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REVIEW

Research on Incentive Mechanism and Analysis of the Obstacles in the Application of Low-carbon Logistics Technology

Jing Sun*
Shaanxi College of Communication Technology, Xi'an, Shaanxi, 710014, China

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ABSTRACT

Low-carbon logistics technology is a modern technology with green environmental protection concept as the core, which can effectively reduce the carbon emissions of all links in logistics activities, and thus achieve the goal of maximizing the use of resources and reducing environmental pollution. With the deepening of the concept of environmental protection, the application of low-carbon logistics technology is not only an inevitable choice for adapting to social development and responding to environmental protection slogans, but also an inevitable choice for the logistics industry to achieve sustainable development goals. Based on the brief introduction of low-carbon logistics technology, this paper analyzes the main obstacles of the application of the technology, and proposes corresponding incentive mechanism according to the obstacle factors, aiming at alleviating the resistance in the practical application of low-carbon logistics technology and promoting the realization of low-carbon logistics development.

1. Introduction

The ultimate goal of low-carbon logistics is to achieve sustainable socio-economic development, and the application of low-carbon logistics technology is conducive to reducing the carbon emission of all aspects of logistics activities, thereby reducing environmental pollution and coordinating the development of environmental and economic benefits of logistics activities, thus Creating an environment conducive to the establishment of an environment-friendly and resource-saving society in China. However, judging from the actual situation of low-carbon logistics development of Chinese enterprises at this stage, the application of low-carbon logistics technology has great resistance, and it is difficult to achieve popularization in a short time. In view of this, this paper has important practical significance for the analysis

*Corresponding Author:
Jing Sun
Shaanxi College of Communication Technology,
No. 289 *Ziqiang West Road, Xi'an, Shaanxi,* 710014*, China.*
E-mail: 54650403@qq.com.

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of the obstacle factors and the incentive mechanism of low-carbon logistics technology application.

2. A Brief Introduction to Low-carbon Logistics Technology

Low-carbon logistics refers to the effective control of carbon emissions in logistics activities through advanced logistics technologies and greenhouse gas emission reduction technologies, thereby reducing the adverse effects of logistics activities on the environment and maximizing the utilization of logistics resources.[1] The main operations of low-carbon logistics include low-carbon transportation and distribution, low-carbon loading and handling, low-carbon flow processing, low-carbon packaging, and low-carbon storage. The principles of low-carbon logistics mainly include adherence to the principles of integrity, hierarchy and dynamics. Low-carbon logistics technology integrates low-carbon design, low-carbon concept, and low-carbon technology into various processes of logistics activities. From the perspective of all aspects of logistics activities, common low-carbon logistics technologies include low-carbon storage technology, low-carbon handling technology, low-carbon packaging technology, low-carbon transportation and distribution technology, and low-carbon circulation processing technology.[2]

3. The Analysis of the Obstacles in the Application of Low-carbon Logistics Technology

The application of low-carbon logistics technology involves a wide range. From the perspective of the development of low-carbon logistics in China, the obstacles to the application of low-carbon logistics technology are mainly reflected in the government, enterprises and the public. The specific analysis is as follows:

3.1 Government Factors

The obstacles to the application of government behavior to low-carbon logistics technology mainly include the following aspects: The first are the obstacles to the management system. At this stage, the Chinese government has rigidly divided the logistics activities into different sections, and each link of the logistics activities is managed by different government functions. In this case, not only the logistics activities of the enterprises are difficult to systematically develop, but also Due to the differences in the management systems of various functional departments, there are situations such as blank or duplicated duties in actual work, which is not conducive to the application of low-carbon concepts. The second are the obstacles to the evaluation criteria. For the government department, it must clearly understand the behavioral attributes of enterprise logistics, and then can supervise or motivate the application of low-carbon logistics technology in enterprise logistics activities. However, at present, the research on China's existing low-carbon logistics evaluation system is still in the exploration stage, and the practical application results of relevant research results are relatively limited. However, due to the inability of government departments to introduce perfect evaluation standards, enterprises have certain speculative behaviors in applying low-carbon logistics technology, and will also increase the management costs of government departments.[3] The third are the obstacles to the regulatory system. The government's supervision on the application of low-carbon logistics technology is very inadequate. In addition to the mandatory measures to limit the carbon emissions of motor vehicles' exhaust gas, other perfect supervision systems have not been established. This situation is for low-carbon logistics technology. The application has had a huge adverse effect. The fourth is that, the compensation system is not perfect. The government's compensation system is an important driving force for enterprises to apply low-carbon logistics technology. Therefore, government departments should reduce the concerns of enterprises on the application of low-carbon logistics technology to increase costs through effective incentive mechanisms. However, the incentive effect of the incentive mechanism implemented by the Chinese government is very limited, and most of them have incentive effects on the production and sales of products, and there are few incentive mechanisms for enterprises to apply low-carbon logistics technology. The enthusiasm of enterprises to apply low-carbon logistics technology is not high.

3.2 Enterprise Factors

The existing logistics technology level of the enterprise is an important technical basis for the development of low-carbon logistics of enterprises. From the current situation, the obstacles for enterprises to apply low-carbon logistics technology mainly include the following three: First, logistics equipment factors. At present, in the logistics activities, the carrier is the main source of carbon emissions. Some equipment manufacturers have gradually started to develop and use clean energy vehicles in response to the low-carbon environmental slogan. However, due to limited effects, they have not received positive response from enterprises.[4] In addition, the development of technologies with low carbon environmental performance such as solar vehicles and electric vehicles is not mature enough to be promoted in a short period of time, which has caused certain obstacles to the application of low-carbon logistics technology. The second are the logistics facilities factors. The logistics facilities mainly include basic facilities such as logistics nodes, logistics channels and logistics processing points. Since the low-carbon environmental protection requirements are not taken into

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account in the initial stage of construction, the existing logistics facilities of Chinese enterprises cannot support the needs of enterprises with low-carbon development.[5] Moreover, due to excessive pursuit of economic benefits, many enterprises deliberately neglect low-carbon environmental protection requirements in the planning of logistics facilities, which in turn leads to serious environmental pollution and waste of resources. The third are logistics information technology factors. Logistics information technology is an important technology to improve the efficiency of logistics activities and solve the problem of information asymmetry between the participants of logistics activities. It is also an effective tool for enterprises to achieve low-carbon development. Common logistics information technologies include GPS technology, electronic data exchange technology, and geographic information system technology. However, at this stage, the research progress of the above-mentioned technologies in China is relatively slow, and the application cost is relatively high, which makes it difficult to achieve universalization, which has caused certain obstacles to the application of low-carbon logistics technology.

3.3 Social Public Factors

On the one hand, the lack of environmental awareness of the public has led to a lower level of concern for low-carbon environmental protection in the whole society, and the low degree of attention means that the public is seriously inadequate in supervising the application of low-carbon logistics technology. In the case of insufficient strength, it is difficult for enterprises to consciously and actively apply low-carbon logistics technology. At present, exhaust emissions are the main concern of the public for the behavior of logistics companies. However, for the deeper development of low-carbon logistics, the public has not yet had a deep perception, and environmental awareness is difficult to correctly express, making the public's impact on corporate logistics behavior smaller and smaller. All in all, the lack of environmental awareness of the public has a great hindrance to the application of low-carbon logistics technology. On the other hand, the lack of a professional talent team has also caused serious obstacles to the development of low-carbonization of Chinese enterprises. From the perspective of hierarchy, logistics modernization is an important foundation for enterprises to apply low-carbon logistics technology, and professional talents with professional environmental protection knowledge and correct low-carbon environmental protection concept are the important foundation for logistics enterprises to achieve low-carbon development.[6] From the perspective of enterprises, professional logistics talents are not only the actual needs of modern logistics development, but also the actual needs of low-carbon logistics development. It can be said that the professional talents are not only the main factors affecting the low-carbon development of logistics enterprises, but also will restrict the development of low-carbon logistics in the future.

4. Research on Incentive Mechanism in the Application of Low-carbon Logistics Technology

Based on the analysis of the obstacles in the application of low-carbon logistics technology in the previous article, the following incentives are also proposed from the government, enterprises and the public to promote the application of low-carbon logistics technology, as follows:

4.1 Incentive Mechanism in the Application of Low-carbon Logistics Technology Promoted by Government

First, government departments should actively change the management system, improve the systemic and integrity of logistics activities management, and create an enabling environment for enterprises to apply low-carbon logistics concepts. At the same time, the government should also unify the management systems of various functional departments to avoid duplication of functions or gaps in responsibilities between departments. Second, government departments need to develop sound and scientific evaluation standards. Under the premise of clarifying the attributes of corporate logistics behavior, government departments need to actively explore and combine international environmental standards and evaluation standards systems for low-carbon logistics technology applications in developed countries to develop evaluation criteria that are consistent with China's national conditions and corporate development trends to provide reasonable supervision and appropriate incentives for the application of low-carbon logistics technology, to avoid the existence of luck in the application of low-carbon logistics technology.[7] Third, establish a sound regulatory system. On the one hand, the introduction of environmental legislation related to corporate logistics activities, especially the legislation on low-carbon logistics supervision exerts certain external pressure on the development of low-carbonization of enterprise logistics. On the other hand, the establishment of a reasonable regulatory system, including the charge and charge system, waste charging system, deposit return system and licensing system, to promote the development of corporate logistics to the development of dyeing. Fourth, implement certain compensation for the application of low-carbon logistics technology. The establishment of the compensation system can eliminate the concerns of enterprises on the cost increase caused by the application of low-carbon logistics technology, and thus improve the enthusiasm of enterprises to apply low-carbon logistics technology.

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4.2 Incentive Mechanism in the Application of Low-carbon Logistics Technology Promoted by Enterprises

First of all, to construct a technological innovation mechanism in all aspects of logistics activities, starting from all aspects of logistics activities, to achieve low carbonization of all aspects of logistics. Specifically, in the transportation sector, the use of clean energy-based vehicles, improve the fuel combustion of fuel engines, and encourage enterprises to use low-carbon transportation methods to achieve low carbonization of transportation. In the packaging process, the establishment of packaging technology innovation incentive mechanism to achieve low-carbon packaging, which can avoid the excessive packaging and reuse of packaging materials, etc., to stimulate the development of low-carbon packaging. In the process of circulation processing, the incentives that can be taken include: Integrate with other links and implement large-scale circulation processing, etc. The scale processing method can be realized in the following two ways. The first is to focus on the processing and utilization of corner scraps that occur during the processing of logistics, so as to reduce the generation of processing waste and reduce environmental pollution; The second is to transform the distributed processing into centralized processing, so as to use the scaled operation method to improve the utilization of resources and reduce environmental pollution. In the warehousing segment, the incentives that can be used include: stimulating logistics companies to rationalize the layout of storage equipment, and strengthening the internal management of storage facilities.[8]

Then, the logistics enterprises are encouraged to actively apply advanced logistics technologies. The specific measures include: stimulating enterprises to pay attention to and continuously accelerate the construction of logistics information systems, encourage multi-modal transportation, and encourage the development of third-party logistics while implementing the common distribution method. Finally, incentive logistics companies to carry out low carbon certification. The ISO14000 system is an international environmental standard proposed by the International Organization for Standardization to reduce environmental pollution, improve environmental quality, and achieve sustainable development. The products, services, and activities of enterprises can be evaluated through this standard.[9]

With the development of low-carbonization wave on a global scale, all countries in the world are building a new low-carbon standard system based on the ISO14000 series of standards. And many developed countries have already standardized the certification of low carbon standards into the track of standardization and legalization. In order to adapt to this market environment and realize the low-carbon development of logistics enterprises, Chinese enterprises must also actively carry out certification of low-carbon standards, and at the same time establish and improve a more complete enterprise environmental management system.

4.3 Incentive Mechanism in the Application of Low-carbon Logistics Technology Promoted by Social Public

On the one hand, improve the environmental awareness of the public. The government should actively promote the concept of environmental protection and the concept of low-carbon consumption, and encourage the public to carry out low-carbon consumption to effectively reduce the environmental pollution caused by the packaging of logistics products. At the same time, the public should actively advocate the concept of low-carbon consumption and resist high consumption. The ability to logistics, the low-carbon ideas into the production and circulation of products, and promote the development of low-carbon enterprise logistics. At the same time, the public should also give full play to their supervisory responsibilities and actively participate in public opinion supervision. According to the previous analysis, the supervision of the public is an important external pressure for enterprises to achieve low-carbon development. Therefore, in order to guide the development of low-carbonization of enterprise logistics, the public should unify the ideological front, actively participate in the supervision of public opinion, express their own understanding of environmental issues through civil organizations and self-media, and advocate low-carbon logistics concepts to exert certain external pressure on the company, and to promote its development towards low-carbon logistics. On the other hand, an incentive mechanism for talent cultivation should also be established. The lack of specialized talents is an important factor restricting the development of low-carbon logistics of enterprises. The establishment of incentive mechanism for professional talent training can cultivate the talents needed for the development of low-carbon logistics, and then develop a low-carbon transformation with scientific and efficient development.

5. Conclusion

With the continuous advancement of environmental protection work and the constant changes in the industry's competitive situation, low-carbon logistics has become an inevitable choice for the logistics industry to achieve sustainable development. The application of low-carbon logistics technology has also become an important boost for the development of low-carbon logistics. Through the research in this paper, we can find that the obstacles of low-carbon logistics technology application are mainly re-

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flected in the three aspects of government, enterprise itself and the public. Therefore, when formulating the incentive mechanism for low-carbon logistics technology application, we should also start from the above three aspects. We will change the management system, innovate all aspects of logistics technology, and strengthen the incentive mechanism of low-carbon environmental protection publicity and personnel training to further promote the application of low-carbon logistics technology, encourage enterprises to achieve low-carbon logistics development, and promote the sustainable development of the entire logistics industry.

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