Construction of Logistics Network System Based on Internet+

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Abstract. To achieve the aim of transformation and upgrading of the traditional logistics industry, it is necessary to deepen the application of technologies such as Internet of Things, cloud computing, big data, artificial intelligence and blockchain in the logistics industry. By this way, we can improve the informatization and intelligence level of modern logistics. This paper uses the theory and method of system analysis and management science, combined with the trend of logistics application of Internet + technology, innovatively constructs the logistics network system under the three scenarios of manufacturing, cold chain and e-commerce logistics. Finally, based on the current status of the construction of the logistics network system, the author puts forward relevant suggestions for promoting the interconnection of the modern logistics network system.

1. Introduction
With the power of modern technology, especially computer network technology, modern logistics integrates the existing logistics resources of the society and realizes the rapid low-cost transfer of goods from production to consumption. At the same time, this is also the optimal configuration process of logistics resources in time and space [1]. The construction of interconnected modern logistics network system is the need of logistics development, also an effective way to improve the competitiveness of logistics industry. It can accelerate the integration of resources and capital integration. The efficient logistics network is essential for improving the quality and efficiency of logistics development. The transformation and upgrading of the traditional logistics industry is imminent, and the construction of a modern logistics network system needs to be further promoted.

2. The Concept of Modern Logistics Network System
At present, there is no clear definition of modern logistics networks and modern logistics network systems. China's national standard "logistics terminology" defines "logistics network" as "a collection of interconnected organizations and facilities in the logistics process." Xu Jie and others believe that the logistics network is a general term formed by the organic combination of logistics organization network, logistics infrastructure network and logistics information network [2]. Li Xin pointed out that the urban logistics network is a system structure formed by the interconnection and interaction of nodes at different levels [3]. Wu Yunliang pointed out that the coal logistics network system refers to the collection of interconnected organizations, facilities and equipment, lines and places, logistics information and services in the process of coal logistics, and is a comprehensive logistics service system [4]. Wang Jian believes that the port logistics network system is a large port system formed by...
individual port logistics systems in which several functions or functions can be replaced. When two or more ports have a common hinterland, a logistics network system is formed [5].

According to the scholars’ research of logistics network system, this research defines the logistics network system as: on the basis of logistics infrastructure network, logistics information network and logistics organization network. The logistics network system is the organic unity of the main elements (enterprises, customers, etc.), the object elements (links, services, goods, etc.) and connecting elements (facilities, information data, lines, technology, etc.) of the logistics network. Regarding the infrastructure (logistics nodes, logistics equipment, logistics facilities, etc.) as the foothold, the information network (Internet, big data and other Internet + information network technology) as the overall support, the level of data and informationization of logistics activities can be improved, and elements can be coordinated. So that we can achieve logistics activities. There will be a transparent and shared logistics network system between different entities, different platforms and different regions.

3. Analysis of the Construction in Typical Fields

3.1. Manufacturing Logistics Network System

The logistics network system of manufacturing logistics is a comprehensive system. It is a point-chain integrated logistics network system, and its components are divided into main elements, object elements and connection elements. The main elements are the production of raw material suppliers, manufacturers and customers, the object elements are manufactured products, related logistics business and services, and the connecting elements are facilities, equipment, information platform, network communication technology and information technology. Based on the above analysis, this paper establishes a logistics network system in the manufacturing logistics field as shown in Figure 1.

![Figure 1. Manufacturing Logistics Network System](image)

The manufacturing logistics network system is a collection of five business networks: procurement, warehousing, production, transportation, and information.

The information network is the core connecting system of the major systems. The information of each system must not only be circulated among the systems, but also must be transmitted to the logistics information platform, which connects the entire logistics network system.

The intelligent storage system collects and acquires the information provided by the transportation equipment information, material label information and data platform. And the system utilizes WMS warehouse management system and cloud warehouse system management system to improve the enterprise warehouse information management.

The production system is based on the data obtained from the storage facility equipment, the material electronic label, the dedicated reading and writing equipment. It can realize the production planning and the operation scheduling management, which can improve the shipping accuracy and reduce the labor intensity and workload.

The transportation system can realize intelligent distribution according to the information provided by the information of platform, the road and itself. At the same time, the whole process monitoring
and tracking is realized by using GPS, vehicle networking and block chain technology to complete the transportation activity.

The whole system realizes the interconnection of the five systems, and the elements of the whole link are closely connected to realize digital production. However, at the same time, it is necessary to strengthen the transparency of information construction and promote the interconnection of information between different entities, different logistics nodes and different regions.

3.2. Cold Chain Logistics Network System

The main elements of the cold chain logistics network system include the demand main body, the supply subject, the government and other regulatory departments. The guest elements are cold chain products, services and related services. And the connectivity elements include the basis facilities, advanced technology facilities, logistics information platform, monitoring and supervision platform, cold chain logistics technology and cold chain logistics organization [6]. This paper builds and analyzes the cold chain logistics system based on the cold chain logistics business process as shown in Figure 2.

The cold chain logistics interconnection network system is generally monitored and monitored by the technology monitoring platform, mainly consisting of monitoring and early warning systems, information systems, warehousing systems, transportation and distribution systems, and full-service safety traceability systems. The systems are interconnected and complement each other. These systems work together to ensure product quality and achieve cold chain logistics services.

The monitoring and early warning system should be closely connected with the monitoring center. Through the feedback of sensors, RFID, GPS, GIS and other applications, the whole process of logistics should be monitored and early warning. Once any abnormal information is found, relevant personnel can take corresponding security according to the warning information.

The information system is the connection system of all major systems. The whole process of monitoring and control depends on the information system. RFID coding technology, bar code coding technology, monitoring equipment, car networking equipment and other IOT monitoring and sensing technologies can provide information for the whole process. The monitoring center can obtain and analyze data in real time, and use the logistics information platform to achieve instant sharing.

The warehousing system should analyze the product information, determine the storage temperature, humidity, location, and realize the collection of business data such as warehousing, warehousing, selection, product inventory, and outbound. The staff can use smart storage facilities and intelligent terminals, WMS system and cloud warehouse management system carry out intelligent warehousing of products and provide planning basis for transportation and distribution.

The transportation system should rationally plan the dispatching of the vehicle, the fitting of the vehicle, and the delivery route of the vehicle. In the transportation process, IOT equipment such as sensors, GIS, GPS, and car networking technology should be used to monitor the whole process of transportation, and timely feedback information to the information system and monitoring and early warning system to ensure the good delivery of cold chain products to customers in the hands.
The whole process of safety traceability system mainly uses block chain technology to make the process data of warehousing, transportation, distribution and monitoring open and transparent. Anyone can know the information of the product from the place of origin, storage and transportation at anytime and anywhere, which is beneficial to connect the whole process and improve customer satisfaction.

Consumers' demand for cold chain products is increasing day by day. How to complete the cold chain process and ensure product quality has become the focus of attention. However, the current construction of the cold chain logistics network system still faces many challenges. It is necessary to strengthen the information exchange between different supply entities, different cold chain industries and different regions, accelerate the construction of large-scale cold chain logistics nodes, and establish a cold chain industry alliance. The government must introduce uniform standards to standardize, specialize and unify cold chain logistics services.

3.3. E-commerce Logistics Network System
The main elements of the e-commerce logistics network system are business product suppliers, sellers and customers. The object elements are e-commerce products. E-commerce products cover almost all the products that people need, food, medicine, electronic products, building materials and other things. The connecting elements include infrastructure equipment, e-commerce network information platform, trading platform, network communication technology (especially mobile Internet), and information technology. Based on the service process of e-commerce products, this paper analyzes the construction of commercial logistics network system as shown in Figure 3.

![Figure 3. E-commerce logistics system diagram](image-url)

The e-commerce logistics network system mainly includes logistics network information system, intelligent operation system, intelligent storage system, product distribution transportation system, and e-commerce operation system.

The logistics network information system is the main artery of the e-commerce system. The whole process information of the logistics must be uploaded to the information system. Relying on the information system to complete the entire e-commerce transaction process, the mobile Internet and e-commerce public information platform is the main part of the e-commerce information construction system.

The intelligent operating system involves warehousing, distribution, and operation systems. The Internet of Things technology is used for unmanned vehicle technology equipment, drone technology equipment, and sorting robots. It not only realizes data collection, but also realizes intelligent operation and improves. Information exchange and work efficiency in all links [7].

The intelligent warehousing system basically adopts the modern concept of WMS warehousing management system and cloud warehouse management system. The warehousing database information of cloud warehouse, central warehouse, front warehouse, front store warehouse and micro warehouse is transmitted to the management system to realize the collection of data in the warehouse,
in the library, and the outbound data and digital labeling of the products, so as to achieve scientific and
unified management, and timely rational storage planning for each warehouse.

The product distribution transportation system is mainly to realize the deployment process of
e-commerce products from supplier to customer. The transshipment center and logistics center carry
out the initial allocation of products according to the supplier's manifest data and the product
information of the central warehouse, and the distribution center and transfer station are based on the
information provided services for the customer.

The delivery station is further distributed according to the customer demand information of the
former store and the warehouse. The deployment transportation system should be carried out processes
according to the warehousing information and transaction information, and the whole process should
adopt GPS, GIS and Internet of Things sensing technology to realize the whole network monitoring.

The e-commerce operation system supports the operation of the whole system. On the basis of legal,
credible and transparent trading platform and information platform construction, the market should be
standardized, an integrated service system should be constructed, and cloud technology and big data
technology should be fully considered to build smart logistics network system to meet market demand.

E-commerce logistics network system interconnection construction should strengthen information
construction, build a specialized platform to absorb more subjects, accelerate the reform of logistics
system, attach importance to the role of modern technology in warehousing and deployment, reduce
intermediate links, and give full play to the Internet, cloud computing and big data, improve
processing capacity and save logistics costs.

4. Promote the Interconnection of Logistics Network Systems

4.1. Accelerate the Construction of Infrastructure
As the most basic part of the logistics network system, infrastructure is an essential foundation for the
realization of logistics functions. In recent years, the government has continuously increased
investment in logistics infrastructure construction. The application of professional talents and
high-tech has strengthened the modernization of logistics facilities, and the integration of technical
facilities is also steadily advancing. Enterprises should check and update facilities and equipment,
introduce advanced equipment, upgrade modern logistics management concepts, and promote the level
of Informatization and intelligence.

4.2. Accelerating the Transparent Construction of Information
The disconnection, asymmetry and opacity of information between the main bodies of the logistics
network system must be disposed and the commercial barriers must be broke. At present, the service
standards of the main bodies are different, it is difficult to meet the needs of modern logistics, and the
government is also difficult to form effective management [8]. Therefore, the government should issue
industry standards. Enterprises should reform their operating models and development models,
combine the Internet + technology system, pay attention to cooperation among entities, realize the
sharing of information resources, form a logistics service model under unified standards, and build an
intelligent information system that accommodates more subjects.

4.3. Actively Promote the Construction of Information Technology
Logistics network information system, as a supporting part of the logistics network system, has a
major impact on the development of logistics. By constructing a logistics public information platform,
the existing various logistics information resources can be integrated, and the logistics information
construction of each enterprise is fundamentally improved. In turn, the construction of logistics
information system will be accelerated, and the overall advantages of the logistics system will be
brought into play, so that the links between various links of logistics will be strengthened, and the
necessary guarantee and support for the rapid development of the logistics industry will be provided.
4.4. Opening up a New Logistics Model

The integration of Internet + technology and logistics industry objectively promotes the development of the big logistics model. The so-called big logistics model is simply the logistics under the cloud concept. This logistics development model can realize data-driven decision making and make full use of the Internet of Things perception, the advantages of technology, big data information processing technology, and cloud computing technology, and rely on big data to make decisions for logistics activities [9]. At the same time, this kind of logistics mode can realize the sharing of information and the connection of various links under the common information platform, which can reduce the pressure on the user terminal and attract the cooperation of the main body under the platform, thus providing a good environment for logistics development.

5. Conclusion

The modern intelligent logistics network system is a comprehensive system of automated logistics facilities, information technology, technology and services. It is characterized by automation, intelligence, digitization and networking. However, it is still necessary to accelerate the development of key common technology applications in the fields of big data, cloud computing, Internet of Things, and smart technologies. To create a highly interconnected modern logistics network system, we must accelerate the integration of Internet + technology and logistics, give full play to the important role of information and data in the construction of logistics network system interconnection, and promote the development of modern logistics to transparency and sharing.

Acknowledgments

This research is led by the China Logistics Association's 2018 key project “Research on Interconnection of Modern Logistics Network System” (2018CSLKT2-004), National Natural Science Foundation Project (71501015), Beijing Great Wall Scholar (No.CIT & TCD20170317), Tongzhou Canal Project Leaders and The Intelligent Logistics System is funded by the Collaborative Innovation Center.

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