

A Review of Differentiated Paths of Industrial Support Policies in the Process of Urban Agglomeration Integration — Taking Beijing-Tianjin-Hebei, Yangtze River Delta and Guangdong-Hong Kong-Macao as Examples

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Abstract. This paper takes the three major national-level urban agglomerations of Beijing-Tianjin-Hebei, Yangtze River Delta, and Guangdong-Hong Kong-Macao Greater Bay Area as research subjects, systematically reviewing their differentiated practical paths in industrial support policies during the integration process. Through comparative analysis, it provides an in-depth examination of the distinctive policy models in these regions: Beijing-Tianjin-Hebei constructs collaborative complementary pathways through functional decentralization, the Yangtze River Delta forms innovative collaboration pathways via industrial chain integration, while the Greater Bay Area explores open integration pathways through institutional innovation. The study reveals significant differences in policy objectives, coordination mechanisms, and influencing factors across these three regions. Although the implementation of these differentiated approaches has achieved notable results, challenges such as administrative barriers and inefficient factor flows remain. Finally, this research summarizes policy experiences including respecting regional differences, innovating coordination mechanisms, and building diversified policy instruments. It proposes optimization suggestions for each of the three urban agglomerations—strengthening factor mobility and capacity-building, deepening market integration and innovation collaboration, and advancing institutional alignment with industrial deep integration—providing theoretical foundations and practical references for formulating industrial policies in China's distinctive urban agglomerations.

Keywords: Urban agglomeration integration; industrial support policies; Beijing-Tianjin-Hebei; Yangtze River Delta; Guangdong-Hong Kong-Macao.

1. Introduction

In recent years, under the background of the continuous promotion of the national regional coordination development strategy, urban agglomeration integration has become the core of solving the problem of unbalanced regional development and building a new development pattern. As the three most economically dynamic urban agglomerations in China, Beijing-Tianjin-Hebei (BTH), Yangtze River Delta (YRD), and Guangdong-Hong Kong-Macao Greater Bay Area (GHM) not only concern the high-quality development of regional economies but also bear the significant mission of exploring regional pathways for Chinese-style modernization. However, due to notable differences in resource endowments, industrial foundations, institutional environments, and strategic positioning among these urban agglomerations, differentiated requirements are placed on the objective setting, tool selection, and coordination mechanisms of industrial support policies. Ignoring such differences and blindly implementing homogeneous policies could easily lead to imbalanced industrial layouts and inefficient resource allocation, thereby constraining deeper integration. Therefore, mapping out differentiated approaches for industrial support policies across these three urban agglomeration holds important theoretical and practical significance for improving regional governance systems.

Existing research has extensively explored industrial policies in urban agglomerations. Most studies focus on the policy effects of a single urban agglomeration: Liu et al. analyzed the impact of the BTH coordinated development policy on industrial structure optimization [1]. Liu et al. examined the relationship between spatial integration and industrial synergy in the YRD region [2]. While Xiang

and Yang investigated mechanisms and models for industrial collaboration in the GHM [3]. Although these findings provide valuable perspectives for understanding urban agglomeration policies, several limitations remain. First, there is a lack of systematic comparison among the three major urban agglomerations, particularly regarding differences in policy objectives, tool selection, and coordination mechanisms. Additionally, existing research inadequately reveals the intrinsic connections between policy variations and urban agglomeration characteristics, failing to establish a universal framework for differentiated policy implementation.

In light of this context, this study takes the BTH, YRD, and GHM as case studies. Centered on the "differentiated development path" as its core analytical framework, it systematically examines institutional arrangements, policy tool combinations, and cross-regional coordination models in industrial support policies across these three urban agglomerations. By analyzing the manifestations and causes of their distinct developmental trajectories, the research provides theoretical references and practical guidance for other urban agglomerations to formulate differentiated industrial support policies. This effort aims to facilitate the precise implementation of China's national regional coordinated development strategy.

2. The Evolution and Practice Path of Industrial Support Policies in the Three Urban Agglomerations

2.1. BTH Urban Agglomeration: A Coordinated Complementarity Path Guided By Functional Decentralization

The BTH urban agglomeration, grappling with issues like excessive concentration of core city functions and imbalanced regional resource allocation, has seen its industrial support policies evolve from prioritizing "functional decentralization" to emphasizing "collaborative complementarity". Historically, early policies focused on transferring non-capital functions from core cities to surrounding areas, clarifying industrial positioning: core cities concentrated on high-end services and technological innovation, while peripheral cities took over traditional industries and manufacturing sectors, forming an initial division of labor framework [4]. Recent years have witnessed enhanced "collaborative complementarity" through building cross-regional industrial chain systems and precise alignment of innovation resources with manufacturing capabilities, aiming to resolve the imbalance between core and periphery development [5].

In practice, the BTH has developed multi-dimensional industrial support measures through a top-down coordination mechanism. On one hand, the government establishes cross-regional industrial transfer platforms to provide policy incentives for industrial recipients, guiding orderly relocation to suitable areas. On the other hand, it actively promotes the facilitation of factor mobility by exploring concrete measures such as mutual recognition of professional qualifications and cross-regional social security integration, aiming to break administrative barriers that constrain optimal resource allocation [6]. At the same time, collaborative innovation platforms are being developed to facilitate the diffusion of high-quality technological resources from core cities to surrounding areas, providing robust support for industrial upgrading in neighboring regions.

2.2. YRD Urban Agglomeration: An Innovation and Collaboration Path Guided By Industrial Chain Integration

With its strong manufacturing base and complete industrial system, the YRD urban agglomeration has gradually upgraded its industrial support policies from "industrial chain integration" to "innovation coordination", aiming to promote industries to the high end of the global value chain. Historically, early measures focused on market integration by establishing regional economic coordination organizations to eliminate market segmentation and administrative barriers, laying the foundation for cross-regional industrial chain extension [7]. Subsequent policies emphasized "innovation collaboration", utilizing platforms like science and technology innovation corridors and

regional innovation centers to deepen integration between industrial chains and innovation chains, thereby enhancing the overall competitiveness of regional industries [8].

In practice, the YRD has developed a distinctive model characterized by "regional collaboration + market-driven mechanisms". To achieve industrial chain integration, the region optimizes its division of labor: core cities focus on R&D design and headquarters economy, while surrounding cities leverage their manufacturing foundations to handle midstream production and supporting sectors, collectively forming a complete "R&D-manufacturing-service" industrial chain [7]. Simultaneously, it promotes innovation resource sharing through joint construction of large-scale research infrastructure and innovation service platforms, enhancing the spillover effects of innovation on industrial upgrading. Wang et al.'s research indicates that the YRD's innovation network demonstrates significantly higher connectivity and coverage compared to other urban agglomerations, providing robust support for industrial synergy [8]. Additionally, the government continues to deepen market integration by unifying market access standards and regulatory rules, streamlining administrative services, and reducing cross-regional operational costs for industrial chains.

2.3. GHM: An Open and Integrated Path Guided By Institutional Innovation

The GHM, operating under the "One Country, Two Systems" framework with institutional differences, has prioritized "institutional innovation" as its core breakthrough in industrial support policies. By dismantling institutional barriers, it drives regional industrial integration and openness. Historically, early policies focused on economic cooperation, with regional trade agreements facilitating orderly access of Hong Kong and Macao's service sectors to the Pearl River Delta. As regional integration strategies evolved, policies shifted toward comprehensive institutional coordination, encompassing factor mobility, market rules, and innovation collaboration. These efforts aim to establish an institutional system compatible with an open economy [9,10].

In practice, the GHM region has driven deep industrial integration through multi-level institutional innovations. First, it focuses on building a cross-border industrial coordination system. Leveraging Hong Kong and Macao's strengths in modern services and the Pearl River Delta's manufacturing base, they have formed a complementary model of "service industry empowering manufacturing", promoting industrial expansion into high value-added sectors [11]. Building on this foundation, efforts are made to facilitate factor mobility through pilot programs like cross-border financial cooperation and mutual recognition of professional qualifications. Wang and Zhong (2021) noted that the formation of regional innovation networks—particularly collaborative innovation networks—provides effective channels for cross-regional factor mobility, though institutional constraints such as visa policies and social security coordination remain unresolved [12]. Meanwhile, the Greater Bay Area emphasizes creating cross-border cooperation platforms by establishing special cooperation zones and piloting tax incentives and market access relaxation policies to attract international resources from Hong Kong and Macao to participate in regional industrial development [10].

3. Comparative Analysis of Differentiated Paths of Industrial Support Policies in Three Urban Agglomerations

3.1. Policy Objective Differences

The policy objectives of the three major urban agglomerations have significant differences. The BTH focuses on functional restructuring and spatial optimization, driving regional industrial layout adjustments through the relocation of non-capital functions. Its policy emphasis lies in addressing "big city disease" and regional development imbalances, promoting coordinated regional development and spatial structure optimization via industrial transfer and reception. The YRD prioritizes industrial chain upgrading and innovation collaboration, aiming to build world-class industrial clusters. Through deep integration of innovative resources across three provinces and one municipality, it advances industrial foundation modernization and industrial chain modernization. The GHM emphasizes institutional breakthroughs and open integration, focusing on resolving

regulatory barriers under the "one country, two systems, three legal jurisdictions" framework. Its policy innovation highlights exploring new pathways for institutional openness, facilitating rule alignment and mechanism coordination among the three regions.

3.2. Differences in Coordination Mechanisms

The three major urban agglomerations have developed distinct collaborative governance models through their unique policy coordination mechanisms. The BTH employs a "central-coordinated" approach, leveraging high-level administrative authority to dismantle regional barriers. The YRD has established a "local collaboration" framework that emphasizes equal participation from multiple stakeholders. Meanwhile, the GHM has created a "cross-border consultation" mechanism, exploring pathways for regulatory alignment under the "one country, two systems" principle.

3.3. Differences in Contributing Factors

The formation of industrial policy path differences among the three major urban agglomerations is influenced by multiple factors such as regional resource endowments, industrial foundations, and institutional environments. The core constraint faced by the BTH lies in uneven resource distribution and excessive functional concentration. Beijing has accumulated excessive non-capital functions, while Tianjin and Hebei regions lack sufficient capacity to absorb them, leading to significant regional development disparities. The YRD region's advantage stems from its robust industrial foundation and well-established innovation network, enabling it to adopt policy paths featuring industrial chain integration and collaborative innovation. The most distinctive feature of the GHM is its unique institutional environment under "One Country, Two Systems." Hong Kong implements common law, Macao follows the civil law system, and Guangdong enforces China's mainland legal framework, forming a unique "triple legal jurisdiction" structure. This institutional uniqueness necessitates that the GHM adopt policy pathways oriented towards institutional innovation, addressing cross-border factor mobility barriers through regulatory alignment.

4. Effectiveness Evaluation and Challenges of Differentiated Approaches to Industrial Support Policies

4.1. Policy Implementation Results

The industrial support policies for the three major urban agglomerations have achieved initial results. The BTH has facilitated the relocation of non-capital functions to Tianjin and Hebei through functional decentralization, enhancing industrial complementarity and policy coordination [13]. The YRD has established a well-developed cross-regional industrial division system through industrial chain integration and innovation collaboration, significantly boosting regional industrial competitiveness [7,8]. Meanwhile, the GHM has promoted cross-border industrial cooperation and open economy development through institutional innovation, with gradually deepening regional industrial integration and innovative networks playing a prominent role in supporting industrial resilience [9,11,12].

4.2. Main Challenges

While significant progress has been made, the three major urban agglomerations still face distinct challenges in advancing industrial synergy. Administrative barriers still exist in the BTH, and the regional benefit distribution mechanism is not perfect, resulting in the depth and breadth of industrial collaborative development has not reached an ideal state, which needs to be further improved. The YRD faces persistent constraints from local protectionism and market fragmentation, with slow legislative coordination and delayed implementation of unified market access standards to overcome industrial chain integration obstacles. The GHM confronts notable enforcement challenges stemming from institutional disparities, with insufficient integration between Hong Kong, Macao and other

regions. Furthermore, optimizing cross-border factor mobility remains crucial to fully unlock the region's industrial convergence potential.

5. The Empirical Implication and Policy Optimization Recommendations of Differentiated Path

5.1. Empirical Implication

5.1.1. Policy paths adapted to regional core contradictions

The practices of China's three major urban agglomerations demonstrate that industrial support policies must closely address regional core challenges. The BTH adopted functional decentralization to resolve "over-concentration of functions", the YRD implemented industrial chain integration to meet industrial upgrading needs, and the GHM pursued institutional innovation to address "systemic disparities." This problem-oriented policy design has proven crucial for achieving significant outcomes [4,7,9].

5.1.2. Diversified coordination mechanisms for regional characteristic

The central coordination model aligns with the national strategic attributes of the BTH, while the local linkage model suits the market-driven characteristics of the YRD. The cross-border consultation model adapts to the institutional uniqueness of the GHM. This demonstrates that coordination mechanisms should be tailored to regional administrative hierarchies, market development levels, and institutional environments, avoiding a "one-size-fits-all" approach [7,10,13].

5.1.3. Factor mobility and innovation coordination as core tools

The industrial chain integration and innovation collaboration in the YRD, the innovation network development in the GHM, and the facilitation of factor mobility in the BTH all demonstrate that "free flow of factors + sharing of innovation resources" serves as the core mechanism for enhancing the effectiveness of industrial policies [6,8,12].

5.2. Policy Optimization Recommendations

5.2.1. BTH: Strengthening capacity building for factor flow and undertaking

For the BTH, efforts should focus on facilitating regional factor mobility. Specific measures include relaxing Beijing's household registration restrictions for talents from Tianjin and Hebei, establishing a unified social security and healthcare coordination mechanism across the region, and promoting orderly talent flow and rational allocation [6]. Meanwhile, Hebei needs to enhance its industrial capacity through an "industrial relocation + technological support" model, developing supporting industries by leveraging platforms like Xiong' an New Area to attract high-end technological resources, cultivate emerging industries, and strengthen regional industrial chain resilience [4,14]. Additionally, a central coordination mechanism should be implemented to reduce homogenized competition among regions. Differentiated industrial development plans should clarify Tianjin's focus on advanced manufacturing, Hebei's development of supporting industries, and Beijing's specialization in high-end services, forming a new pattern of complementary advantages and differentiated development in regional collaboration.

5.2.2. YRD: Deepening market integration and innovation coordination

The YRD region should focus on dismantling hidden market barriers between areas by unifying market access standards, improving intellectual property protection rules, and expanding the "One-Stop Online Service" government system to achieve full coverage. This will enhance market integration between emerging cities and established urban centers [7,8]. Governments need to scientifically guide industries toward differentiated development by formulating industrial chain division plans based on each city's comparative advantages. For instance, Shanghai could concentrate on integrated circuit chip R&D, Suzhou prioritize semiconductor manufacturing, and Hefei focus on

new energy materials to create a diversified development pattern. Furthermore, regional innovation collaboration should be strengthened through joint establishment of the YRD National Technology Innovation Center, promoting open sharing of large-scale research facilities, facilitating free flow of scientific innovation elements, and comprehensively enhancing regional innovation spillover effects and overall competitiveness.

5.2.3. GHM: Promoting institutional convergence and deep integration of industries

To optimize industrial collaboration in the GHM, sustained efforts should be made in three key areas: institutional alignment, industrial integration, and platform development. First, deepen institutional coordination by implementing pilot programs like "one-stop inspection" and "cross-border qualification mutual recognition", standardizing market rules and regulatory standards across the region to reduce costs in commodity clearance and currency settlement [9,10]. Second, promote deep industrial integration by leveraging Hong Kong's status as an international financial hub to provide targeted financing support for Pearl River Delta manufacturers, while utilizing Macao's close ties with Portuguese-speaking countries to help businesses expand overseas more efficiently [11,12]. Additionally, optimize cross-border cooperation platforms by expanding policy pilot zones in Qianhai and Hengqin, replicating proven "institutional innovation" experiences from these areas to establish more robust practical frameworks for regional industrial synergy.

6. Conclusion

First, differentiated path selection is crucial for the success of industrial policies in urban agglomerations. The BTH has restructured regional industrial layouts through functional decentralization, the YRD leveraged chain integration to enhance innovation efficiency, and the GHM utilized institutional breakthroughs to promote open integration. These three approaches align with their respective resource endowments and developmental needs. This differentiated path selection fully embodies the wisdom of "adapting measures to local conditions", providing valuable references for other urban agglomerations. Meanwhile, innovative coordination mechanisms play a central role in breaking down administrative barriers. The three major urban agglomerations have developed central-coordinated, locally-linked, and cross-border consultation mechanisms in practice, effectively balancing overall regional interests with local partial interests. Additionally, the suitability of policy tools forms the foundation for enhancing implementation effectiveness. Industrial policy instruments in these three urban agglomerations are closely aligned with their development needs, ensuring precise targeting at critical junctures. BTH addressed insufficient capacity for industrial transfer by implementing industrial relocation coordination and factor flow facilitation tools. The YRD tackled incomplete industrial chain integration through unified market rules and shared innovation resources. The GHM focused on institutional alignment challenges by piloting cross-border cooperation platforms and mutual recognition of professional qualifications. This "demand-tool" matching mechanism effectively resolved pain points constraining industrial development while ensuring full realization of policy efficacy. Finally, it should be noted that urban agglomeration development involves both achievements and challenges. While all three urban agglomerations have achieved phased results in industrial policy implementation, they still face various issues stemming from imperfect mechanisms, requiring targeted breakthroughs to unleash policy effectiveness.

Future research can be further expanded and deepened from multiple directions. In terms of research subjects, the Chengdu-Chongqing Twin City Economic Circle and the Mid-Yangtze River Urban Agglomeration can be included in comparative studies to explore the adaptation paths of industrial policies for different types of urban agglomerations. Regarding research methods, it is necessary to strengthen quantitative evaluation studies by establishing an indicator system for assessing the effectiveness of industrial policies and applying econometric methods to evaluate policy implementation outcomes. Simultaneously, research on policy implementation mechanisms should be deepened to explore pathways for empowering regional policy coordination through digital technologies, such as the application prospects of blockchain technology in regional policy

enforcement and supervision. Additionally, international comparative studies can be conducted to systematically summarize global experiences in industrial policy implementation from major urban agglomerations, providing international references for the development of China's urban agglomerations.

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