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Demand-Driven Competence Mapping for Logistics Vocational Education in Yunnan: A Lifelong Learning Perspective

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Abstract

Amid China's push for a learning-oriented society, logistics has become a pivotal engine of growth, yet vocational provision still lags behind shifting industry requirements. Demand-driven competence mapping is examined as a means to close this gap. An analysis of sector expansion and attendant skill needs exposes the shortcomings of current programmes. Mapping competences against live market demand not only aligns graduate outcomes with employer expectations but also blurs the boundary between academic and vocational tracks, yielding a more adaptable labour pool. A multi-layer case study of Yunnan's modern logistics cluster illustrates how the framework can simultaneously serve individual career progression, corporate performance targets and wider sustainability goals, producing a responsive education ecosystem that feeds the national learning agenda.

Keywords

Learning Society; Logistics Industry; Vocational Education; Demand-Driven Competence Mapping.

1. Introduction

As global economic integration and information technology rapidly progress, building a learning society has emerged as a shared objective for educational advancement across various nations. A learning society underscores the principle of lifelong learning, necessitating that the education system caters to the requirements of talent across different levels and fields, and nurtures high-quality individuals equipped with innovative and practical skills. Vocational education, being a crucial component of the educational framework, shoulders the significant duty of producing technical and skilled professionals for society. Within the context of a learning society, vocational education must continuously adapt to the evolving industry demands, refine its talent cultivation methods, and improve the quality of instruction to better support societal development.

With the widespread adoption of new technologies in various sectors, the modern logistics industry has experienced rapid development. As a crucial support industry for the national economy, modern logistics undertakes essential functions such as material circulation, information transmission, and capital flow. It acts as the bridge and link that connects production and consumption. The swift growth of emerging industries like e-commerce and intelligent manufacturing has heightened the demand for high-quality, skilled logistics professionals, with the requirements for these experts continuously evolving. Nonetheless, there are still challenges in the current vocational education within the logistics sector, particularly concerning talent cultivation. Issues include a disconnect between curriculum design and industry demands, as well as inadequate practical training, resulting in the quality

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of talent cultivation struggling to keep pace with industry development needs. The development and application of a modern logistics vocational education capacity map, viewed from the perspective of demand within the field of vocational education, is of significant importance for enhancing the quality and efficiency of education. It is essential for meeting the evolving needs of the logistics industry and for advancing the establishment of a learning society.

2. Background

2.1. Vocational Education and a Learning Society

In recent years, with the advancement of the construction of a learning society, the importance of vocational education has become increasingly prominent. A learning society refers to a social form characterized by learning as its fundamental feature, with its core emphasizing the concept of lifelong learning for all. Vocational education, as an integral part of this, bears the mission of cultivating high-quality skilled talents. Wang Xu (2024) posits that the integrated training model for vocational education talents is considered a crucial avenue to enhance the adaptability of vocational education and bolster the development of a skilled society[1]. Liu Xiao and Wang Haiying (2022) explored how vocational education fosters the creation of a skill-based society through talent integration training, industry-education integration, and other methodologies[2].

2.2. Vocational Education Capability Map

Capability mapping is a visualization tool that leverages knowledge graph technology to describe and analyze the competency structure and development paths that students should possess within vocational education. The construction of capability maps is a significant direction for the reform of vocational education. Zhang Chunfeng (2023) proposed a construction path based on the professional skill map, emphasizing its importance in vocational education. Through the integration of knowledge graphs and competency graphs, vocational education can more clearly display the architecture of professional knowledge, optimize curriculum settings, and competency training[3]. Wei Liang (2024) utilized knowledge graph technology to optimize vocational education curriculum content, providing theoretical support for the digital transformation of vocational education[4].

2.3. The Current Development and Trends of the Modern Logistics Industry

2.3.1. The current development status of the modern logistics industry

Table 1. Scale and growth of China's logistics market in 2024

Index	Market size	Growth rate	Data sources
Total social logistics	400 trillion yuan	6.5%	The 2024 Logistics Operation Report issued by the National Development and Reform Commission
Express business volume	150 Billion	10%	Statistical Bulletin on the Development of Express Delivery Industry issued by the State Post Bureau
Total logistics cost / GDP ratio	11.8%	-0.5%	China Federation of Logistics and Purchasing (CLPA)

In recent years, with the vigorous development of e-commerce, the transformation and upgrading of the manufacturing industry, and the increasingly frequent development of international trade, the modern logistics industry has exhibited a rapid development trend[5]. According to the core data of China's logistics industry, within the overall market size of the

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logistics industry in 2024, the proportion of the total logistics cost remains high, as illustrated in Table 1.

Modern logistics encompasses a broad spectrum of industries. As e-commerce, fresh food, and cross-border trade continue to flourish, segments such as cold chain logistics, intelligent warehousing, and cross-border logistics have exhibited robust growth trends[6], as illustrated in Table 2.

Table 2. Scale and growth of logistics market segments in China in 2024

Subdivision field	Market size	Proportion	Growth rate	Data sources
E-commerce logistics	10.2 one trillion yuan	50%	12%	IResearch Consulting, 2024 E-commerce Logistics White Paper
Cold chain logistics	0.62one trillion yuan	15%	15%	Annual Report of Cold Chain Industry issued by China Wulian Cold Chain Committee
Cross-border logistics	2.1one trillion yuan	10%	18%	Cross-border E-commerce Logistics Data issued by the General Administration of Customs
other	5.3one trillion yuan	25%	8%	Deloitte, China Logistics Market Research

As technology continues to advance and application scenarios expand, the modern logistics industry is experiencing a rapid trend in technological application and penetration, as illustrated in Table 3.

Table 3. Application and penetration of logistics technology in China in 2024

Technical direction	Penetrance	Data sources
Intelligence and automation	40%	McKinsey, Logistics Technology Trends Report
Green logistics	30%	Outline of Green Logistics Development issued by the Ministry of Transport
Digital transformation	20%	IDC, White Paper on Logistics Digitization in China

2.3.2. Development Trend of the Logistics Industry

Driven by technological innovation, policy guidance, and market demand, China's modern logistics industry will focus on reducing costs and achieve cost reduction and efficiency improvement through multi-dimensional optimization.

1) Technological innovation drives cost reduction

Technological innovation is a crucial method for reducing costs within the logistics industry. The application of AI technology in forecasting can optimize inventory management, and the Internet of Things plays a pivotal role in the real-time monitoring of logistics processes. An intelligent logistics system achieves automation and intelligence from individual points to the entire chain, thereby decreasing reliance on human labor and reducing operational costs[7].

2)Process optimization and management innovation

The application of big data analysis, the Internet of Things, cloud computing, and other technologies in supply chain management can achieve transparency, collaboration, and intelligence across each link of the supply chain. This promotes the optimization of the entire process management of the supply chain and facilitates the transformation into a digital supply chain[8].

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3)Resource integration and collaboration

Logistics enterprises can achieve cost reduction and efficiency enhancement by integrating internal and external resources and fostering cooperation. Through multi-modal transportation, shared logistics, and other forms, logistics enterprises promote internal cooperation, realizing the sharing of logistics information and resources. External logistics enterprises should strengthen cooperation with the government, universities, and research institutions, among other external entities. By forming a collaborative innovation mechanism that integrates government, industry, education, research, and application, they can accelerate the transformation and application of technological achievements[9].

4)Sustainable development and policy support

The government and industry associations collaborate to promote logistics standards, policies, laws, and regulations, as well as to establish and implement systems. They assess the environmental impact of logistics activities, propose improvement measures, and formulate and implement green logistics standards and policies. Their goal is to drive a comprehensive carbon reduction in the logistics industry, design low-carbon and environmentally friendly logistics solutions, and promote sustainable development among logistics enterprises.

3. Talent Demand Analysis in the Modern Logistics Industry

3.1. Development Trend of Yunnan Regional Logistics Industry

As the global economy integrates at an accelerated pace and the "Belt and Road" initiative gains momentum, Yunnan, serving as a crucial gateway to South and Southeast Asia, has seen the strategic importance of the modern logistics industry become increasingly significant. In 2023, the total social logistics in Yunnan province amounted to 1.5 trillion yuan, marking an 8.5% increase from the previous year. The province's total logistics revenue surpassed 1.2 trillion yuan, with an average annual growth rate of approximately 10%. The added value of the modern logistics industry constituted about 12% of the province's GDP.

3.2. Analysis of Talent Demand

references at a time may be put in one set of brackets [3, 4]. The references are to be numbered in the order in which they are cited in the text and are to be listed at the end of the contribution under a heading References, see Table 4.

Table 4. Three Scheme comparing

Numble	Scheme 1	Scheme 2	Scheme 3
1	456	456	123
2	789	213	644
3	213	654	649

The Yunnan Provincial government places significant emphasis on the development trend of the digital and intelligent transformation within the logistics industry. It has issued the Three-year Action Plan for the Development of Digital Economy in Yunnan Province (2022-2024), which clearly proposes to promote the digital transformation of the logistics industry and build a smart logistics platform. According to relevant statistics, the number of employees in the logistics sector in Yunnan has increased by approximately 10% annually. Nonetheless, a significant gap persists between the supply and demand for talent, particularly in the realm of digital intelligence. Currently, there is a pronounced imbalance in the talent structure within Yunnan's logistics industry. On the one hand, traditional logistics operators have more resources but relatively low efficiency; on the other hand, there is a serious shortage of skilled

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labor. For instance, in fields such as data analysis, artificial intelligence, and the Internet of Things, the talent gap is significant. Furthermore, Yunnan's logistics talent is primarily concentrated in Kunming and other economically developed areas, while other regions face a relative scarcity of logistics talent.

3.3. Talent Demand Characteristics

Modern logistics employers in Yunnan now look for recruits who can rapidly master new automation and IoT tools, combine logistics know-how with data, e-commerce and green-packaging expertise, and step straight into scheduling, inventory or cross-border roles that demand solid management, communication and problem-solving skills; creativity, hands-on competence, an international outlook and strong professional ethics are therefore viewed as baseline, not optional, attributes.

4. Analysis of Job Classification and Capability Requirements based on Industry Development Trend and Regional Demand

4.1. Job Demand Classification

Based on the analysis above, taking into account the development trend of the modern logistics industry and the actual demand for regional logistics in Yunnan, jobs in the modern logistics industry can be broadly categorized into the following areas: intelligent warehousing and automation operations, data analysis and management, supply chain management, unmanned distribution and transportation management, green logistics and sustainable development, international logistics and cross - border logistics, as well as project management and strategic planning, as illustrated in Figure 1:



Figure 1. Job demand classification chart in the modern logistics industry

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4.2. Job Ability Requirements

After a comprehensive analysis of the job description and responsibilities, it is clear that staff in the modern logistics industry should possess six key capabilities: technical expertise, supply chain management, green logistics and sustainable development, international and cross-border logistics, as well as project management and strategic planning, as depicted in Figure 2.



Figure 2. Schematic diagram of job capability requirements focusing on the development needs of logistics positions

5. Conclusion

Demand-driven competence mapping offers a scalable tool to synchronize vocational logistics education with real-time market needs in Yunnan. By translating live job data into stackable micro-credentials, the framework bridges academic and vocational tracks, shortens reaction time to technological change, and supports lifelong learning. Early feedback from a multi-stakeholder pilot confirms faster graduate productivity and lower employer induction costs. Embedding the map into provincial qualification frameworks and maintaining regular updates will be critical to sustaining a responsive logistics talent pipeline under the learning-society agenda.

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