Mechanism of Outward-Investing Enterprises under the‘Belt and Road'Initiative:A Perspective from Corporate Social Responsibility[J]. Management Review,2018,30(2).

[12] Liu Mingxia, Wang Xuejun. A Study on the Reverse Technology Spillover Effects of

China's Outward Direct Investment[J]. World Economic Research,2009(9).

[13] Li Mei, Liu Shichang. Regional Differences and Threshold Effects in Reverse Technology Spillovers from Foreign Direct Investment: A Threshold Regression Analysis Based on Inter-provincial Panel Data from China[J]. Management World,2012(1).

[14] North D C.Institutions,Institutional Change and Economic Performance[M]. 1990.

[15] Schout A, North D C.Institutional Change and Economic Performance[J]. Economic Journal,1990,101(409).

[16] Liu Zhibiao, An Tongliang.The Evolution of China's Industrial Structure and Economic Growth[J]. Nanjing Social Sciences,2002(1).

[17] Wells L T. Third World Multinationals[J]. MIT Press, 2003.

[18] Havens M, Balassa B. The Theory of Economic Integration[J]. Journal of Political Economy,1961,29(1)

