Original Research Article

Research on the transformation path of modern logistics management talent cultivation under the background of free trade port

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Abstract: Amid the accelerated development of global free trade ports, the cultivation of modern logistics management talents faces dual challenges of digital transformation and international supply chain restructuring. This paper analyzes the driving effects of free trade port policies on logistics industry upgrading, revealing core issues in current talent cultivation including outdated curriculum systems, insufficient industry-education integration, lack of international platforms, and weak digital competencies among faculty. Proposing transformation paths through government-industry-university-research-application collaboration mechanisms, it designs dual-core curriculum modules, virtual simulation platforms, and international qualification certification systems. Emphasizing the integration of policy guidance, technological innovation, and educational reform, the study aims to cultivate compound logistics talents with cross-border operational capabilities and digital literacy. The research provides theoretical frameworks and practical references for logistics education reform under free trade port strategies, supporting regional economic development.

Keywords: Free trade port; Logistics management talents; Industry-education integration; Digital transformation

1. Introduction

The accelerated development of global free trade ports has positioned logistics as a core driver of international trade. Policy advantages like zero tariffs and streamlined tax systems, coupled with cross-border supply chain demands, are redefining competency standards for logistics management talents. The integration of special regulatory models and smart logistics technologies requires professionals to master international trade rules, digital tools, and multilingual operations. However, current talent cultivation systems face challenges including outdated curricula, disconnection from real-world scenarios, and insufficient faculty expertise in globalization and digitalization, resulting in mismatches between talent supply and industry needs. These gaps hinder policy dividend realization and China's competitiveness in global supply chain restructuring. Exploring transformation paths for talent cultivation thus becomes imperative for aligning with national opening-up strategies and resolving education-industry disparities[1]. By analyzing competency demands within free trade port logistics ecosystems, this study identifies adaptation gaps and proposes government-industry-university-research collaboration mechanisms, offering innovative solutions for deeper education-industry integration.

2. Analysis of current logistics management talent cultivation models

The current logistics management talent cultivation system has shown quantitative growth but faces structural mismatches with industry demands. From 2019 to 2023, the number of Chinese universities offering logistics programs increased by 18%, reaching 980 institutions in 2023. However, graduate employment rates declined from 92% to 84%, reflecting a widening gap between theoretical training and practical needs. Industry-academia collaboration projects grew by 35%, yet only 42% of students participated in such initiatives due to limited scalability and outdated training content. Notably, institutions offering courses aligned with free trade port requirements (e.g., cross-border supply chain management) rose from 12% to 28%, but faculty with indus-

try experience remained stagnant at 31%, hindering scenario-based teaching. Digital literacy training coverage expanded to 67% of curricula by 2023, yet only 23% of programs integrated emerging technologies like blockchain or AI into core courses. These metrics highlight systemic challenges in aligning education outputs with the evolving logistics ecosystem[2].

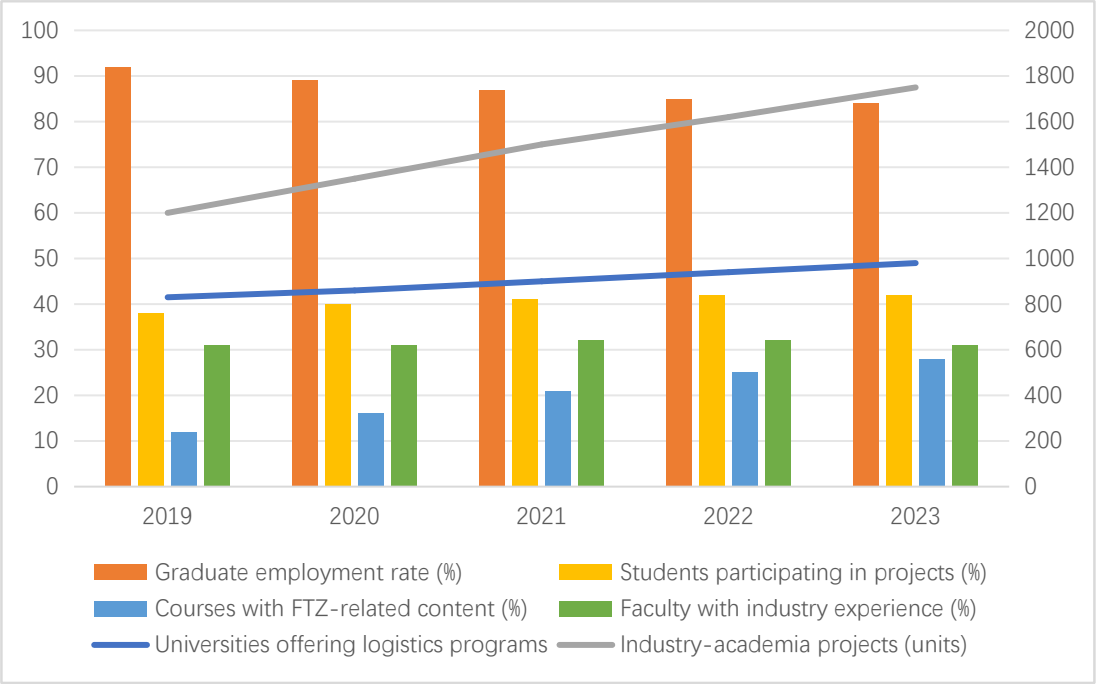

Figure 1. Statistical overview of logistics talent cultivation (2019–2023).

3. Major Problems in Cultivating Logistics Management Talents in Free Trade Harbors

3.1. Curriculum system disconnected from free trade port logistics industry demands

Existing logistics education curricula fail to align with the real-time industry dynamics driven by free trade port policies. Core courses lack systematic integration of emerging requirements such as digital customs clearance processes, cross-border supply chain operations under special supervision modes, and blockchain-enabled logistics traceability. Theoretical frameworks predominantly reflect traditional domestic logistics models, neglecting scenario-based training modules tailored to the unique "first-line liberalization, second-line control" regulatory environment[3].

3.2. Absence of long-Term policy support for industry-education integration mechanisms

Collaboration between educational institutions and logistics enterprises remains project-driven rather than institutionally embedded. Current policies focus on temporary internship placements and ceremonial partnership agreements without establishing sustainable funding mechanisms, standardized evaluation systems, or legal safeguards for intellectual property co-creation. This results in fragmented cooperation models that cannot address the evolving skill requirements of intelligent port logistics and bonded warehouse innovations[4].

3.3. Underdeveloped international talent cultivation platforms

The construction of cross-border logistics education platforms lags behind the global connectivity demands of free trade ports. Most institutions lack multilingual learning resources for international trade dispute reso-

lution, overseas logistics node operation simulations, and cultural intelligence training aligned with BRI (Belt and Road Initiative) partner countries. Additionally, there is insufficient infrastructure for joint degree programs with overseas logistics schools or virtual collaboration networks to replicate multinational supply chain coordination scenarios.

4. Transformation path setting for logistics management talent cultivation in free trade port

4.1. Curriculum system optimization strategies

To align curricula with Free Trade Port (FTP) industry needs, universities should establish joint curriculum committees involving customs authorities, logistics enterprises, and digital service providers. These committees would systematically update course content to integrate FTP-specific operational requirements, such as cross-border e-commerce tax procedures and blockchain-based cargo tracking. Core courses should adopt modular structures combining foundational logistics theories, policy simulations (e.g., replicating single-window customs systems), and hands-on digital twin platform training. Partnerships with leading logistics firms could embed industry-certified micro-credentials into elective modules, while mandatory live case studies from operational FTP zones would ensure practical relevance[5].

4.2. Sustainable industry-Education integration policies

A multi-level governance framework should institutionalize industry-academia collaboration. National legislation could incentivize enterprises through tax benefits to establish on-campus innovation labs or fund professorship positions. Regional FTP administrations would form logistics talent boards to co-design skill roadmaps and enforce binding agreements for internships and technology transfers. Certified apprenticeship programs would require enterprises to allocate resources for dual-role faculty, combining teaching and industry roles. Independent auditors would evaluate partnership outcomes annually using international standards to ensure accountability and quality.

4.3. International platform development solutions

Developing global talent platforms requires multilateral collaboration. Central ministries should fund virtual hubs integrating international logistics datasets and multilingual case studies for VR-based simulations. Universities must establish dual-degree programs with logistics schools in key trade regions, embedding standardized FTP competency units. Partnerships with multinational logistics firms would create culture-intelligence labs using AI tools to train students in region-specific business practices. Government-sponsored exchange programs could facilitate student rotations in overseas FTP operations, while accreditation requirements would mandate internationalization directors to maintain cross-border academic pipelines.

5. Conclusion

The construction of free trade port requires logistics talents to have the ability of cross-border operation and digital technology application, while the traditional training mode has bottlenecks in curriculum adaptability, industry-teaching synergy mechanism and international platform construction. This study proposes to build a dynamic curriculum updating system, strengthen the long-term cooperation policy between schools and enterprises, build a cross-border virtual training platform and other transformation paths, so as to promote the in-depth integration of the education chain and the industrial chain of the free trade port. In the future, it is necessary to focus on solving three problems: first, to formulate regional differentiated training standards to

match the functional positioning of different free trade ports; second, to improve the articulation mechanism of "vocational education and higher education" to form a multi-level supply of talents; and third, to deepen the application of digital twins, blockchain and other technologies in the practical training, and to establish a dynamic model for competency certification. As the reconstruction of global supply chain accelerates, composite logistics talents with the power of policy interpretation and technology integration will become the core resources for FTTP to participate in international competition and provide continuous support for systematic opening up.

Project

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