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Research on the Innovation Path of Logistics Formats Based on 5G Technology

Yanan Yan

Shanghai University, Shanghai, China
Email: hdsince@163.com

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Abstract

At present, with the commercialization of 5G, all walks of life are affected, and logistics industry, as a supporting industry of the national economy, is no exception. This paper studies the innovation path of logistics formats based on 5G. This paper establishes an intelligent logistics traceability system through the integration of 5G and Internet of things, artificial intelligence, and realizes fully automated transportation through the integration of 5G and Internet of things, which accelerates the development of smart logistics. In addition, the integration of 5G and blockchain can maintain logistics security, reduce the risk of information leakage, and provide ideas for logistics finance.

Keywords

5G, Logistics Industry, Smart Logistics

1. Introduction

In recent years, with the popularization of artificial intelligence and the rapid development of communication technologies, the logistics industry is constantly improving and optimizing. In order to improve delivery efficiency and reduce transportation costs, from warehousing, transportation to delivery, all logistics links are integrated with advanced technology, which greatly improves the quality of logistics and level of services. According to the data released by the China Federation of Logistics and Purchasing, China's total logistics cost to GDP ratio has been declining from 2014 to 2017, which shows that China's logistics industry has achieved certain results in reducing costs and increasing efficiency. However, compared with developed countries, China's total logistics cost to GDP ratio in 2017 is 14.6%[1], still much higher than the US 7.2%[2] in the same pe-

[1]China Federation of Logistics and Purchasing.
[2]http://www.Chinabaogao.com.

riod, and also higher than the global level of 11.7%[3], so we can see that Chinese logistics industry has a huge space in reducing costs and increasing efficiency.

With the deep integration of the traditional logistics industry and the technical means represented by the IoT, cloud computing, blockchain and artificial intelligence, the era of smart logistics has arrived. Smart logistics is a feasible and effective development mode of modern logistics, which can greatly reduce the cost of manufacturing industry, logistics industry and other industries and promote industry upgrading [1]. The development of the above technologies is inseparable from the support of high-level communication technologies, and the development of 5G has provided support for the implementation of products based on the above technologies. At present, the predecessors studied the concept, basic functions and implementation framework of smart logistics [2], as well as the promotion effect of IoT, big data and cloud computing on the development of smart logistics [3] [4] (**Figure 1**).

2. Research Design

For the logistics industry, how to use the data efficiently and quickly to coordinate each link of supply chain, so as to make the whole supply chain system operate with low cost and high efficiency, has been the focus.

According to the characteristics of ultra-low delay, high-speed broadband and mass access, 5G can help each link acquire relevant data more quickly, intuitively and accurately. In this way, the data such as transportation, commodity loading and collection can reach the client side, management side and operation side more quickly, and the data sharing and connection between these three sides are also closer. By taking advantage of the high bandwidth of 5G network, the scope and efficiency of the IoT can be further expanded. Besides, the acquisition of environmental information by devices is also faster and richer, providing more valuable reference for logistics companies. However, the research on the deep integration of technologies such as 5G and the logistics industry is not enough. Therefore, from the perspective of 5G, this paper explores the path of deep integration of 5G and logistics format, thereby enhancing the core competitiveness of the logistics industry and providing ideas for the development of logistics finance.

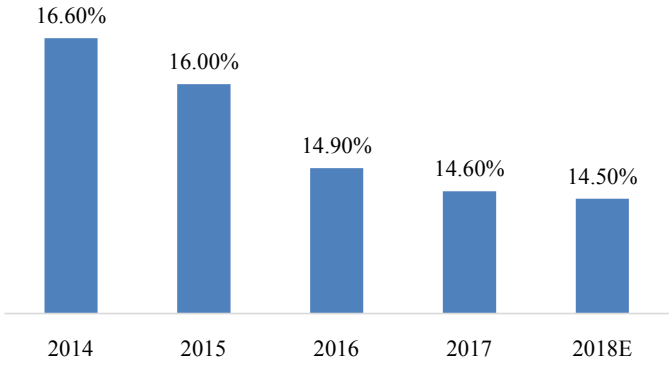

Figure 1. Chinese logistics costs as a percentage of GDP in 2014-2018[2,3].

[3]Ai Media Consulting.

3. Research Process

The term "format" comes from Japan and was originally dedicated to the "retail formats" [5]. Retail format refers to the different element formed by retail enterprises in order to meet the different needs of different consumers [6]. By referring to the more mature retail formats, Chinese experts and scholars have studied the development path of logistics formats.

As the world's second largest economy, the development of China's real economy has driven huge logistics demand, and the logistics industry has become a supportive industry for the national economy [7]. The development of China's logistics industry has passed the stage of mechanization and automation, and now entered the stage of smart logistics. In this process, mutual cooperation in the fields of media, telecommunications and information services has gradually deepened, and there has been a phenomenon of intersection and integration between industries, which can be divided into internal integration and external integration [8].

Logistics is a fusion of distribution, transportation, warehousing and other industries compound service industry [9], in order to meet the demand of "one-stop" logistics services, different functions of the logistics enterprises between strategy and cooperation continued to deepen the reform, aiming at expansion capacity to conduct horizontal integration development, and gradually formed at the beginning of the traditional logistics industry, which is logistics industry of internal integration.

The external integration of logistics industry is also known as the cross-industry integration, producing a new industrial that is different from the original industry and providing additional functions and stronger competitiveness for the logistics industry [10]. With the integration of logistics industry and other industries, more and more new logistics industries keep emerging. Cold-chain logistics, agricultural logistics parks are all the products of the integration betwen logistics industry and the primary industry. In addition, the integration of logistics industry and manufacturing industry improves the industrial chain and value chain of enterprises. Besides, the logistics industry and tertiary industry have also been integrated, such as Logistics finance is the product of the integration of logistics industry and financial industry.

Thanks to the leapfrog development of logistics industry in our country, Chinese logistics industry has gradually integrated with the three major industries, greatly enriching the additional functions of the logistics industry. Logistics finance is the combination of logistics and finance, giving logistics enterprises the role of regulator, to provide supervision services for financial institutions such as Banks. Since 1999, when Zhongchu started the first inventory financing business in China, China's logistics finance business has achieved a breakthrough from scratch [11]. During this period, logistics and technical means were gradually integrated. The application of rf scanning code technology and IoT made the logistics process visible, traceable and controllable, so as to im-

prove the problem of information asymmetry between Banks and enterprises and reduce the loan risk of Banks or other financial institutions. At present, the emergence of 5G energizes the logistics format, and realizes the transition and upgrading of the logistics industry again.

4. Analysis on the Innovation Path of China's Logistics Format in the 5G Era

Nowadays, although the traditional logistics system has made remarkable achievements, with the rapid economic development, the logistics industry can no longer meet the needs of economic development, and the logistics industry innovation is extremely urgent.

As an inseparable important part of the 5G industrial chain, logistics will undergo great changes due to the generation of 5G. Therefore, the value of 5G for logistics is self-evident [12]. The reason why 5G can be widely applied in the logistics industry is that there is a close connection between logistics and the IoT. 5G has three features: ultra-low delay, high-speed broadband and mass access. Each of these features is likely to bring leapfrog technological progress in artificial intelligence, Internet of things, automated driving and other fields, and technological progress in these fields is exactly the key to the development of smart logistics [13]. Therefore, it is possible to realize the intellectualization of logistics transportation, the automation of logistics warehousing and the networking of logistics information. In addition, the integration of 5G and block connection is applied in the field of logistics finance, providing real-time data feedback and prevent tampering, so as to improve the reliability of logistics supervision [14].

1) Establishing an intelligent logistics traceability system based on 5G

Smart logistics tracing system is the use of the IoT and Internet to realize tracking and traceability of products, Suppliers can conduct controllable query on the forward logistics of goods and report analysis, the consumers can reverse query information through the platform or software after receipt of the goods. It usually used in agricultural and sideline products or cold-chain logistics system [15]. Its essence is a bottom-up, multi-level, distributed and multi-node information sharing chain formed by relying on the characteristics of 5G+ IoT massive links. The smart logistics traceability system is divided into four layers. A large number of intelligent data readers in the perception layer capture the relevant data for analysis and storage, and then transmit to the upper layer for application scenarios. 5G communication technology serves as the data circulation medium of this information sharing chain.

The intelligent logistics traceability system uses a large number of connected devices of perception layer for data recording by using 5G's mass connection feature, and edge server using 5G network for data collection, information gathered the data center. The application layer draws the visual scene through these data, providing accurate decision for logistics management.

2) Implementing fully automated logistics transportation based on 5G

The establishment of the fully automated logistics transportation system depends on the multi-function unmanned intelligent robot. Therefore, the development of unmanned driving technology and unmanned distribution system greatly limits the development of the fully automated logistics industry. In recent years, unmanned driving technology has been a hot topic in various industries, but it have not been a major breakthrough due to its high technical threshold, legal constraints and other issues. With the appearing of 5G, the characteristics of high bandwidth, low latency and wide connection not only make the unmanned driving industry more "hot", but also provide a feasible solution from the technical level, making full automatic logistics transportation no longer just "a paper idea".

Compared with the traditional transportation, the fully automatic logistics transportation is controlled by the computer. The terminal equipment is connected to the network through the Internet of vehicles technology, and the data obtained by the control center is used to make the path decision, so as to realize the complete interaction between people, vehicles and roads, making the logistics transportation more safe and efficient. Any unmanned driving technology needs the support of Internet of vehicles, and powerful data communication technology is the cornerstone of Internet of vehicles technology. The development of 4G to 5G not only improves the speed of data transmission, but also effectively solves the problem of "Shared sensing" between vehicles, greatly avoiding accidents and enhancing the safety and reliability of transportation.

3) Maintaining logistics security by 5G+ blockchain

Traditional logistics systems are generally based on large-scale and scalable mass data storage technology, which requires the analysis and safe storage of multi-party data [15]. In recent years, logistics security has become the focus of the industry due to the frequent occurrence of security problems such as lost bag and wrong collar or information leakage.

Therefore, the exchange of logistics data and information based on block chain technology emerges at the historic moment, realizing the safe transmission of physical information. Due to the characteristics of block chain technology such as distribution and sharing mechanism, the recorded items have a strong traceability and can realize the capitalization of commodities. Therefore, block chain technology can be widely applied in the field of logistics security. 5G, as its communication mode, is the foundation of block chain technology, ensuring the real-time and high efficiency of information transmission process.

In addition, these true-fidelity and untamable data can reflect the real trade situation of small and medium-sized enterprises, ensure the authenticity of the flow of credit certificates, and realize the credit penetration of core enterprises in the supply chain. The judgment based on actual transaction data can help financial institutions effectively evaluate credit risks, reduce the default cost in the logistics financial process, and maintain the security of the whole logistics process.

5. Conclusions

Smart logistics tracing system is the use of the 5G+ IoT and Internet to realize tracking and traceability of products, which implemented the data flow of information chain; 5G also provides a feasible solution for unmanned driving technology because of the characteristics of high bandwidth, low latency and wide connection. In addition, with the integration between logistics industry and other industries, the security of logistics has become increasingly important. So the exchange of logistics data and information based on block chain technology emerges at the historic moment. All of them are the products of 5G and the development of smart logistics.

In a word, 2019 is a year of rapid rise of 5G. The emergence of 5G is affecting all walks of life. Logistics industry, as the first level of service industry, must be prepared to lead the popularization of 5G. With the rapid growth of the logistics industry, the traditional logistics industry can no longer meet the diverse needs of people. The emergence of 5G communication technology is bound to promote the innovation of the traditional logistics industry.

In recent years, with the rise of technological means such as IoT+, big data and cloud computing, scientific and technological innovation has triggered a new round of logistics competition, and cross-border integration ability has become the core competitiveness of new logistics industry. The birth of 5G not only optimizes the communication technology in the logistics system, but also serves as the technical support and media for many hot technologies to help them to deeply integrate with the logistics industry. At the same time, 5G supports blockchain to truly achieve real-time data capturing and tracking, making blockchain "better". The massive connectivity of 5G makes the Internet of everything possible. The flexibility of using 5G technology is improved by the on-demand networking, which enables the IoT to be closely integrated with the logistics industry. These things together make it possible to be monitored at any time and tracked everywhere. In the future, 5G will definitely promote the split development of the logistics industry and eventually form the 5G ecosystem.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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