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# *Towards a New Paradigm: Transformation of Logistics and Supply Chain Driven by Digital Intelligence and Led by Green Development — Insights from the 20th Shenzhen International Logistics and Supply Chain Expo*

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***Abstract.*** As one of the most influential events in the global logistics and supply chain industry, the 20th China (Shenzhen) International Logistics and Supply Chain Expo showcases cutting-edge trends that centrally reflect the core direction of the current industrial development. Combining the key topics of the expo and the latest industrial policies, this paper deeply explores the development paths, major challenges and future evolution trends of China's logistics and supply chain industry in three key aspects: the in-depth integration of digital and intelligent technologies, the practice of green and low-carbon development, and cross-border collaborative innovation. It is intended to provide theoretical references for relevant academic research and industrial practice.

***Keywords:*** Logistics and Supply Chain, Digital Intelligence, Green Logistics, Artificial Intelligence, Sustainable Development

## 1. Introduction

The global trade pattern is changing rapidly and the digital economy is developing at a fast pace, driving profound changes in the logistics and supply chain industry. The 20th China (Shenzhen) International Logistics and Supply Chain Expo (hereinafter referred to as the "Logistics Expo") is an important indicator for the logistics industry in China and even the world, which will be held at the Shenzhen Convention and Exhibition Center (Futian) from December 2 to 4, 2026. The scale of this expo is expected to be quite impressive, with the exhibition area reaching 130,000 square meters. It will attract more than 2,200 enterprises from over 60 countries and regions to participate in the exhibition, among which the proportion of international exhibitors exceeds 20% [1]. Such a large scale is really anticipated. The theme of this Logistics Expo is set as "Integration of Digital and Intelligence, Led by Green Development", which is well-chosen as it echoes the current trend of global supply chain restructuring and conforms to the direction of China's high-quality economic development. From the policy perspective, the Action Plan for Effectively Reducing the Overall Social Logistics Costs issued at the end of 2024 is of great guiding significance, which clearly proposes to improve the overall efficiency of logistics by virtue of digital and intelligent

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technologies. Subsequently, the Special Action Plan for Accelerating the Development of Digital and Intelligent Supply Chains issued in 2025 further refines the development direction and deploys specific application strategies of artificial intelligence, the Internet of Things, blockchain and other technologies in the supply chain. These two policies complement each other, jointly building the overall framework for industrial transformation and pointing out the direction for industrial development.

In terms of market practice, industrial transformation is an imminent task. In the first half of 2025, the proportion of total social logistics costs in GDP continued to decline, and road freight transport showed the characteristics of short-haul orientation and agility. The traditional logistics model can no longer keep up with the times and adapt to the modern production system featuring "multiple batches, small lots and low inventory", making upgrading and transformation increasingly urgent. Against such an industrial background, the value of the Logistics Expo has become increasingly prominent. It is not only a platform for technology display and business cooperation, but also gradually an academic exchange highland for observing industrial changes and discussing cutting-edge trends. Through an analysis of the core topics of the expo, this paper aims to sort out the evolution path of the logistics and supply chain industry under the dual influence of technological drive and sustainable development, providing references for those concerned about the industrial development.

## 2. Digital and intelligent transformation: from efficiency optimization to decision-making autonomy

### 2.1. Artificial intelligence and data-driven systems

The digital and intelligent transformation of the logistics industry has entered an in-depth intelligent stage characterized by core algorithms of artificial intelligence and real-time data closed loops. The current transformation is faced with three major bottlenecks: data fragmentation, rigid processes and delayed decision-making. To break through these bottlenecks, it is necessary to implement a "bottom-up, integration of software and hardware" technical path — that is, implanting perception and computing capabilities from the smallest units of logistics operations (such as vehicles and warehousing equipment), realizing local real-time decision-making through edge AI devices, and then conducting global optimization through cloud platforms. Taking warehouse intellectualization as an example, through computer vision and machine learning algorithms, AI systems can real-time perceive and predict the operation flow in the warehouse and independently make a huge number of decisions. The practice of China Hi-Tech Group KJ Kunshan Intelligent Warehouse shows that its AI system can dynamically generate cargo heat maps, and optimize the warehouse layout and picking path in real time accordingly, shortening the average overall picking path by 40% and improving the operation efficiency by 25%. At the same time, with the help of the AI visual monitoring and intelligent packaging material recommendation system, the commodity damage rate has been reduced by 18% [2]. These progresses mark the shift of logistics operation from "experience-driven" to "algorithm-driven".

### 2.2. Data standardization and platform ecosystem construction

Under the framework of the digital economy, logistics data has transformed from auxiliary information into a core production factor. The realization of its value relies on two pillars: data standardization and platform-based governance. The National Standards for Digitalization of

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Logistics Enterprises series formulated under the leadership of the China Federation of Logistics and Purchasing provide universal norms for data collection, interfaces and security, laying the foundation for the interconnection of the industry. At the same time, standardized online freight platforms can significantly reduce transaction costs and information asymmetry by integrating transport capacity resources, implementing unified settlement and conducting credit evaluation.

It is obvious that the issues of cross-border data flow and data ownership definition have gradually become the core concerns of international logistics enterprises. Nowadays, many enterprises are actively expanding their global businesses, and logistics data thus needs to be transmitted safely among different countries and regions. This puts forward new requirements for logistics platforms, which must build a self-adaptive compliance framework. This framework must comply with international norms such as the European Union's General Data Protection Regulation (GDPR) and effectively connect with domestic laws such as the Cyber Security Law and the Data Security Law, so as to ensure the compliance and security of data transmission.

## 3. Green transformation: technology integration under the framework of sustainable development

### 3.1. Large-scale application of new energy logistics equipment

The core goal of green logistics is clearly to minimize carbon emissions in every link of logistics. Among them, the innovation of the energy structure in the transport link is particularly crucial. At present, China has become the world's largest market for new energy logistics vehicles. In pioneer cities like Shenzhen, the proportion of new energy electric logistics vehicles in operation exceeds 80%, a figure that is truly impressive. Such progress cannot be achieved without the joint promotion of policies, technologies and the market. The government has provided purchase subsidies and road right preferences, making enterprises and individuals more willing to try new energy logistics vehicles; battery technology has been advancing continuously, with faster charging speed enabling vehicles to be put back into operation more quickly; more importantly, the life cycle cost of new energy logistics vehicles is 15% to 25% lower than that of fuel vehicles, laying a solid foundation for its commercialization.

However, there are still some practical challenges to the large-scale promotion of new energy logistics vehicles. For example, drivers always worry about insufficient power when operating long-haul trunk lines; the distribution of charging piles is often mismatched with the actual demand in terms of time and location [3]; the battery performance declines significantly in extremely cold winters or extremely hot summers. Frankly speaking, these challenges cannot be ignored. In response to these problems, the industry is actively seeking solutions. For instance, hydrogen fuel cells are considered to assist long-haul heavy-duty trucks; intelligent charging dispatch systems are being developed to optimize charging time according to electricity prices and vehicle task arrangements, thereby saving electricity costs; there are also battery bank and battery swapping modes that separate the ownership of batteries from vehicles, which can not only alleviate range anxiety but also improve battery utilization efficiency.

### 3.2. Green logistics and whole-chain carbon management

Nowadays, green logistics has extended from focusing on the transport link to the green management of the entire chain including packaging, warehousing and recycling. In terms of packaging, the development directions of reduction, recyclability and full biodegradation are now

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highly advocated. Taking SF Express as an example, through the adoption of reduced packaging in 2024, the company reduced carbon emissions by approximately 192,000 tons; its recyclable express boxes can be used for more than 52 times on average; in addition, hundreds of millions of fully biodegradable "Feng Xiao Dai" courier bags have been put into use [4]. With the support of the Internet of Things (IoT) technology, intelligent packaging can now real-time monitor temperature, humidity and impact conditions, which not only reduces package damage but also optimizes loading schemes.

Carbon footprint management is a relatively difficult link in the green transformation. Fortunately, the carbon accounting technology, with the help of IoT sensors and blockchain evidence storage, enables the traceability and verification of product carbon footprints, which brings us a lot of confidence. In addition, optimizing intermodal transport is an important way to reduce carbon emissions [5]. However, to achieve this, it is necessary to first build a digital dispatch platform, break the data barriers between different transport modes and make the entire connection process more smooth. It can be seen from this that digitalization and green development promote each other, jointly driving the logistics and supply chain towards sustainable development. In addition, common green logistics technologies also include new energy equipment and intelligent warehousing [6]. New energy tools such as electric vans, hydrogen energy logistics vehicles and electric forklifts can not only reduce carbon emissions but also save costs in the long run. Intelligent warehousing, through software systems such as WMS and WCS as well as automated equipment such as Automated Guided Vehicles (AGVs), effectively reduces warehousing energy consumption and operating expenses.

## 4. Cross-border collaboration and resilience building: supply chain restructuring in the context of globalization

### 4.1. Optimization of logistics network based on RCEP

The entry into force of the Regional Comprehensive Economic Partnership (RCEP) has fostered a new pattern of logistics integration in the Asia-Pacific region. Tariff reduction and the simplification of customs procedures have shortened the average logistics time in the region by 15%-20%. Against this background, the modern logistics system of "corridors + hubs + networks" is taking shape at an accelerated pace. The China Railway Express has realized "one-stop commission and single waybill for the entire journey" in cross-border railway transport by virtue of unified waybills and tariff guarantees; the New International Land-Sea Trade Corridor to Southeast Asia has efficiently connected Chinese manufacturing bases with the ASEAN consumer market through sea-rail intermodal transport and overseas warehouse and distribution integration. The intellectual upgrading of overseas warehouses is another trend. Traditional overseas warehouses mainly undertake storage functions, while the new generation of intelligent overseas warehouses integrate automated sorting, demand forecasting and inventory visualization systems, which can serve as local fulfillment centers for cross-border e-commerce and also provide Vendor Managed Inventory (VMI) services for manufacturing enterprises. Taking Cainiao Overseas Warehouses as an example, in 2025, Cainiao set up more than ten new intelligent warehouses worldwide and introduced a series of intelligent equipment such as AGVs and fully automated sorting lines on a large scale, leading to a substantial increase in both its order processing scale and staff work efficiency.

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### 4.2. Technology-enhanced strategies for supply chain resilience

Geopolitical conflicts and natural disasters have made supply chain resilience a common concern in academia and the industry. Building resilience is not simply about increasing inventory, but about achieving end-to-end transparency and agile response through digital technologies. Specifically, enterprises are taking actions from three aspects: first, integrating multi-stakeholder data by using supply chain control tower technology to realize full-process visualization from Tier-N suppliers to end customers [7]; second, developing machine learning-based risk early warning models to conduct probability prediction and alternative scenario simulation for events such as port congestion and route disruptions; third, exploring the combined strategy of modular design and nearshoring outsourcing to strike a balance between efficiency and security. Notably, multi-objective optimization algorithms have become a research frontier, aiming to find the Pareto optimal solution for cost, carbon emissions, service level and risk exposure.

## 5. Challenges and future prospects

### 5.1. Main current challenges

It is obvious that the transformation of logistics and supply chain is still plagued by some long-standing structural challenges. Solving these problems is far from the effort of a single field, and it is necessary to integrate knowledge in various aspects such as technology, management, economy and institutions. Based on observations, the main challenges can be summarized into the following four points:

(1) The technical integration is extremely complex. Different manufacturers have different equipment and system interfaces as well as inconsistent data standards, leading to poor data connectivity and the formation of data silos. Although the digital twin technology sounds cutting-edge, it is basically still in the pilot stage at present, which fundamentally restricts the improvement of overall collaboration efficiency.

(2) The talent structure is unbalanced. The industry is in urgent need of interdisciplinary talents who understand both logistics practice and data analysis and algorithm design. However, in current university education, majors are overly segmented, and the cooperation between universities and the industry is not in-depth enough, resulting in a frequent talent mismatch between the cultivated personnel and the actual industrial needs.

(3) Institutions and standards lag behind development. For new scenarios such as drone logistics and autonomous freight transport, the definition of accident liability is not clear in case of incidents. In addition, carbon accounting methods vary among countries, and a mutual recognition mechanism has not yet been established, which brings difficulties to cross-border green logistics.

(4) It is difficult to balance economic benefits and green investment. Many small and medium-sized logistics enterprises are faced with capital constraints, while green technologies require large upfront investment and have a long payback period, which they can hardly afford. Therefore, it is really necessary to innovate financial means for support, such as promoting green credit or exploring carbon pledge financing.

### 5.2. Future evolution trends

Based on the topics of the Logistics Expo and the industrial development trends, it is believed that the logistics and supply chain industry will show the following trends in the next three to five years:

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(1) Drone delivery is likely to be truly popularized. At present, more and more regions in China have started the pilot opening of low-altitude airspace. In the future, drone delivery is expected to become increasingly common in special scenarios such as islands, mountainous areas and emergency medicine delivery. Drones can cooperate with ground transport networks to form a three-dimensional delivery system.

(2) The role of AI in the supply chain will become more in-depth. Previously, it was thought that large language models could only be used for customer service, but now it turns out that they can also help formulate procurement strategies, review contracts and even generate sustainability reports. It is evident that large language models are evolving into real decision-making collaborative partners for managers.

(3) The integration of digital finance and the supply chain will become increasingly close. For example, the industry will use blockchain technology to generate electronic bills of lading or monitor the status of chattel pledge in real time through the IoT. These technologies can not only make risk control more reliable but also enable more small and medium-sized suppliers to obtain loan opportunities, effectively alleviating their financing difficulties.

(4) Environmental regulations are forcing the supply chain to develop in a circular way. For example, the recently issued Battery Regulation and Packaging and Packaging Waste Regulation of the European Union clearly require producers to be responsible for the entire life cycle of products. This has forced many export-oriented enterprises to build closed-loop recycling systems and also promoted the accelerated upgrading of technologies related to reverse logistics.

## 6. Conclusion

The 20th Shenzhen International Logistics and Supply Chain Expo has systematically displayed the latest progresses and development trends of the industry in digital and intelligent transformation as well as green transformation. Combining the content presented at the expo, it is held that the main evolution line of the current logistics and supply chain industry is clear, namely the integration of digital and intelligence, green and low-carbon development, and cross-border collaboration. The core logic behind it is simple: realizing cost reduction and efficiency improvement through systematic technological innovation, thereby expanding the capacity boundary of the industry's sustainable development. Specifically, the core of digital and intelligent transformation is to promote the comprehensive integration of data elements and physical operations, and build an independent closed-loop system from perception and analysis to decision-making and execution. Green transformation requires enterprises to break through the limitations of "end-of-pipe governance" and truly internalize carbon emission constraints into key links such as network planning, operation mode and technology adoption. The cross-border collaboration and resilience building also show that against the background of increasing global environmental volatility, the supply chain must simultaneously improve efficiency, resilience and sustainability to form multi-dimensional competitiveness. Based on these observations, this study further puts forward the following managerial implications:

Faced with challenges such as technical integration, talent shortage and institutional lag, the government-industry-university-research collaboration mechanism is crucial. (1) The academic circle needs to strengthen interdisciplinary research, especially producing original achievements in fields such as digital twin, carbon metrology methodology and supply chain complexity modeling; (2) The industrial circle should focus on scenario innovation and verify the commercial feasibility of new technologies and models through pilot projects; (3) Policy makers need to pay attention to the construction of standard systems and inclusive regulation, and provide a certainty-oriented

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environment for innovation. As an industrial indicator, the technologies displayed and topics discussed at the Logistics Expo indicate that logistics in the future will no longer be a simple cargo transportation, but a modern service system embedded in the global production and consumption network and characterized by data intelligence and green efficiency. This transformation is not only related to the core competitiveness of the industry itself, but also an indispensable supporting force for China to build a modern industrial system and achieve the dual carbon goals.

## References

[1] Shenzhen Logistics and Supply Chain Management Association. China Logistics Expo - The 20th China (Shenzhen) International Logistics and Supply Chain Expo. [EB/OL] [2026-1-21]. https: //www.scmfair.com.

[2] China Industry News Network. When the Supply Chain is Equipped with an "AI Brain": How Visualization and Intellectualization Subvert Traditional Management? [EB/OL] (2025-08-11) [2026-1-21]. https: //gxt.hlj.gov.cn/gxt/c107049/202508/c00_31862584.shtml.

[3] Wang Gongze. Research on the Development Trend of New Energy Vehicle Technology Under the Background of Industrial Integration [J]. Times Automotive, 2023, (19): 109-111.

[4] SF Express. Zero Carbon Future | SF Express Sustainable Development. [EB/OL] [2026-1-21]. https: //www.sf-express.com/chn/sc/sustainable/0Carbon.

[5] Wei Hairui, Guo Sijia. Research on Carbon Emission Calculation of China-EU Container Intermodal Transport Logistics [J]. Journal of Railway Science and Engineering, 2025, 22(09): 3880-3893.

[6] Yan Xiaodan, Luo Qiang, Zhou Wenjia, et al. Application of Digital and Intelligent Technologies in the Development of Green Logistics from the Perspective of "Dual Carbon" Goals [J]. China Shipping Gazette, 2024, (46): 57-59.

[7] Sun Wenjie. Enterprise Digitalization, Relational Network Position and Supply Chain Resilience Improvement [J/OL]. Economic Survey, 1-14 [2026-01-22].