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Analysis of the Current Situation of China's Intelligent Logistics

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Abstract

In recent years, with the development of foreign trade and the deepening communication of international logistics. Intelligent logistics has been widely recognized by China's transportation, storage, production, sales and other enterprises. Based on the technology of "Internet of things" and the application of information technology, intelligent can greatly reduce the cost of various industries and promote the upgrading of logistics industries, which is the direction of future logistics development.

The purpose of the research was to find the factors that affect the logistics of intelligent logistics on China and the factors that affect the current development situation of intelligent logistics in China, and give a general conclusion on the current situation of intelligent logistics in China.

In order to achieve these purposes, the qualitative research approach and literature review research methods were selected for this study. These data were collected from previous researches and articles. Through the analysis, collation and summary of the selected sources, the conclusion would be resulted.

China attaches great importance to the development of intelligent logistics. However, the results show that there are still many problems in the development of intelligent logistics in China, which cannot be compared with the developed countries.

The main effects factors are the low level of information technology, the lack of a perfect information platform, the lack of logistics professionals, etc. Finally, in view of the current situation of the development of intelligent logistics in China, relevant suggestions and countermeasures have been put forward.

Keywords/tags (subjects)
intelligence logistic, Logistics informatization, Digitalization; digitalization

Miscellaneous

Contents

Figure.

1 Introduction

China's logistics industry has witnessed rapid development in the recent years. According to the data published by the website of the National Logistics Bureau, as shown in Figure. 1, the total value of social logistics goods reached 125.4 trillion yuan in 2010, 219.2 trillion yuan in 2015, and 243.7 trillion yuan in 2018. Although the total value of social logistics goods is increasing, the growth rate is declining. This phenomenon shows that there is a series of problems in China's logistics development. At the same time, because of the high turnover rate of the express delivery industry, there is a prominent contradiction between the shortage of the human resources of logistics and the huge volume of express business. (Jia & Peng, 2019,43). Besides, the costs of each link of the whole logistics system are constantly rising. Therefore, how to reduce the logistics cost and how to develop modern logistics have become important issues in China's economic development.

The concept of the intelligent logistics system (ILS) originated from the research report, *Intelligent Future Supply Chain,* issued by IBM. It discussed the "intelligent supply chain" that uses sensors, GPS and other instruments generating real-time data to deepen links between the logistics industry and the others. (Jia et al, 2019,43). With the progress of science and technology, Premier Wen Jiabao put forward the strategy of "perceiving China" in Wuxi, the Jiangsu Province, China in 2009, and the Internet of Things technology began to develop and promote every walk of life nationwide (Jia et al, 2019,43). In the same year, the concept of "intelligent logistics" in the logistics sector was put forward jointly by the Information Centre of China, Logistics Technology Association and other institutions. (Jia et al. 2019, 43).

The purpose of this study is to explore the current situation of China's intelligent logistics through qualitative research and literature review. This research introduces the background of intelligent logistics and the necessity of its development in China. This paper analyzes the framework of intelligent logistics system based on the Internet of things. It discusses the relevant policies of China's intelligent logistics, hoping to provide a theoretical basis for current development situation of intelligent in China.

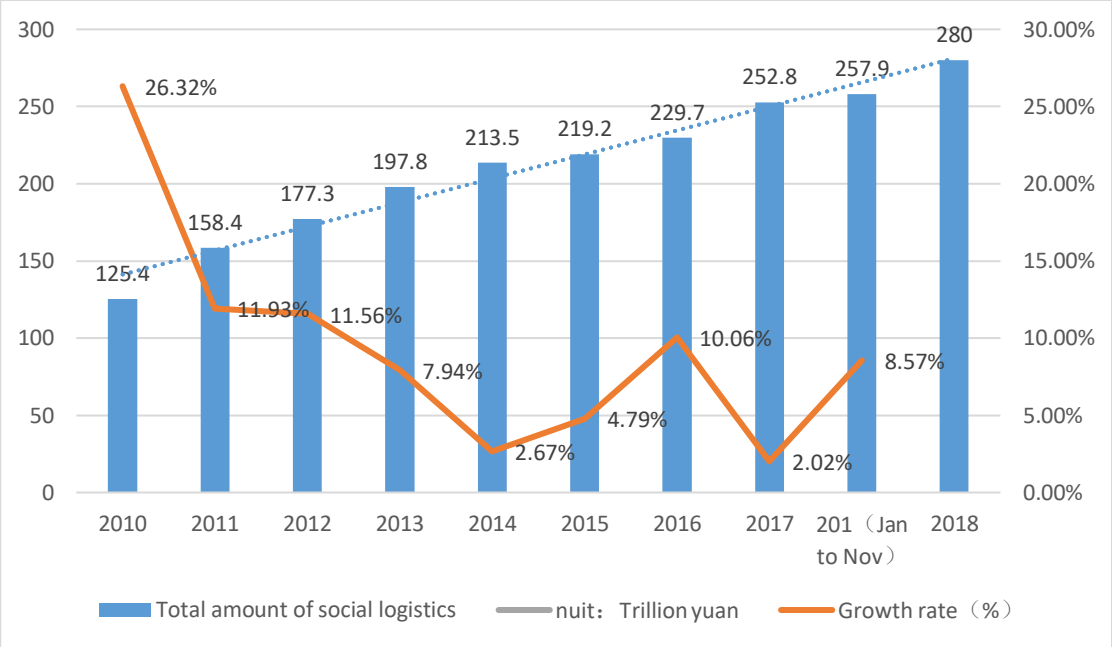

Figure 1. Statistics and growth of social logistics in China from 2010 to 2018.

2 The Framework and importance of intelligent logistics in China

2.1 China's intelligent logistics

Like pressing the fast-forward button in the 21st century, the logistics industry has undergone a great transformation over the years, and it is still changing. With the transformation dominated by market demand, society and consumers have higher requirements from logistics. Although China's logistics industry is developing rapidly, it is still relatively backward at present when compared with other developed countries. For example, the total costs of social logistics in China accounted for 18% of the GDP in 2012, but in Japan and the United States, they only accounted for 8%. Therefore, traditional logistics enterprises have an urgent need for intelligent logistics.

Besides, China's logistics industry has gradually developed with the growth of Internet e-commerce. In particular, the development of many competitive e-commerce enterprises, such as the Taobao, Jindong, Suning etc., makes the logistics industry integrated into people's daily life, and it has even become an indispensable necessity. However, the "Double 11", "June 18" and other e-commerce sales promotions also attract a large number of Internet consumers, which has further driven the development and market demand of the logistics industry in China. (Wei 2019, 109). For example, with the turnover of the Taobao's "Double 11" reaching 213.5 billion yuan in 2018, the logistics orders exceeded one billion. (Wei 2019, 109).

The growth of logistics orders has led to a sharp increase in the demand for logistics services. However, it is difficult for traditional logistics enterprises to deal with the demand for logistics services in the market, and this has resulted in more and more problems with the overloaded warehouses of the logistics enterprises. (Wei 2019, 109). The emergence of intelligent logistics has effectively solved the problem in the overload in the logistics enterprises and the problem of the insufficient logistics resources, which allows logistics companies to employ a large number of "last kilometer" logistics the human resources at a lower cost in a short time. It also allows a rational and efficient use of the idle resources in society, which effectively ensures the timeliness of logistics distribution, and comprehensively embodies the concept of the resource sharing (Wei 2019, 109) and efficient utilization in the sharing economy.

In order to improve the development level of the logistics industry, China has issued a series of relevant policies, especially for the industry planning and policy guidance towards intelligent logistics. (Jia et al. 2019, 44). For example, in August 2011, *The Opinion on Policies and Measures to Promote the Healthy Development of the Logistics Industry* proposed to strengthen independent research on new technologies, such as intelligent transportation, cargo tracking, logistics information platform and management, as well as emphasized information technology in the system. (Jia et al. 2019, 44). In July 2017, a new generation of the artificial intelligence development plan was released, which fostered high-end and efficient intelligent economy as one of the key tasks in promoting the integration and innovation of artificial intelligence and industries. Thus, several artificial intelligence application pilots, represented by

intelligent logistics, will become a new driving force to accelerate the upgrading of industrial intelligence. (Jia et al. 2019, 44.)

Under the strong guidance of national policies and technological innovation and with the aid of the mobile Internet and various sensor technologies, logistics facilities have access to networks, and they are widely used in transportation, warehousing, distribution and other fields. (Wei 2019, 109). Combining global positioning, RFID and other technologies of the Internet of Things to logistics, it is possible to realize the intelligent mode and automatic management of the logistics industry, the operational mode of intelligent logistics information and system automation. and this helps to build intelligent logistics and system automation in China, in other words, this is China's intelligent logistics. (Jia et al. 2019, 44).

2.2 The framework of China's intelligent logistics

According to the service objective and service scope, the intelligent logistics system was divided into three levels: enterprise intelligent logistics, industry intelligent logistics and regional or national intelligent logistics. (Zhang, 2011, 44).

Enterprise intelligent logistics level: The intelligent logistics system of this level is the application of information technology in the logistics enterprises, which mainly focuses on the application of new sensor technology to achieve intelligent storage, intelligent transportation, intelligent loading and unloading as well as, packaging, intelligent distribution, an intelligent supply chain and so on. (Zhang, 2011, 44).

Industry intelligence logistics level: This level mainly includes the construction of a regional intelligent logistics center, as well as an early warning and coordination mechanism for the regional intelligent logistics industry at this level. (Zhang, 2011, 44).

National intelligent logistics level: This level mainly for building an integrated modern logistics application platform of intelligent transportation. It includes railways on

the same track and same payments for riding, aiming at system coordination, the resource complementation and demand amplification, in order to promote the rapid economic growth of the whole region with logistics integration. (Zhang, 2011, 44).

Generally, there are four layers in the framework of an intelligent logistics system from the bottom to the top, as shown in the Figure. 2, Those layers are the perception layer, the network transport layer, the data storage layer and the application service layer.

Perception layer: As the data entrance point in intelligent logistics, this level is the basis and premise for realizing visibility, controllability and traceability in the whole logistics process. Various basic data parameters in the logistics operation process are captured by RFID, the QR code, sensors, audio and video processing, and other technologies to realize the digitalization of the logistics business. (WANG & LIN, 2019, 38-39).

Transport layer: This layer uses various transmission networks and communication technologies to transmit the collected information in a timely and safe manner. The data channel used for the transmission mainly includes the Internet, LAN, mobile communication technology, and other such technologies. (Jia et al. 2019, 44).

Data storage layer: This layer handles and processes the data acquired by the perception layer, concentrates all kinds of logistics information data into the cloud storage and utilizes technologies of information integration, classification and intelligent processing technology for analyses and processes. All this happens according to a pre-set logic and rules, when it generates decision instructions and issues them to the execution system through the perception communication technology. (WANG et al. 2019, 38-39).

Application service layer: This layer is the execution system of intelligent logistics, and it including a data exchange system, public information platform, enterprise service system and other systems. It receives and executes orders for decision-making from the storage and analysis layer. It is mainly used in fields of multi-model transport, vehicle cargo matching, demand prediction, path optimization, process visualization, the idle resource sharing, credit evaluation and other fields at present and in the future. (Jia et al. 2019, 44).

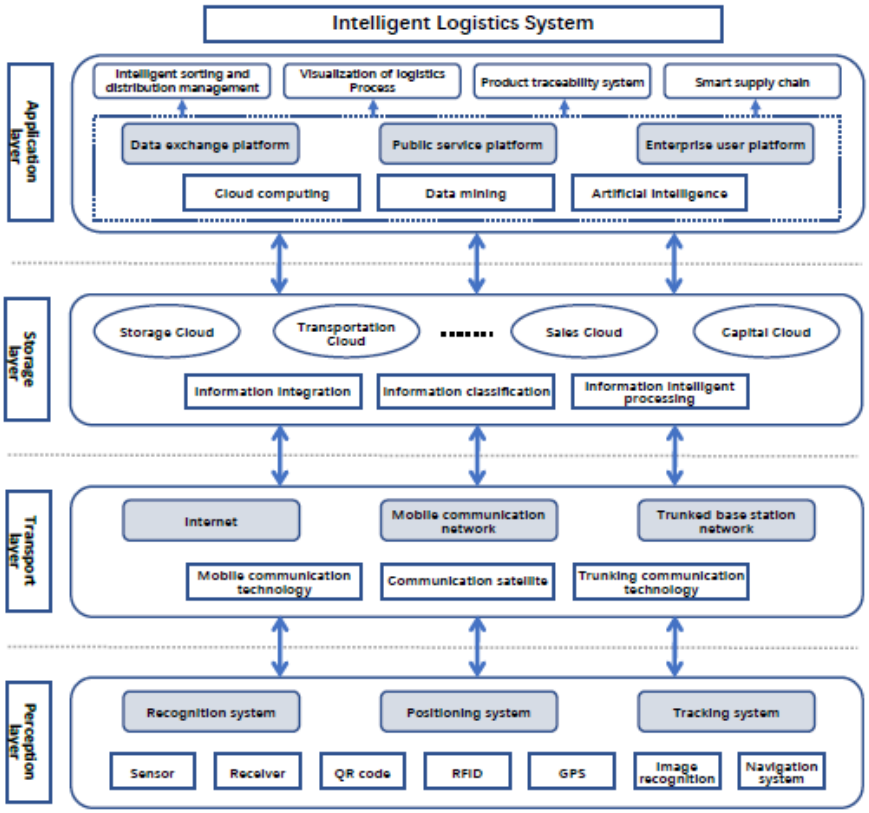

Figure 2. Architecture of intelligent logistics system.

2.3 The Importance of China's intelligent logistics

The logistics industry, as a productive service industry, is the hot spot of national economic development and a new growth point (ZHANG. G. B 2015). With the improvement of the country's emphasis on the logistics industry, the rise of the Internet of Things as well as the development and popularization of modern information

technology, transformation and upgrading of the logistics industry to the intelligent logistics is inexorable.

Intelligent logistics will reduce the cost of logistics of enterprises

With the development of society, the importance of logistics in people's life is increasing. At present, logistics has become the third-largest profit-center after labor and the natural resources. The key to achieving the promotion of profits is how to reduce the cost of logistics effectively. (Zhang & Peng 2013,36). At present, the logistics cost of many enterprises' accounts for a large proportion in the whole product sales process, which seriously affects the profits, reduces the profit margins of enterprises (Liu, 2019, 27-28). Therefore, the key to logistics cost control is to strengthen the management of logistics activities and the control of each key link of logistics. In order to achieve this goal, it is necessary to apply modern information technology to logistics cost management, and reduce the expenses in the process of logistics operation effectively through the meticulous management of logistics activities, which is the inevitable choice for enterprises to reduce costs and increase profits. Generally speaking, the main cost in the logistics process, such as the costs of transportation, storage and distribution, can use Internet of Things, RFID and other information technologies to effectively reduce the loss of logistics process and cost saving.

Intelligent logistics is conducive to improving the competitiveness of logistics enterprises.

With the continuous development of Internet technology, logistics enterprises can make full use of Internet technology to improve their efficiency and provide customers with more efficient and comprehensive services. For example, customers can put forward opinions and suggestions to enterprises through the Internet and mobile Internet platform. Then relevant enterprises will make improvements of logistics services based on these opinions and suggestions (Zhang & Peng, 2013, 37). As a service industry, the logistics enterprises must deal with many customer information data to

communicate and contact with customers effectively. Through the mining and analysis of big data, they can find and summarize the required content and standards of service. However, intelligent logistics can quickly and accurately transfer logistics information, and timely and effectively share information for analysis and decision-making, while traditional logistics does not. Through the Internet of Things, RFID and other technologies, enterprises can quickly and accurately obtain information, such as storage, transportation, orders and customer demand trends of commodities. (We 2019, 109). Basis on this information and data, production enterprises can make plans of procurement, production and other practices, and also provide accurate and real-time data for the logistics enterprises that they can make decisions on transportation, storage, distribution and other activities to meet the demands of customers future.

3 Methodology

3.1 Research purpose

This study aimed to explore the current situation of intelligent logistics in China. The purpose was to start from the analysis of these two research questions. Through the analysis of the factors to get the conclusion of the current situation of the development of China's intelligent logistics, hoping to provide a theoretical basis for Chin's intelligent logistics development.

The research questions were as follows:

- What is the impact of intelligent logistics on China?
- What are the factors that affect the development of China's intelligent logistics?

3.2 Qualitative research

This thesis is qualitative research. Generally speaking, when academic researchers study research questions, they will choose two research methods, namely quantitative and qualitative. (Saunders & al. 2009, 245). When the collected data is numerical and structured, quantitative method was used. However, when the collected data are unstructured and non-numerical, qualitative methods are adopted. Researcher collected data from relevant literature, but these data were unstructured and non-numerical, so they cannot be measured quantitatively. Science shows that quantitative methods help researcher to obtain consistent and objective research results, but the research results are too general. The application of qualitative methods allows researcher to collect in-depth information and draw specific conclusions. Therefore, this study chooses qualitative research method.

3.3 Research method

The qualitative research is applied by the literature review. The literature review is based on scientific research principles, research plans, the interpretation of old data or the combination of old and new interpretation. (Joy 2016)). A literature review compiles and evaluates the re-search available on a certain topic or issue that you are researching and writing about. (Myllärniemi 2016). Literature review allows us the opportunity to use other people's research as a source of information for new research. (Myllärniemi 2016).

The process of literary review begins with the research question by determining the research topic. The whole process includes: research plan, research questions, data collection, data analysis and result writing. During the planning stages, researcher review existing materials, identify research needs, and develop research plans. The research plan is conductive to understanding the whole research process. The research question is to define the scope of the research. Generally, there are 1-3 research questions. The answer to the question of current situation of China's intelligent logistics was found in previous research. It also contributed to a better understanding of the topic. Then to select the search method and select the database and terms used

for database search. The next steps are to review the search articles, through the way of scoring articles to conduct the final review. Researcher can use the data of previous studies to identify, analyze and combine the existing work (Myllärniemi 2016), which is of great significance for analyzing China's current intelligent logistics. The final step is to put all the research data together to draw conclusions, then report the conclusions and make conclusions and recommendations based on the results. The current literature review will be a key point to integrate the knowledge of China's intelligent logistics status. The aim was to strengthen the integration of resources, avoid duplication and prevent the waste of resources.

The articles used in this study were obtained from the CNKI and ResearchGate databases. Different keywords and concepts were used to search these articles, namely intelligent, intelligence, system, operation, management, automation and some concepts, such as information standards, intelligent logistic system, Internet of Things, logistic operation mode, modern information technology and the sharing resources. By searching the main perspective of articles (e.g., intelligent logistics, intelligent logistics, China logistics situation and so on), there are 30 articles selected during this process; by screening topics that are not the first main argument, only 26 articles are left; then through the paper's abstract, only 21 articles were selected from the aforementioned papers; papers as mentioned above, there are 18 articles left; finally, by referencing the full text, there are only 13 ones left. All available articles published between 2010 and 2020 were selected based on the pre-determined criteria (Figure.3), which describe the current situation of China's intelligent logistics. Article selection start with the title, then the abstract, finally the full text, as shown in the flow chart in Fig. 4. The articles included the answers of research questions and met the inclusion criteria.

Figure 3. Inclusion and exclusion criteria.

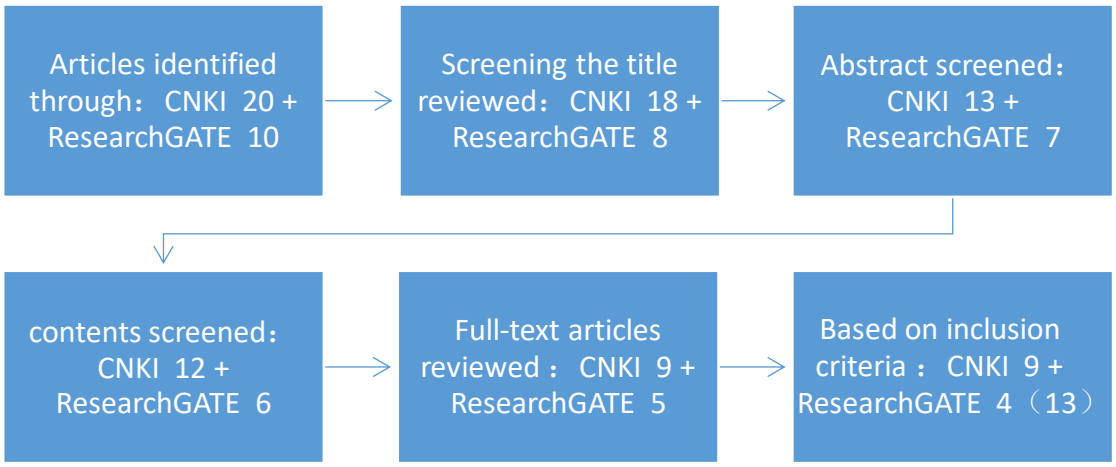

Figure 4. A PRISMA flow chart of the selection process.

3.4 Research implementation

This paper adopts the method of qualitative research, which refers to the process of determining the research scope, proposing research objectives and questions. By specifying research questions, studying relevant literatures and theories, putting forward development hypotheses, collecting data, testing hypotheses, to get the conclusion. (Wilson 2010, 133).

Figure 5. Thesis implementation stage.

Scope definition and theory acquisition

At the beginning of the research process, the research scope of the paper is defined. The conclusion is obtained through the collection, screening, analysis of the literature, and with the understanding of the strategy of China's intelligent logistics. This paper hopes to analyze the current situation of intelligent logistics in China from a theoretical point of view and draw a conclusion.

Data collection, screening, analysis

The articles used in this study were obtained from the CNKI and ResearchGate databases. After collecting the necessary information, the literature was analyzed and finally selected by scoring the literature. This research method requires researcher to collect relevant theories and literature about the integration strategy of China's intelligent logistics and its impact. Based on the research of influencing factors, this paper summarizes the conclusion and analysis of the development situation of intelligent logistics in China.

Conclusion and summary

In this part, the conclusion of this paper is to explain the direct and indirect influence of intelligent logistics in china to readers. The steps of the thesis and main idea of each chapter are concluded.

3.5 Data analysis and scoring

The selected data was analyzed by five steps of process. In this process, it starts from data processing, data display, data comparison, conclusion and verification. Data analysis was to get the familiar with the selected research materials through repeated reading. Data extraction was based on research questions to decided what information to get from the source literature, this process focuses on the research question. During this stage, the data describing the present stage of intelligent logistics in China was extracted from the selected articles, and the researcher will make a summary and analysis of the opinions intercepted from the literature. The last part of data analysis is to draw conclusions and verify them. This section includes topics, relationships, as well as conclusions. What it requires is verifying with primary source data to ensure accuracy and confirmability. (Whittemore 2005; Elo & Kyngas et al. 2008). The researcher has drawn the table of the analysis. (appendix.1).

For the purpose to accessing the quality of the research article, this study attempts to take advantage of the scoring method to select the literature materials. This method scores seven aspects of each paper (e.g., title, abstract, table of contents, research questions, research focus, research direction, research data). Each part will get a score from 1 to 5, namely poor to good. The total score is from 7 to 21 and to 35, namely very poor to qualified and to very good, which is helpful for the evaluation and selection of literature. Each article included in the study were carefully examined to ensure consistency in the assessment of article quality on the base of the rigorous methods. The number of articles in the study ranged from 21 to 35. The researcher evaluated the paper and made a final analysis. (scoring table on appendix.2).

For example, the steps of researcher to study the literature, namely [analysis of situation and issues of intelligent logistics in China]. The first step is to check whether the title of this literature conforms to the key direction of this research. After the review, it is found that the title of the literature fully conforms to the research points of this study, namely China intelligent logistics, market situation, logistics develop strategy. So, give the score 5. Then is the research of abstract, the study found that the abstract of this literature is a description of the current situation of China's intelligent logistics, in line with the research direction, so give 5 points. Then there is the review of contents, research questions, research directions and research priorities. The table of contents is a brief summary of an article, but the researcher found that this literature mainly introduces the strategies published by Chinese government and the security issues of intelligent logistics. It is not very consistent with the research direction of this study (current situation, intelligent developed in china, effect factors, challenges, developed strategy), but it is also useful data, so it is 4 points. Finally, the last part is the research data of the literature. The researcher found that some of the data were used in the literature about the flow of people in China's logistics industry and the data of the structure framework of the intelligent logistics system are very useful, so give 5 points. To sum up, the comprehensive score of this literature is 31.

4 Research results

Over the past ten years, at domestic and abroad, some viewpoints on intelligent logistics have been published. The purpose of this paper is attempt to provide a comprehensive and up-to-date synthesis for the current situation of intelligent logistics in China. This paper studies the development of intelligent logistics from four aspects. The first aspect is to analyze the information obtained in each article through the summary of literature review. The second part studies the impact of intelligent logistics. The third part studies the existing problems at present. The fourth part summarizes the situation of intelligent logistics in China. Finally, Finally, some suggestions are put forward for the development of intelligent logistics in China.

4.1 Summary of literature review

Through the selection of the collected literatures, there were 13 articles were selected for the final analysis and summary. A total of all 13 selected articles, 5 of them focus on the construction and application of intelligent logistics; 5 of them focus on description of the concept, functional and implementation plan; 5 of them focus on the existing problems, the importance of intelligent logistics, and the description of situation; 8 of them focus on describing the development trend and the development suggestion of intelligent logistics. Through the analysis and summary of these 13 articles, the researcher has integrated the following viewpoints. And through the analysis of these viewpoints, summed up the conclusion about the current situation and the development of China's intelligent logistics. These categories and subcategories will be described below.

He (2017), Zhang (2011). Zhang et al. (2013) investigated the concept and functional of intelligent logistic, and researched the implementation plan of how to achieve the uses of intelligent logistic. Hence, these three articles introduced the article on the origin of intelligent logistics (IBM 2008 PUBLISHED), development, exploration. The following is referred the analysis of the basic concepts. The result of the analysis is

that the intelligent logistics is based on information technology, which can realize system perception, comprehensive analysis, timely processing and self-adjustment in all aspects of logistics transportation, warehousing, packaging, loading and unloading, handling, distribution, and information services. This is a summary of the concept of intelligent logistics in these three articles. Then, the focus of the articles is function. This part is to study whether the intelligent logistics system is more in line with the current development of the logistics industry in those different functions, compared with the traditional operation mode. In this part, Zhang (2011) describes it more clearly. Zhang (2011) thought that the biggest functional comparison between intelligent logistics and traditional operation mode is that through the application of various advanced technologies, intelligent logistics system can obtain real-time information of each logistics link. Then to use the intelligent simulator model to analyze the logistics problems, to find the loopholes or weak links in the logistics activities. Finally, the emphasis of the articles is how to implement intelligent logistics. The conclusion of this sources is that Zhang (2011) believes that information network is the foundation of intelligent logistics system. Without the support of information technology, the real intelligent logistics cannot be realized. The support of information technology can get the data they want in the network data, and then automatically generated the solutions. Zhang et al. (2013) studied the level of enterprise management affecting the implementation of intelligent logistics. He (2017) studied the impact of lack of talents on the implementation of intelligent logistics. This is the basic conclusion of the three articles. It determines the efficient performance of intelligent logistics under the support of information technology, which can help people find problems and solve problems automatically. Its suitable for China's current development.

Liu 2017, Jia et al. (2019), Wang et al. (2019), Zhang et al. (2013) investigated the construction and application of intelligent logistics. Beginning with the introduction of China's intelligent logistics, the article begins to explain the importance of intelligent logistics system, and then leads to the analysis of the framework of intelligent logistics. Through the analysis of the framework of intelligent logistics to compare with the traditional logistics operation mode to get the conclusion about the

framework of intelligent logistics. Jia et al. (2019) &Liu (2017) resulted that the framework of intelligent logistics has four layers: perception, transmission, storage and application. Zhang et al. (2013) resulted that the framework of intelligent logistics has four layers: perception, communication, application and activity. Wang et al. (2019) resulted that the framework of intelligent logistics has six layers: foundation, operation, perception, transmission, analysis and decision-making. By summarizing these four articles, Get the conclusion of the framework in this paper. (2.2 cheaper). Specifically, intelligent logistics is mainly through the use of advanced information technology and equipment at all levels of business to carry out effective logistics information acquisition, transmission, processing, control and application. By improving the intelligence of the whole system, the operation efficiency of the whole system can be improved. The last part is about the description for the application of intelligent logistics. Based on the analysis of those articles to get the conclusion. McKinsey Global Institute (MGI) released a research report in 2013, which mentioned 12 disruptive technologies that may affect human life, business and economy in 2025. The top five, such as the mobile Internet, the automation of Mental Labor, the Internet of things, cloud computing, and smart robots, are all related to intelligent logistics. Highlight the development of technology on the logistics industry, as well as the importance of the development of intelligent logistics.

Jia et al. (2019), Tong (2015), He (2017), Wang et al. (2019) resulted that the current situation, the existing problems, the importance and the description of the development situation of the intelligent logistics. The conclusion of these articles is the country is vigorously guiding the development of intelligent logistics, but because the policy is not perfect, the low level of information technology, and overpopulation, the demand for intelligent logistics is too high. Therefore, China's intelligent logistics development situation is still at a low level, which cannot be compared with developed countries. The conclusion of these results is more specific in article 4.4.

Most of the articles discussed the development trend and the development suggestion of intelligent logistics indirectly or directly. This paper summarizes this in Chapter 4.5. But because it is not the main research questions, so the space is relatively

short. Next the analysis of these articles to get the summary of research questions will be conducted. In Chapter 4.2, the analysis of the impact of the development of intelligent logistics on China will be studied. In Chapter 4.3, the analysis of the effect factors of China's intelligent logistics has been shown at present stage. Finally, the researcher gets the reasons and summary of China's intelligent logistics through the analysis of those articles.

4.2 The impact of the development of intelligent logistics on China

The construction of intelligent logistics conforms to the development trend of the Internet of Things. It has brought a lot of benefits to the society, such as reducing the production cost of enterprises, reducing the waste of resources, improving the ecological environment, improving the productivity of enterprises, and providing people with an unprecedented logistics experience. It has a great significance of the development of enterprises, the whole logistics industry and even the national economy.

4.2.1 Impact on government regulation

Through the analysis of articles, the researcher concluded the following conclusions. Wang et al. (2019) searched that under the modern logistics operation mode, by using the vertical organizational structure for centralized and regional supervision, the government supervises mainly the physical logistics enterprises. This focuses on the approval-based pre-qualification supervision by the means of administrative-oriented regulations. (Wang et al. 2019.36-37). Zhang et al. (2019) investigated that under the mode of intelligent logistics, by contrast, regulation tend to be intelligent and transparent. The government is facing more virtual platforms, while the latter is facing all kinds of supply and demand entities. Jia et al. (2019) searched that with the commercialization of the blockchain technology, the logistics credit recording mode and contract rules have changed completely. The development potential of the logistics credit system will become more substantial in the aspect of government governance. In the future, the researcher believe that the focus of supervision will be shifted from qualification approval supervision to credit-based supervision.

4.2.2 Impact on the organizational mode of logistics

Wang et al. (2019) searched that under the modern logistics mode, the enterprises have been constrained by the limited infrastructure, time, cost and other resources. Through transportation, logistics parks, transportation organizations and other modern logistics management means, resources are used in a centralized way to reduce the costs as far as possible on the premise of meeting the customer's needs. Furthermore, the enterprise derives the transit, distribution, storage, delivery and other operations. (Wang et al. 2019. 36-37).

Jia et al. (2019) searched that the intelligent logistics mode, because of the immediate response to demand, automatic matching of supply and demand and intelligent integration of resources. It can break through the existing solution form of centralized utilization of the limited resources and carry out more point-to-point transportation, (Jia et al 2019), and reduce the derivative operations and the logistics transportation costs. Tong (2015) searched that intelligent logistics enables goods to be delivered to destinations in the best possible way, in the most economical way and at the most reasonable time, reducing logistics costs. (Tong, 2015, 50-51).

4.2.3 Impact on small and medium-sized logistics enterprise development

Under the modern logistics mode, the key point of enterprise management is to meet customer demands as the premise through internal process optimization and control. Wang et al. (2019) searched that the management also needs to reduce the costs as much as possible, develop logistics solutions and strengthen the control of logistics process in the implementation process (Wang et al. 2019, 37-38). While under the mode of intelligent logistics, the transparency of the whole transportation process of the logistics enterprises can make customers feel more comfortable and safer. (Tong, 2015, 50-51). Moreover, intelligent logistics can provide accurate and real-time data support for the logistics, so that enterprises can make decisions on

transportation, storage, distribution and other activities, and further optimize the enterprise management. (Tong, 2015, 50-51).

For small and medium-sized enterprises, under the mode of intelligent logistics, the information opening and the resource integration of the whole process of logistics make the boundary of enterprises become more and more blurred. (Jia et al 2019). The development focus of small and medium-sized industry is transformed into the integration of cross enterprise, cross process. (Wang et al, 2019,38-39). With the co-operation of network, facilities and information sharing, the enterprises to achieve the results of win-together. Relying on modern technology to promote the use power of the resource sharing and improve the efficiency of the resource utilization. It also allows the level of company services improved through specialized equipment leasing services provided by logistics equipment providers. (Wang et al 2019,38-39).

4.2.4 Impact on social service level

With the development of intelligent logistics, the coverage of logistics services continues to expand. In order to meet the needs of e-commerce personalization, diversification, high efficiency, economy, timeliness and high quality, the logistics system of counties, towns and remote areas has been greatly developed. (Tong 2015). The supply system of e-commerce logistics and the regionality of logistics service system in villages, towns and remote areas have been strengthened. Intelligent logistics makes the relationship between Internet, logistics and agriculture, manufacturing industry, commerce and trade circulation closer, optimizes the supply chain system of the whole society. (Zhang 2011). With the promotion of intelligent logistics, the overall speed, service quality, personalized service level and international service level of logistics services have been greatly improved. With the improvement of the logistics service of transparency, efficiency and security privacy, the logistics resources of the whole society can be optimized in a wider range. (Zhang 2011).

4.3 Effect factors of China's intelligent logistics at this stage

China's intelligent logistics has encountered some challenges in the process of development. How to solve these challenges will be the next development focus of China's intelligent logistics.

4.3.1 There is no clear standard between enterprises for intelligent logistics

Public logistics information platform is an open network information system that provides information exchange and service sharing to all kinds of users. Intelligent logistics was based on logistics information standardization, which requires standardization in the coding, file format, data interface, electronic data interchange (EDI), a global positioning system (GPS) and other relevant codes. (Zhang 2011). In order to eliminated the information communication barriers between different enterprises. Only in this way can we really achieve the interconnection between things to things, and data to data, then to achieve Information sharing and intelligent application in future. (Zhang et al. 2015, 38).

Compared with the application level of information technology in China, foreign developed countries have established a set of more practical standards in the bar code, information exchange interface and other aspects. (Jia et al 2019). The logistics enterprises are more and more convenient to communicate and serve with customers, subcontractors and suppliers. The logistics software is also integrated into the industry standards such as format and process, creating a good environment for the construction of enterprise logistics information system.

At present, although China's logistics enterprises are developing intelligent logistics based on informatization. However, because the standard system has not been completed, the public information platform of logistics lacks effective product and technical support. So, the application function only stays in information release without effective review and supervision. (Zhang et al. 2015, 38). The intelligent logistics system cannot achieve collaborative sharing, data is difficult to exchange, information is

difficult to share. (Wei 2020). It is also difficult to form a complete and smooth supply chain of goods from production, circulation to consumption, which seriously affects the management of logistics industry and the operation of e-commerce.

4.3.2 Low level of information technology

At present, because of the low level of information technology in our country. The function of information system is not perfect, and the necessary logistics service systems such as goods tracking system, warehouse management system, transportation management system are lacking. (Wei 2020). Because the integration ability of logistics information resources has not been formed, so it cannot cover and track the whole process of logistics operation, and cannot really reflect the real value of information and logistics data application. (Zhang et al. 2015, 38).

In the same way, the application of bar code, RFID, GPS / GIS, electronic data exchange technology is not ideal. And most enterprises are backward in logistics equipment, lack of bar code automatic identification system, automated guided vehicle system, and automatic cargo tracking system, which leads to the failure to obtained logistics information timely. (Liu 2020). Information resources cannot be shared in time, which hinders the informatization process of logistics enterprises and leads to high logistics cost. Therefore, compared with the application of foreign intelligent logistics technology, there is still a big gap. (Zhang et al. 2015, 37-38).

4.3.3 Lack of logistics professionals

Logistics is a talent and technology intensive industry. The realization of intelligent logistics needs the joint efforts of professional IT talents and management talents who are familiar with the law of logistics activities. (Zhang et al. 2015, 39-40). In the logistics industry, the talent structure is in the "pyramid" type, top-level logistics management talents are scarce, and there are more staff in the logistics department at the grassroots level. Nevertheless, occupation ability and comprehensive quality are generally not high. (Jia et al. 2019, 45). In terms of logistics technology, the

domestic logistics enterprises still lack logistics technology personnel. Many universities have more theoretical knowledge than practical knowledge of logistics education, and students do not contact with the practice of intelligent logistics-related aspects. The practice of relevant aspects cannot meet the needs of the logistics enterprises for intelligent logistics talents. (Wang. W. B 2017).

4.3.4 Social logistics resources cannot be integrated

From the perspective of China's policies, markets and other environments. The current development of intelligent logistics fails to mobilize the enthusiasm of logistics related industries fully, and the utilization of a large number of the social resources, assets and capital are not enough. Many resources are idle and inefficient, so it is difficult to form a unified, open and orderly market. (Zhang et al. 2015, 37-38.)

4.4 The current situation of intelligent logistics in China

Through the analysis of 13 literatures, the researcher summarizes the conclusion of the current development situation of China's intelligent logistics. At present, some enterprises in our country have begun to use the Internet of Things technology gradually to construct the intelligent logistics system. however, in general, the scale of enterprises is not large, and the distribution in the country is uneven and unbalanced. According to the relevant data, 90% of our freight companies own no more than ten private trucks, even almost half the self-employed have only one (Jia et al. 2019, 45). Besides, there is also a lack of further effective management tools and methods in these logistics industries, which leads to management confusion, cannot allow the resources to achieve effective free flow and effective allocation. These make it difficult to form an open and orderly market. (Jia et al. 2019, 45). However, because of the capital, technology and other reasons, even under the premise of using the relevant intelligent logistics technology, some logistics enterprises in our country have not promoted the efficiency of the enterprises, and often appear no-load phenomenon.

Many start-up technology companies rely on capital market financing, entered the field of logistics. On the other hand, the key to intelligent logistics success still lies in the deep integration of logistics demand and intelligent technology. (Zhang 2011). Some logistics enterprises, especially the small and medium-sized one, cannot achieve a deep integration of logistics systems and information technology. This has resulted in a low degree of collaborative sharing between information (Wang et al. 2019,41-42). Public logistics information platform is a system that provides information for multiple parties. However, some businesses haven't fully established, but just stay in the stage of information release without effective review and supervision. (Zhang et al. 2013). The role of monitoring and auditing information has not achieved. Finally, the enterprise information received and sent blocked, which seriously restricts the integrated development of logistics.

With the background mentioned above, given the unique advantages of the logistics industry. In December 2009, the Information Center of China Logistics Technology Association, HUAXIA Internet of Things, and the editorial department of "Logistics Technology and Application" jointly proposed the concept of "intelligent logistics". (LIU 2019, 27). The concepts of intelligent logistics conform to the trend of Internet of Things development, also accords with the new trend of the development of modern logistics industry, and will help the automation and transparent management of logistics industry. (Zhang et al. 2013). At present, intelligent logistics technology is also constantly developing and mature. General Secretary Xi Jinping pointed out in the report of the Nineteenth National Congress of the Party that we should "*strengthen the construction of infrastructure networks such as water conservancy, railway, highway, water transportation, aviation, pipeline, power grid, information and logistics*". (LIU 2019, 27). The 13th Five-Year Plan for Logistics Development clearly states that we should "develop intelligent logistics, timely study and formulate 'Internet' cargo and logistics action plan, in-depth promotion of mobile Internet, big data, cloud computing and other new generation of information technology applications. (Liu 2019, 27).

Through the analysis and integration of 13 articles, the above conclusions about the current situation of China's intelligent logistics are obtained. 9 of the 13 articles mentioned that although China is a large logistics country with the largest logistics market

in the world, but it is still in the initial stage of the development of intelligent logistics. Although the Chinese government has made a lot of efforts, but because of the large population and vast geographical area, it has led to a higher demand level for intelligent logistics. For most small and medium enterprises, because of the habit of traditional logistics operation mode, and lack of key information technology and high capital cost of enterprise transformation, it is difficult for China's small and medium-sized logistics enterprises to complete the transformation of intelligent logistics operation mode. Therefore, China's intelligent logistics is still in the primary stage when compared with the United States, Japan and other developed countries.

4.5 Development suggestion

4.5.1 Formulate logistics development plan, establish and improve relevant policies and regulations

Because of the unbalanced distribution of the logistics resources in China. It is necessary for the central government to formulate the development plan of logistics industry development plan, and issue the development policy of logistics industry. Apply new sensor technology, mobile computing technology, wireless network transmission technology. In order to establish the product intelligent traceability network system, logistics process visualization intelligent management network system, and intelligent enterprise logistics distribution center and enterprise intelligent supply chain. (Zhang et al. 2015, 37-38).

In terms of fiscal policy, smart logistics projects should be taken as key support projects and effective government financial support mechanisms should be established. (Zhang et al. 2013). In order to promote the rapid development of intelligent logistics. It is necessary to promote the attempt of special financial funds and tax relief policies to intelligent logistics, to strengthen the research, and develop the intelligent logistics technology and products, strengthen the construction of intelligent logistics industrial base.

4.5.2 Accelerate the construction of standard system of logistics informatization

Through information technology, intelligent logistics links all links of the supply chain into a whole to realize intelligent coordination and management. This requires standardization in related areas, and speed up the research and formulation of the logistics information technology, the encoding, security, management and service standards. (Zhang et al. 2015, 38-39). Software also needs to adopt industry standards in the aspects of format and process. It eliminates the barriers of communication between different enterprises, and creates the conditions for intelligent logistics construction.

5 Discussion

5.1 Discussion of key results

This study not only exposed some problems in the current stage of China's intelligent logistics, but also put forward some suggestions on how to develop it.

From the present research, the development of intelligent logistics in China is still in the primary stage. The total cost of China's logistics market has not only surpassed that of the United States, but also become the largest logistics market in the world. According to relevant statistical data, China's growth in intelligent logistics market scale exceeded 400 billion yuan in 2018, with a year-on-year growth of 20.4%. It predicted that the market scale will exceed 500 billion yuan by 2020 and trillion yuan by 2025. (Jia et al. 2019, 44).

However, the development of China's intelligent logistics is still at the primary stage because of the influence of the market resources cannot be integrated, the lack of top logistics talents, the law level of information technology and the lack of perfect information platform. Moreover, because of the lack of perfect information

technology, China's intelligent logistics market is difficult to form a perfect information technology platform. So, the logistics information cannot be acquired in time, which has led to the waste of funds seriously. Similarly, because of the lack of top technical personnel, the development of intelligent logistics lacks enough intellectual support (Jia et al. 2019, 44). The same reason is that some enterprises have no positive attitude towards the development policy of the sharing resources, which leads to the insufficient use of a large number of the social resources, many social resources are in idle and inefficient use. Likewise, because some traditional logistics enterprises were accustomed to the operation of traditional logistics, they cannot upgrade the logistics enterprises to intelligent logistics timely and effectively. It is difficult for China to develop the intelligent logistics. Also, the lack of a social security system and imperfect supervision system will be restricted the development of intelligent logistics in China. (Zhang et al. 2015,38-39).

5.2 Considerations

The included articles were obtained through CNKI and Research GATE databases. The former is the largest website of literature and full-text of related journals in our country, and provides full-text for more than 500 journals indexed by CNKI (CNKI.NET). The process of retrieving, evaluating and analyzing all articles in this study has described step by step, which may present a comprehensive understanding of the subject. Besides, the articles in the study come from Singapore, Taiwan, the United Kingdom and China. And diverse backgrounds, as well as different countries and ideals give a broader perspective on the issues discussed.

The study was conducted by only one researcher, who evaluated the quality of the research, and tried to improve the reliability of the study. Because the time of publication of the selected papers in the study is only ten years (2010-2020), and materials were selected according to the scope of topic selection and research issues. Therefore, there may be a lack of important and valuable information. This study includes articles published in English and in Chinese, and it is based on JAMK's paper description. All articles are the latest between 2010 and 2020, and all articles were

based on evidence and experience. The statements in the study mention the author in the article, thus avoiding plagiarism.

5.3 Conclusions and recommendations for further studies

The results of all 13 articles are based on the current situation of intelligent logistics in China. On the one hand, the government have begun to focused on the construction of intelligent logistics; on the other hand, enterprises have a certain understanding of intelligent logistics. While one of the main concerns is the length of construction time and the problems that need to be solved in construction. The results indicate that many enterprises are used to the traditional logistics operation and process, because it is easier to operate for them (Jia et al. 2019, 44). Besides, in some enterprises, they do not have the power to lead the transformation of the company on time. In contrast, in others, the development of intelligent logistics is limited-mainly due to national policy issues.

It was considered that the most difficult part of the challenge of implementing comprehensive intelligent logistics is as follows. The lack of information technology to improve the information platform, the lack of facilities and security system, and the imperfection of the regulatory system. (He 2017, 10-12). The reason is that the people's views, attitudes and behaviors on intelligent logistics will have a great effect on the feasibility of its development in China's current national conditions. To promote the development of China's intelligent logistics, the most important thing is to make the country and enterprises have an accurate understanding of it. (Jia et al. 2019, 44). To understand the importance of the development of intelligent logistics, such as reducing the logistics cost of enterprises, improving the competitiveness of the logistics enterprises, building a smart city and improving the level of urban services.

The data analysis of the cost and prospect sketch of the intelligent logistics in China all show that the importance of developing intelligent logistics. It is to improve the competitiveness of enterprises, improve the level of urban service, the urgent demand of society and logistics industry for intelligent logistics. In the end, China is in a

critical period of a new round of technological revolution and industrial transformation. Attempt and innovation are the main factors of the development of China's intelligent logistics. It requires further understand for the current situation of China's intelligent logistics, looking for the most suitable way to develop intelligent logistics, and to creating new development opportunities for the logistics industry.

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Appendices

Appendix 1. Analysis table.

Author	Title	Journal	Year	research focus	research question	result	contribution	score
B. Yang, Y. P. Du, L. Zhu, G. Y. Liu, Y. Zhang	New Technology Application and Case Analysis in Intelligent Logistics System	Green Packaging	2019	Construction and application. Framework of intelligent.	How to build a framework of intelligent logistics system?	It introduces the application of intelligent logistics. Then give the briefly description of the framework of intelligent logistics system, and the process of how to building it. Then it introduces the application of intelligent logistics.	It provides guidance for the framework flow chart of intelligent logistics in this study	26
He liming	Development status and trend of intelligent logistics in China	Business and Market	2017	concept. challenge. develop trend.	What factors affect the development of China's intelligent logistics? The strategy of how to developing the China's intelligent logistics	This paper studies the concept of intelligent logistics and the problems encountered in the development of intelligent logistics in China, and puts forward some suggestions for its development	This paper provides a theoretical basis for the concept of intelligent and the challenge and the develop strategy and trend.	29
Hans Hendrischke	How local are local enterprises? Privatisation and translocality of small firms in Zhejiang and Jiangsu	Journal Provincial China Volume	2010	Logistics mode. Transportation. Government policies.	the strategy of how to developing the China's intelligent logistics? What is China's policy on developing intelligent Logistics?	This paper introduces the concept of intelligent logistics, and studies the development strategies of intelligent logistics for the governments of Jiangsu and Zhejiang provinces	It provides a research basis for the Chinese government's strategy in the process of developing intelligent logistics	25
Liu XuFang	Construction and application of intelligent logistics	Beijing Vocational College of Finance and trade	2017	Information technology. Framework. Development trend.	How to achieve win-together results with the development of intelligent logistics and information technology? How to build a framework of intelligent logistics system?	This paper introduces the influence and importance of information technology on intelligent logistics, and introduce of how to building the intelligent logistics system framework.	It provides a theoretical basis for the description and importance of information technology, and also helps researchers to make a framework diagram of intelligent logistics	25
Jia Rong & Peng WweiJia	A brief analysis of the current situation of intelligent logistics in China.	China Business and Market (Chinese) & Atlantis press (English)	2019	current situation. Government policies. Framework. Develop strategy.	What is the development status of smart logistics in China? What is China's policy on developing intelligent Logistics? How to develop the intelligent logistics in china?	This paper studies the concept of intelligent logistics, introduces the framework process of intelligent logistics, security and privacy issues of intelligent logistics, and also mentions the policy of developing intelligent logistics in China	It provides a theoretical reference for the paper to study the concept of intelligent logistics, the framework process of intelligent logistics and the policy of developing intelligent logistics in China	31

Shanta Hallock	What factors impact logistics cluster benefits for firms?	Heriot-Watt University	2019	influence. Logistics mode.	What factors impact logistics cluster benefits for firms?	It explains the influence of intelligent theory in logistics industry and the factors influencing the efficiency of enterprise logistics cluster	It provides a theoretical basis for the article to explain the position of intelligent logistics in the logistics industry	26
Tong Qian	Research on the current situation and countermeasures of intelligent logistics development in China	JOU R NAL OF LANZHOU INSTITUTE OF EDUCATION	2015	Current situation. Functional. Develop strategy.	What factors affect the development of China's intelligent logistics? What is the development status of smart logistics in China? How to develop the intelligent logistics in china?	This paper explains the importance of developing intelligent logistics, gives a simple description of the current situation of China's intelligent logistics, and puts forward suggestions for its development	It provides a theoretical basis for the article to explain the importance of the development of intelligent logistics, as well as a literature reference for the current situation of China's intelligent logistics	26
Wei MeiYing	Research on the development of intelligent logistics industry in the era of sharing economy	Techno economics Management Research	2019	resource sharing. Logistics cost. Logistics business mode.	What is the significance of resource sharing in Intelligent Logistics? How does the development of intelligent logistics affect the business model? How to control the cost of enterprises through intelligent logistics?	This paper introduces the concept of resource sharing and its significance in intelligent logistics, and studies the business model of intelligent logistics to control and reduce the logistics cost of enterprises	this paper provides a theoretical basis for the use of the concept of resource sharing, and gives an analysis of how to reduce and control enterprise costs	32
Wang Shuai & Lin Tan	Motivation, framework and suggestions for the development of intelligent logistics	China Business and Market	2019	functional. Framework. Importance. develop strategy.	What factors affect the development of China's intelligent logistics? How to build a framework of intelligent logistics system? The strategy of how to developing the China's intelligent logistics?	This paper studies the concept of intelligent logistics, introduces the framework process of intelligent logistics and the problems encountered in the development of intelligent logistics, and puts forward the development suggestions	It provides a theoretical reference for the paper to study the concept of intelligent logistics, the framework process of intelligent logistics and the policy of developing intelligent logistics in China	30
Xiao, J., Lee, S., Liu, B. and Niüche	Contemporary Logistics in China	Springer	2012	logistics mode. Transportation. modern logistic.	What is the current situation of logistics in China? How China's logistics will develop in the 21st century?	This paper studies the current situation of China's logistics and discusses how China's logistics will develop	It provides a reference for the study of the current situation of China's logistics and a theoretical basis for the discussion of the future of China's logistics	26
ZHANG & PENG	Development Strategy of intelligent logistics in China	China Business and Market	2013	Concept. Functional. Develop strategy	What factors affect the development of China's intelligent logistics? What is the development status of intelligent logistics in China?	This paper introduces the concept of intelligent logistics, then describes the problems encountered in the development of intelligent logistics, and finally puts forward suggestions for the development of intelligent logistics in China	It provides a theoretical basis for the concept, development problems and development strategies of intelligent logistics in this study	30

					The strategy of how to developing the China's intelligent logistics?			
Zhang. G.-W.	Large data and intelligent logistics	ResearchGate	2015	IOT. Concept. Existing problems.	What is the relationship between intelligent logistics and the Internet of things development? What factors affect the development of the intelligent logistics?	This paper introduces the concept of intelligent logistics, puts forward and expounds the relationship between the development of IOT and intelligent logistics, and studies the problems encountered in the development of intelligent logistics	It provides a theoretical basis for the concept of IOT and its importance to intelligent logistics	25

Appendix 2. Summary of Critical Appraisal Scores

Score	title	title	abstract	contents	research focus	research direction	research data	research questions
26	New Technology Application and Case Analysis in Intelligent Logistics System	5	4	4	3	3	3	4
30	Development Strategy of intelligent logistics in China	5	5	4	4	4	4	4
25	Large data and intelligent logistics	5	4	3	3	3	3	4
25	How local are local enterprises	4	4	4	3	3	4	3
31	Research on the basic connotation and implementation framework of intelligent logistics	4	4	5	5	5	4	4

26	The development of Eco Cities in china	5	4	4	3	3	3	4
29	Development status and Countermeasures of intelligent logistics	5	4	4	4	4	4	4
32	Research on the development of intelligent logistics industry in the era of sharing economy	5	4	4	5	4	5	4
26	Research on the current situation and countermeasures of intelligent logistics development in China	5	4	4	3	3	3	4
26	Development of Intelligent Logistics in China	5	4	3	3	4	3	4
30	Motivation, framework and suggestions for the development of intelligent logistics	5	4	5	5	5	5	4
31	brief analysis of the current situation of intelligent logistics in China.	5	5	4	4	4	4	5

30	Construction and application of intelligent logistics	5	5	4	4	4	4	4