

Green Logistics Practices and Challenges in the Logistics Industry: case study of SF Express

Jiawei Huang¹, Ziyi Shi^{2*}, and Yang Song³

¹International Business School, Fuzhou University of International Studies and Trade, Fuzhou, China, 350299

²School of chemical engineering, Dalian University of Technology, Dalian, China, 116081

³School of German language, Sichuan International Studies University, Chongqing, China, 400031

Abstract. With the rapid development of China's logistics industry, the integration of green logistics has become a key goal to achieve sustainable development. This study examines the current status of green logistics development in China, the challenges it faces, and its practice at SF Express, including the environmental impacts of traditional logistics processes, such as transportation emissions, excessive packaging, and the limited attention paid by companies to green logistics awareness. In addition, this study analyzes SF Express' initiatives to optimize its logistics system, implement green transportation, reduce packaging waste, and promote low-carbon logistics through technological innovations such as drones and new energy vehicles. By adopting a green logistics framework that incorporates the "5Rs" principles, SF Express has made significant progress in reducing its environmental footprint. The study suggests that despite some successes, there are still challenges in promoting green logistics across the industry, such as the need for greater coordination with e-commerce partners and wider adoption of sustainable practices by employees at all levels of the organization.

1 Introduction

Green logistics refers to the fact that by realizing the purification of the logistics environment and maximizing the utilization of logistics resources, the logistics process is suppressed to avoid any harm to the environment [1, 2]. It aims to reduce pollutant emissions and resource consumption, and the ultimate goal of green logistics is sustainable development. And this can be achieved through the integration of economic, social and environmental interests [3], which is achieved through the use of advanced logistics technology and the concept of environment-oriented management for the planning, control, management and implementation of logistics network systems [4]. The rapid development of China's logistics has pushed forward green logistics. China is now in the initial stage of socialist development, and it is also under the background of market economy. Under the market economy background, the rapid development of modern logistics is the main achievement, and green logistics is an important part of modern logistics [5]. Since the development of green logistics

* Corresponding author: shiziyi@mail.dlut.edu.cn

in China, the government has given strong support to the efficient and intelligent logistics of the United States, the theme of Chinese logistics will be green. Therefore, it is necessary to follow the footsteps of the general background, to some extent, to promote the development of green logistics [6].

2 Challenges facing traditional logistics

2.1 Environmental pollution caused by the transport process

The latest data from the State Post Bureau showed that in July 2024, China's express business volume was 14.26 billion pieces, up 22.2% year on year. From January to July, the cumulative volume of express delivery business completed 94.42 billion pieces, an increase of 23.0% year on year. With the rapid development of the express delivery industry, the issue of environmental pollution is receiving more and more attention. The development of online shopping has led to the development of intercity logistics, accompanied by an increase in the number and frequency of express deliveries. The problem of the "last mile" of express delivery needs to be solved urgently. Pollution and other problems usually occur at the end of the courier process. Different modes of transportation can cause environmental pollution and waste of resources. The most important is the damage caused by carbon dioxide emissions, which is contrary to the concept of sustainable development. Establishing low-carbon awareness and developing green and low-carbon logistics is of great importance to China. In the case of SF Express, it uses multiple modes of transportation by sea, land and air. If the rationalization of routes and modes is not controlled, it will lead to environmental pollution and waste of resources.

Courier packaging is a kind of packaging, in order to define the concept of courier packaging, it is necessary to start from the concept of packaging. National standards (GB/T 4122.1-2008). Packaging is defined as the process of circulation to protect the product, facilitate storage and transportation, promote sales, and in accordance with the provisions of technical methods of sales, as well as a general term for containers and auxiliary materials used by prescribed technical methods. It also refers to operational activities The use of certain methods in the use of containers, materials and supplies [7]. With the growth of online shopping, express packaging has become an important packaging category. Unlike traditional packaging, the main function of express packaging is to protect express goods from damage during logistics transportation, facilitate transportation and loading and unloading. It does not attach importance to the role of packaging in promoting sales and is a secondary packaging [8].

Nowadays, festivals such as "Double 11" and "520" have become a shopping frenzy under the marketing of various merchants, and many people wait for these times to promote and consume crazily. As a result, the number of express deliveries increased sharply. According to the data provided by the State Post Bureau, in 2023, China's total express delivery service volume will be 132.07 billion. This is equivalent to an average of about 94 express deliveries per person per year. In 2023, China will consume 132 billion packing boxes, 48 billion meters of adhesive tape and one trillion plastic bags. The length of tape could wrap around the Earth 1200 times, and the resulting packaging waste could fill nearly 200,000 football fields.

However, taking SF Express as an example, the packaging material used is mostly polyethylene, which is widely used and has high stability. Therefore, its properties are difficult to degrade under natural conditions and can cause great harm to the environment. There are many similar situations. Once cartons and foam boxes are discarded, it is difficult to recycle them. SF Express is the leading integrated express logistics service provider in

China, known as the "King of Express", and will handle 11.97 billion parcels in 2023. In addition to the pursuit of performance results, social responsibility is also important. SF Express has always been known for its concept of time stability, precision and worry-free. Behind the high efficiency and safety, it should not be achieved through unnecessary and complex packaging, but should find a scientific and reasonable way to complete it.

2.2 Lack of green logistics concepts among company personnel

At present, the implementation of low-carbon logistics and the implementation of green logistics is imminent; however, the practice of sustainable development strategy remains a major challenge. To achieve this goal, the implementation of green logistics practices in the core business of logistics enterprises should prioritize the cultivation of environmental awareness. In China, most enterprises know little about the concept of green logistics and remain at a shallow level. For the top management of the enterprise, such a concept still maintains the idea that nature is more concerned about profits and personnel management, not to mention the logistics enterprises in the bottom workers, more lack of green logistics concept and awareness. To this end, this study proposes the concept of "5Rs" of enterprise green logistics management. Enterprise green logistics management, that is, the idea of environmental protection is related to every layer, every field, every aspect and every course of business. always consider the environment and the sustainability of the company's supply chain and reflect the green everywhere. This idea can be summarized as the "5R" principle, namely Research environmental protection into the decision-making elements of the company, focus on researching corporate environmental strategies, reduce the use of new techniques and technologies, reduce or eliminate hazardous waste emissions, redesign, transform conventional products into environmentally friendly products, and adopt environmental and environmental protection measures. Reuse, transforming traditional products into environmentally sustainable alternatives and actively adopting "Green Mark" certification; recycle, remanufacture, and reuse used products; rescue, actively participating in environmental restoration activities in the community, and conducting environmental awareness campaigns for employees and the public to establish an ecologically responsible corporate image [9]. From top to bottom, the company should have the concept and awareness of green logistics, and the role of bottom workers is also crucial, only the idea of leadership, the lack of staff cooperation is also not feasible.

3 SF Express green logistics practice analysis

3.1 Optimization and integration, the establishment of a green logistics system

In order to adapt to the developing trend of GTP, it should be optimized and integrated from green purchasing, green manufacturing, green transportation and delivery, green packaging, recycling, and so on. Second, we should consider the use of new technologies such as IOT, big data and AI, etc. in the construction process to improve logistics efficiency and reduce resource waste [10]. Economic coordination and sustainable development are the keys to integration.

At the same time, to strengthen the reform of transportation mode, enterprises can improve the efficiency of transportation, distribution and storage through green transportation, so that the logistics industry is upstream and downstream through the formation of a complete industrial chain, so that the cooperation of both top and bottom management are closely linked, so that the entire logistics sector to operate in an environmentally friendly manner, integrate recycling sources, apply environmentally

friendly and low-carbon policies in all aspects of logistics business. The application of green logistics will contribute to the development of low carbon, environmental protection and eco-civilization.

Second, it is an essential approach to building green logistics and responding to the system by strengthening the training of green logistics personnel in the new retail environment. As the idea of green logistics is gradually promoted, it becomes increasingly important to protect the environment. In order to meet the growing demand for qualified personnel in the field of green logistics, it is necessary to make great efforts to cultivate green logistics personnel. Strengthening the training of green logistics personnel will help improve the overall quality of China's green logistics, which will lay a solid foundation for building a green logistics system.

3.2 Logistics and distribution system and increase distribution efficiency

According to the official data of SF, by the end of 2020, the coverage rate of SF in prefecture-level cities across the country has reached 99.8%, covering 98% of county-level and district-level cities, and at the same time, it has built nine hub transit bases, more than 50 air-railway stations, as well as more than 360 distribution points and nearly 20,000 self-owned shops, which truly meets the comprehensive coverage of the national distribution network. SF Express has been praised by most users for its high punctuality. According to SF's annual report, SF Express has established a series of intelligent and high-tech logistics systems in all aspects of collection, forwarding, transportation and distribution, based on the means of scientific and technological innovation and system technology. As of June 2021, shunting transit equipment investment has increased by more than three hundred percent, including six-side scanning machines, automatic pendulum sorting, modular belt automatic sorting, intelligent sorting car, God's pupil monitoring and so on. "618 Shopping Festival", shunting maximum order volume increased by 36% over the same period last year, order processing capacity increased by 325% over the same period last year, operational efficiency increased by 12%, and customer service satisfaction as high as 98.96%.

The advantages of SF's delivery system are that it is fast, the system is more solid, and the average speed of private couriers is 20% higher than China Post. SF is a private company, but it has aircraft resources and a perfect ground network line. SF Express has a variety of types. Generally, first and second tier cities have the next morning. A class of normal standard shipments are dispatched within 48 hours of receipt. SF land transportation is usually delivered within 72 hours, the latest four days. But accordingly, some problems need to be improved, for example, SF Express e-commerce business process is generally: e-commerce customers mail orders - the company arranges courier department with the pickup - the company's information system data processing - sorting, packaging, distribution - courier department after receiving the order to arrange for special personnel delivery.

There is nothing wrong with such a process in itself. There is a real need for coordination among the various links, otherwise the time cost will increase, the efficiency of work will decrease, and the cost will be affected. In addition, there is a need to strengthen cooperation with low-end and mid-end e-commerce. Compared with other express delivery companies, SF has relatively little cooperation with low-end and middle-end e-commerce, and in the field of e-commerce, low-end and middle-end e-commerce customers are regarded as the main distribution customers. In China, it is still the four-way and one-way (Shentong, Zhongtong, Yuanlong, Bestway and Yunda) that consider the low-end and middle-end as their main customers. Although for SF, the profits brought by low-end and middle-end customers are small, the scale and coverage of low-end and middle-end customers are large, and the accumulation of a small number of customers can also bring high economic benefits.

3.3 Establish an information-sharing platform to achieve resource sharing

SF has achieved rapid delivery of goods to customers by establishing primary distribution and warehousing centers in major cities. A first-level logistics and warehousing center is required to classify, store, pack, and distribute express delivery services. It is necessary to establish a first-level distribution and warehousing center based on e-commerce for logistics and distribution information. At the same time, the system can also be connected to the logistics information system of secondary cities. The logistics and distribution information system can provide real-time updates on the delivery status of goods, speed up logistics response, improve logistics efficiency, and enhance customer confidence. In addition, it must be connected to the logistics and distribution of e-commerce information in first-tier cities. Logistics centers in second-tier cities must organically integrate modern logistics assembly technology and transportation logistics technology, coupled with advanced logistics management methods, to maximize their role in second-tier cities. Chinese express delivery companies, especially private express delivery companies, need to expand their three-tier distribution network to areas where consumer groups are concentrated.

3.4 Logistics technology innovation and the application of new energy

SF has always been at the forefront of technological innovation. SF Express has applied for 2634 patents and obtained 1450 software copyrights, among which, in the first half of 2020, the company's invention patent application volume reached 49%, holding the largest share in the national express delivery industry. By the end of 2022, SF Technologies has applied for 2392 patents and obtained 1806 software copyrights. SF's patents mainly include drones and airplanes, express cabinets and lockers, sorting devices and systems, computer programs and methods, packaging box structures, vehicle compartment detection devices, battery devices and methods, intelligent electronic locks, etc. SF has applied for a wide range of patents covering the entire process from shipping to receiving. For example, drones and airplanes have improved transportation efficiency, avoided situations where goods cannot be delivered promptly due to traffic conditions, and the use of drones can reduce environmental pollution caused by the operation of cars, airplanes, etc. This is in line with the theme of green logistics and reflects the concept of sustainable development. The success of SF's patent application has also changed people's concept of traditional logistics transportation, not only increasing brand value, but also enhancing brand awareness and credibility.

In the context of the dual carbon target, SF Express has contributed its wisdom and strength in green packaging and green transportation. How to achieve green logistics while ensuring steady growth of business benefits, SF Express has provided its answer. In recent years, SF Express has actively responded to the call of the country and gained a deeper understanding of the practice of the concept of green environmental protection. The importance of color development. Efforts to build a sustainable green logistics supply system should integrate services. By optimizing and improving business operations, providing services to the entire industry and society can create positive effects. The company has actively responded to the "dual carbon" strategy, and has carried out various energy conservation and emission reduction efforts nationwide. Increasing investment in new energy promotes the green transformation of enterprises. Advocate green packaging, promote green office, continuously improve resource utilization efficiency, reduce carbon dioxide emissions, reduce energy consumption, and fulfill environmental responsibility.

4 Conclusion

The development of China's logistics industry started relatively late, but the overall trend is positive. At present, the government provides significant policy support for the logistics industry. Logistics companies are also actively responding to the national call and striving for development. However, there are still some problems in the development of the logistics industry, such as environmental pollution and waste of packaging materials. It is believed that with the joint efforts of the government, enterprises, and the public, these problems will be solved, and the logistics industry will tend towards high-quality development.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

1. A. Pazirandeh, H. Jafari, Making sense of green logistics. *Int. J. Prod. Perform. Manag.* **62**(8), 889-904 (2013)
2. W. Zhang et al., What influences the effectiveness of green logistics policies? A grounded theory analysis. *Sci. Total Environ.* **714**, 136731 (2020)
3. U. Al-Minhas et al., Corporate environmental management: A review and integration of green human resource management and green logistics. *Manag. Environ. Qual. Int. J.* **31**(2), 431-450 (2020)
4. Z. Guirong, et al., Green logistics and Sustainable development. 2012 *Int. Conf. Inf. Manag. Innov. Manag. Ind. Eng.* **1**: 131-133 (2012)
5. A. Alexander, Building Green Transport Ecosystem in the Operation of Logistics in the Kingdom of Saudi Arabia. *Int. J. Oper. Logist. Manag.* **5**(1), 42-54 (2016)
6. X. Meng, L. Gu, Analysis on the Development of Green Logistics. *Sci. Technol. Wind.* **4**, 124-125, 136 (2021)
7. X. Zhu, Exploration of Packaging Issues in the Express Delivery Industry Based on the Green Logistics Concept. *Logist. Eng. Manag.* **39**(9), 39-40 (2017)
8. Y. Lin, Y. Jiang, Y. Wu, Research on the Differences between Online Shopping Packaging and Traditional Packaging. *Packag. World.* **3**, 10-11, 14 (2016)
9. W. Balwan, et al., 5R's of zero waste management to save our green planet: A narrative review. *Eur. J. Biotechnol. Biosci.* **10**(1), 7-11 (2022)
10. L. Lv, Research on Green Logistics System Based on New Retail Environment. *China Bus. Rev.* **33**(14), 105-108 (2024)