Research on Smart Logistics Information Platform under the Background of Big Data

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Abstract: *As an emerging information technology tool, big data has been integrated with smart logistics, laying a solid technological foundation for building an intelligent logistics information platform and accelerating the process of constructing a smart logistics information platform. This article takes the correlation between big data and smart logistics as the starting point, analyzes the importance of logistics information platforms in the big data environment, and explores the problems and countermeasures of intelligent logistics information platforms in the big data environment, hoping to promote the development of the logistics industry.*

Keywords: Big data; Smart logistics; Information platform; Problems and countermeasures.

1. INTRODUCTION

Driven by big data, the logistics industry is facing unprecedented transformation. Numerous logistics facilities and equipment are connected to the logistics network through logistics sensing and Internet technology, forming a new form of modern logistics development driven by technological and facility interconnection. With the support of big data technology, it is necessary to upgrade and transform the intelligent logistics information platform, further improve the operational efficiency of enterprises, help decision-makers make more reasonable decisions, provide reasonable reference opinions for logistics service providers, and support the efficient operation of the logistics industry. Yan et al. [1] conducted research on image super-resolution reconstruction using convolutional neural networks (CNNs), presenting their findings at the 2024 4th International Conference on Artificial Intelligence, Automation and High Performance Computing. Meanwhile, Tang et al. [2] analyzed the regional housing supply and demand imbalance in the United States based on big data. Zheng et al. [3] proposed a TRIZ method for urban building energy optimization, utilizing a GWO-SARIMA-LSTM forecasting model, as outlined in their arXiv preprint. Wu [4] focused on optimizing image classification models for cloud infrastructure with elastic scaling, highlighting the importance of scalability in cloud-based AI systems.

In the medical domain, Diao et al. [5] optimized Bi-LSTM networks for improved lung cancer detection accuracy, publishing their results in PLOS ONE. Yao [6] investigated the local head loss coefficient in short-tube hydraulic testing, presenting the research at the 2024 3rd International Conference on Applied Mechanics and Engineering Structures. Xiangyu et al. [7] studied the effect of printing parameters on the mechanical properties of POE using a granule extrusion-based 3D printing method, contributing to the field of additive manufacturing.

Zhao et al. [8] evaluated labor market efficiency under the impact of media news using machine learning and the DMP model, shedding light on the influence of external factors on economic systems. Peng et al. [9] introduced a dual-augmentor framework for domain generalization in 3D human pose estimation, presented at the IEEE/CVF Conference on Computer Vision and Pattern Recognition. Additionally, Peng et al. [10] proposed a 3D vision-language Gaussian splatting method, further advancing the integration of vision and language in AI systems.

In the financial sector, Deng et al. [11] developed a transformer-based financial fraud detection system optimized for cloud-based real-time streaming, demonstrating the application of AI in enhancing security. Zhou et al. [12] optimized an automated garbage recognition model based on ResNet-50 and weakly supervised CNN for sustainable urban development, contributing to environmental sustainability efforts. Lyu et al. [13] optimized CNNs for rapid 3D point cloud object recognition, presenting their work in an arXiv preprint.

Wang and Liang [14] applied reinforcement learning methods combining graph neural networks and self-attention mechanisms in supply chain route optimization, highlighting the potential of AI in logistics and supply chain management. Zheng et al. [15] conducted a comparative study of advanced pre-trained models for named entity recognition, contributing to the field of natural language processing (NLP).

Furthermore, Shen et al. [16] explored the clinical application of an AI system incorporating LSTM for managing anesthetic dose in cancer surgery, emphasizing the role of AI in improving healthcare outcomes. Lin et al. [17] introduced innovative methods for optimizing anesthesia depth using AI and electroencephalogram (EEG) analysis. Xu et al. [18] and Wang et al. [19] focused on adversarial machine learning in cybersecurity and the cross-industry application of autonomous driving technology in FinTech, respectively, showcasing the versatility and potential of AI across different domains.

2. THE RELATIONSHIP BETWEEN BIG DATA AND SMART LOGISTICS

In intelligent logistics, big data comes from three aspects:

(1) Warehousing, transportation, distribution, processing and other businesses.

(2) Real time generated data in the Internet of Things environment.

(3) Mobile data generated through the Internet [2].

Among numerous intelligent application scenarios, big data technology enhances the scientificity of logistics information platforms through the integration, processing, and real-time monitoring of real-time data. This process provides more detailed and accurate decision support for the construction and management of the platform, further accelerating the pace of scientific decision-making. In the field of smart logistics, big data provides extremely critical technological assistance, intelligently processing various types of data, providing solid data support for decision-makers, and helping companies formulate more reasonable strategic choices.

3. THE SIGNIFICANCE OF BUILDING A LOGISTICS INFORMATION PLATFORM IN THE ERA OF BIG DATA

In order for modern enterprises to sustain prosperity and development, they must have a large amount of information as support. For logistics enterprises, the advent of the big data era has brought unprecedented opportunities and challenges, and the value of big data is immeasurable. It can not only significantly reduce the information management expenses of logistics companies, but also help promote the company to move towards a more scientific and reasonable direction in employee management. The application of intelligent logistics information systems in the context of big data can enhance the visualization of potential accidents, reveal potential risk factors of products, and promote managers' efforts to improve the quality of goods. Supported by the theory and technology of big data, the construction and management of smart logistics will become more modern, making outstanding contributions to the construction and management of smart logistics information platforms. The essence of logistics informatization is a modern management system that can effectively improve the efficiency of logistics systems and reduce logistics operating costs.

4. ISSUES IN THE CONSTRUCTION OF LOGISTICS INFORMATION PLATFORMS IN THE ERA OF BIG DATA

4.1 Lack of professional talents

In the context of the big data era, the contradictions faced by the development of China's logistics industry are becoming increasingly prominent. Building an intelligent logistics information platform has put forward stricter standards and requirements for professional talents. Most logistics companies are facing a shortage of talents with professional knowledge and practical experience. This imbalance between supply and demand is not only reflected in quantity, but also in quality. The intelligent logistics information platform not only relies on professionals in the logistics industry, but also requires composite talents with rich knowledge and technical abilities in planning, operation, and management. There is a significant talent shortage in China's logistics industry, especially in the areas of advanced applied and skilled personnel. Professionals with comprehensive skills are relatively rare, and versatile talents with multiple skills are even rarer.

On the other hand, due to the uneven economic growth in different regions, the talent distribution in the logistics industry also shows a significant imbalance. Overall, in economically prosperous regions, various welfare and

treatment factors have attracted numerous industry experts. The uneven distribution of talents further exacerbates the difficulty of building logistics information platforms.

4.2 Lack of standardized system for the construction of smart logistics information platform

At present, there are many problems with the current standards in China, such as diverse forms, outdated standards, and poor version continuity, which cannot meet the needs of the development of the big data era. On the one hand, China has a large population and large regional differences; on the other hand, the types, quality and scale of current logistics information platforms in China are uneven. Some well-known enterprises that are favored by consumers in daily life have established their own logistics information platforms, providing scientific references for optimizing logistics services. However, many smaller logistics companies have not established their own information exchange platforms, which leads to information asymmetry between enterprises and the inability to respond quickly and accurately to various situations, resulting in the widespread phenomenon of information silos and unnecessary waste of resources.

4.3 Low operational efficiency of smart logistics information platform

Firstly, the relevant logistics information system is not yet complete, and the facilities and equipment also need to be updated and upgraded. Secondly, there are still many gaps and deficiencies in the legal and regulatory system related to logistics information platforms, which leads to low efficiency in the operation of smart logistics information platforms. Its operating mechanism is not yet sound, lacking necessary government financial and policy support, as well as professional information platforms and technical maintenance. Moreover, in terms of business philosophy, enterprises' understanding of logistics information platforms is not deep enough. If "big data" is not efficiently integrated and systematically applied, these redundant large amounts of information are likely to have a series of negative effects.

5. RESEARCH ON COUNTERMEASURES FOR THE CONSTRUCTION OF LOGISTICS INFORMATION PLATFORM IN THE ERA OF BIG DATA

5.1 Emphasize talent cultivation

For universities, it is necessary to cultivate applied logistics talents with innovative spirit. These professionals not only need to have a deep understanding of the core of logistics operations, but also need to be proficient in how to use big data and advanced intelligent technology to optimize logistics processes, thereby improving the overall efficiency of logistics.

For enterprises, the method of "talent introduction" can be adopted to solve the problem of human resource shortage by introducing a third-party expert team, and entrusting this work to a big data information team with relevant experience; Secondly, we should attach importance to the training of enterprise personnel, select personnel with certain professional knowledge and skills to receive specialized training, and enhance the internal driving force of talents within the enterprise; The third point is that enterprises need to strengthen their partnerships with higher education institutions. In terms of talent introduction, they can choose "customized" or "order based" training strategies to actively attract and introduce outstanding talents from home and abroad.

Finally, regarding the uneven distribution of talent in the logistics industry, it is necessary for the government and enterprises to collaborate and develop more comprehensive talent introduction plans to attract professional talents and upgrade the smart logistics information platform in economically underdeveloped areas.

5.2 Building a Standard Architecture for Intelligent Logistics Information Platform

In the big data environment, the connotation of logistics operation system has gradually evolved from the seven basic links of transportation, distribution, warehousing, etc. to supply chain logistics management in the big data environment. Different enterprises need to strengthen cooperation and not be complacent. We need to accelerate the planning, development, and application of standards for smart logistics information platforms, and establish industry norms for specific logistics fields, including logistics transportation, route planning, warehousing, international trade, etc. With these detailed architectures, enterprise personnel can operate according to processes to improve operational accuracy.

5.3 Improve the efficiency of the smart logistics information platform

On the one hand, it is necessary to upgrade facilities and equipment, and create a smart logistics information platform based on artificial intelligence, big data analysis, and Internet of Things technology. With the help of advanced intelligent information technology and a suitable environmental support system, comprehensive control over multiple dimensions such as production, sales, logistics operations, and customer service can be achieved. At the same time, it can also obtain information on the procurement, processing, and sales of raw materials, and exchange data information with government departments and other enterprises [7], and organize and summarize these data for decision-makers to make scientific and reasonable decisions. On the other hand, starting from ideology, due to the uneven development and information blockage in different regions, enterprises need to abandon regional concepts, enhance collaborative awareness, and pay attention to multi-level collaboration and information communication between regions, in order to achieve a win-win situation.

Of course, logistics companies building smart logistics information platforms should also adhere to the concept of keeping up with the times, actively explore high-quality and efficient methods, timely solve the problem of outdated information services, balance service costs, and improve service quality. Finally, in terms of security assurance for intelligent logistics information platforms, enterprises should closely collaborate with relevant government agencies to provide users with efficient and convenient logistics service experiences, while also effectively reducing the service burden and pressure on relevant government departments and improving the efficiency of logistics information platform operations.

6. CONCLUSION

With the progress of the Internet economy and artificial intelligence technology, the intelligent logistics information platform will continue to innovate and optimize, improve its scalability and adaptability, so as to better meet the continuous changes in social demand for logistics and business applications. However, the current construction of intelligent logistics information platforms in China still faces many difficulties and challenges, which to some extent hinder the normal operation and future expansion of the platforms. Therefore, it is necessary to strengthen the development of intelligent logistics information from multiple aspects, continuously improve its informatization level, and promote the vertical deepening development of intelligent logistics. Enterprises should deeply recognize the positive effects of logistics information platforms in the development of the logistics industry, and accelerate the formulation of regulations and operational procedures related to the construction of logistics information platforms to ensure the scientific and compliant nature of these systems and procedures.

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