Proceedings of the 2nd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/65/20231629

Sustainable Supply Chain Strategies in E-Commerce: Case Studies of Amazon and Cainiao

Jiaqi Luo[1,a,*]

[1]*W.P. Carey School of Business, Arizona State University, Tempe, AZ, 85281, United States*
a. Jluo73@asu.edu
**corresponding author*

Abstract: Sustainability has become a core issue of increasing concern to e-commerce companies. However, admit that this area's promotion and implementation is still in a relatively early stage of development. This study focuses on the e-commerce and supply chain giants in China and the United States, namely Amazon in the United States and Cainiao, a logistics subsidiary of China's Alibaba Group. During the investigation, the detailed green supply chain management strategies of e-commerce giants such as Amazon and Cainiao, including their innovative measures in energy use, logistics efficiency, packaging materials, carbon emission control, etc. These strategies aim to reduce adverse environmental impacts while improving operational efficiency and achieving sustainability goals. In addition, it also provides an in-depth understanding of the increase in carbon emissions of cross-border e-commerce companies within a specific time range, as well as the progress made in reducing their carbon footprint. This research aims to provide strong guidance and support for future emerging e-commerce companies, helping them progress in sustainable supply chains more successfully while contributing to realizing global sustainable development goals.

Keywords: Sustainable Supply Chain, E-Commerce, Amazon, Cainiao

1. Introduction

The concept of a sustainable supply chain originated from sustainable development [1]. The concept and practice of a sustainable supply chain have gradually developed in multiple fields, including international initiatives, corporate social responsibility (CSR), environmental protection organizations, and social public opinion. This concept emphasizes the importance of comprehensively considering economic, social, and environmental factors in supply chain management and has become one of the core elements of modern supply chain management [2-5]. It means that economic benefits should be pursued in supply chain management, and social and environmental factors should also be considered [6]. These issues have aroused global concern about the damage to the earth's ecosystems, the increase in resource scarcity, and the threat of climate change. Society's increasing demands for environmental protection, human rights, and ethical economy place higher ethical and legal responsibilities on businesses. Some companies are beginning to incorporate social responsibility and sustainability into their supply chain management and publish CSR reports on supply chain practices [7]. This helps drive sustainability in supply chain management.

E-commerce companies should adapt to this emerging social background and actively lead the trend of sustainable development to meet increasingly stringent environmental regulations and social

DOI: 10.54254/2754-1169/65/20231629

expectations [8]. For enterprises, establishing a sustainable supply chain has become critical to maintaining corporate reputation and competitiveness. Consumers are more likely to support brands that actively focus on environmental, social, and governance (ESG) issues [9]. Therefore, e-commerce companies need to ensure the sustainability of their supply chains and promote this to win the trust and loyalty of their customers. Sustainable supply chains also help reduce business risks, reduce unnecessary costs, and increase supply chain transparency and stability [10].

This study aims to explore the importance of sustainable supply chain development for e-commerce companies. By analyzing cases of well-known global companies, this study the impact of sustainable supply chains on e-commerce companies, providing e-commerce companies with specific strategies and methods to achieve sustainable development goals. Through this study, the value of sustainable supply chains to e-commerce companies' competitive advantage and long-term sustainability can be better understood. Promote enterprises to participate more actively in sustainable development to achieve the triple victory of economy, society, and environment. This will also help e-commerce companies better adapt to the changing business environment in the future and stand out in global competition.

2. Case Analysis: Amazon

Amazon is a global giant in e-commerce and cloud computing and is recognized as one of the largest online retailers in the world. The company was founded in 1994 and has rapidly developed into a multinational enterprise with an extensive global customer base. Amazon provides an online sales platform for various goods and services and has made outstanding achievements in cloud computing, artificial intelligence, and logistics.

Regarding sustainable supply chain development, Amazon has been actively promoting sustainability and environmental protection initiatives. The company is committed to reducing carbon emissions by investing in renewable energy, optimizing logistics and packaging, and promoting electric delivery vehicles. Amazon has also committed to achieving net-zero carbon emissions by 2040. It co-founded "The Climate Pledge" in 2020 to advocate for other companies to reduce their carbon footprints.

Amazon's sustainable supply chain development analysis will be presented in three dimensions, referencing the official disclosure of the Building a Better Future Together 2022 Amazon Sustainability Report. The discussion will revolve around Amazon's primary focus areas at a macroscopic level, namely, the initiatives related to Driving Climate Solutions, Reducing Packaging and Waste, Protecting Natural Resources, Advancing Human Rights, and Innovating Products and Services. The second dimension will delve into Amazon's adherence to environmental criteria for its suppliers, as stipulated in the Amazon Supply Chain Standards. Lastly, the examination will encompass Amazon's practical projects to reduce carbon emissions. This comprehensive overview will serve as a valuable reference for e-commerce enterprises, offering insights from a macroscopic perspective and specific operational strategies, thereby inspiring the pursuit of a more sustainable future for all stakeholders.

2.1. Five Focus Areas

2.1.1. Driving Climate Solutions

Amazon is investing heavily in renewable energy, such as wind and solar, to meet its operational needs and significantly reduce the carbon footprint of its electricity purchases. This initiative helps reduce the carbon footprint and actively promotes the growth of the renewable energy industry. Amazon has also demonstrated its ambition in global climate leadership by co-creating the Climate Pledge, pledging to achieve net-zero carbon emissions by 2040, exceeding the goals of the Paris

DOI: 10.54254/2754-1169/65/20231629

Agreement, and conveying the critical role of business to the world. In addition, Amazon is actively developing renewable energy projects and introducing new wind, solar, and energy storage projects to reduce its reliance on carbon-based energy and positively contribute to transforming a low-carbon energy system.

2.1.2. Reducing Waste and Packaging

Amazon is actively working to improve packaging performance and sustainability by reducing packaging waste through adopting Ships In Own Containers (SIOC). The overarching goal is to select recyclable materials and ensure product packaging is suitable and easily recyclable, minimizing waste and safeguarding delivery integrity. Amazon emphasizes avoiding unnecessary packaging and works hard to eliminate non-essential packaging. Introducing lighter, right-sized packaging options aims to reduce waste and carbon emissions while ensuring product safety. Additionally, Amazon actively pursues low-waste packaging types and reduces high-waste packaging options year after year. Prioritize automation and right-sized packaging to drive sustainability efforts. Even where automation is impossible, they optimize packaging size and weight options in fulfillment centers to further reduce packaging waste.

2.1.3. Protecting Natural Resources

Amazon is deeply committed to responsible stewardship of its natural resources while actively investing in conservation and restoration programs. They are deeply aware of the increasing pressure on the planet from global natural resource extraction, which has tripled since 1970. Amazon is actively moving toward a more sustainable future by promoting a circular economy that eliminates waste, recycles resources, and regenerates nature, seeking to reintroduce more materials into the cycle and reduce waste caused by customer fulfillment operations and remaining inventory. These efforts help protect natural resources and are closely linked to other sustainable development goals, such as reducing waste, promoting human rights, and responsible supply chain practices. Amazon's comprehensive commitment to resource stewardship and sustainability provides a strong foundation for a more sustainable future.

2.1.4. Advancing Human Rights

Amazon's human rights strategy is based on international standards and frameworks established by the United Nations and the International Labor Organization (ILO). It incorporates its practices into the Global Human Rights Principles, emphasizing its unwavering support for fundamental human rights and the dignity of people associated with its operations. They regularly review policy and actively work with external stakeholders to identify areas for improvement, using changing international and industry human rights standards as a yardstick. Amazon's human rights commitment extends to its products, services, and growth. It aims to address human rights risks and take a more assertive human rights-based approach to ensure its business is sustainable and meets the highest global human rights standards.

2.1.5. Innovating Our Products and Services

Amazon continues to innovate to provide customers with more ways to purchase sustainable products. The company is extending its ReCommerce service to sellers, allowing them to grade, resell, liquidate, or donate returned, damaged, or overstocked products. In 2022, Amazon helped US third-party sellers successfully resell 2 million "second-hand" items and supported sellers in Europe and the United States to wholesale sell millions of items and donated millions of items. Additionally, the company

DOI: 10.54254/2754-1169/65/20231629

is committed to making its products more sustainable, using responsible sourcing of materials, and working with supply chain partners to drive the adoption of new regulations and compliance requirements. Amazon advocates for strict standards to limit negative social and environmental impacts while providing customers with new and better ways to purchase sustainable products. This initiative series demonstrates Amazon's commitment to sustainability and responsible operations.

2.2. Environmental Principles for Supplier Compliance and Sustainability

Suppliers must comply with environmental principles to ensure respect for a clean, healthy, and sustainable environment. This includes complying with environmental regulations and reducing adverse environmental impacts, such as energy use, air and greenhouse gas emissions, waste generation, water use, pollution, and hazardous substances.

At the same time, suppliers are encouraged to actively participate in efforts to support environmental sustainability, such as conducting environmental due diligence and integrating environmentally sustainable practices throughout their operations and supply chains.

In addition, suppliers are urged to continuously improve energy efficiency and reduce energy consumption and greenhouse gas emissions, requiring them to track, record, and report greenhouse gas emissions to Amazon. Suppliers are responsible for obtaining and maintaining all necessary environmental permits, approvals, and registrations and complying with applicable operating and reporting requirements.

Regarding the use and handling of hazardous substances, suppliers must comply with relevant laws and regulations, effectively identify and manage the safe handling, movement, storage, and disposal of dangerous substances that threaten humans or the environment, and provide appropriate training to workers.

Additionally, suppliers must establish effective resource management systems to comply with regulatory requirements and promote optimal performance. Finally, suppliers are encouraged to assess and address environmental equity issues and pay attention to the ecological impacts of their operations on employees and communities, particularly vulnerable and marginalized communities that may face higher environmental risks from pollution caused by industrial and consumer activities. These six principles constitute a supplier's comprehensive commitment to environmental protection.

2.3. Practical measures to reduce carbon emissions

2.3.1. Collaborate with Open Supply Hub to improve supply chain transparency.

Open Supply Hub is an Amazon partner that provides open access to global supply chain data, including the location of production facilities and the ecosystem surrounding the facilities. The Open Supply Center helps build and open the largest cross-commodity supply chain database by allowing merchants in the industry to share their data. Moreover, it provides merchants a platform to collaborate and share information, increasing supply chain transparency. With Amazon's commitment to reducing carbon emissions, the Open Supply Hub contributes to a more environmentally sustainable and transparent supply chain landscape.

2.3.2. Transportation: Decarbonizing ocean shipping and electric delivery vans

Amazon has recently forged a strategic partnership with the shipping and logistics leader, Maersk, to facilitate the transportation of goods using methanol—a fuel known for its lower greenhouse gas emissions than traditional alternatives. In a pioneering endeavor, the Laura Maersk, the world's first zero-emission-capable cargo ship, embarked on its inaugural voyage, transporting Amazon's shipping containers from Shanghai to Rotterdam. This groundbreaking collaboration underscores

DOI: 10.54254/2754-1169/65/20231629

Amazon's commitment to decarbonizing its transportation network while showcasing the potential for cleaner shipping practices. At the forefront of this endeavor is Laura Bowen Wegener, Amazon's Head of Ocean Shipping Decarbonization, whose pivotal role has been instrumental in driving this initiative forward. Notably, Amazon is ready to invest in eco-friendly shipping solutions, readily opting for vessels that emit a remarkable 95% fewer emissions than their conventional counterparts.

Amazon is committed to decarbonizing its transportation network across various segments, including inbound transportation, middle-mile transportation, and last-mile delivery. Inbound transportation involves transporting shipments across international borders using road, rail, air, and water transportation. Middle-mile transportation refers to moving shipments between Amazon facilities, primarily done by trucks. Amazon is experimenting with lower-carbon options such as renewable natural gas, battery-electric, and hydrogen-powered trucks. They are also planning to power their middle-mile transportation fleet with ultra-low-carbon electrofuels starting in 2023. Amazon has implemented micromobility solutions in Europe and the US to enable shorter deliveries on foot or by e-bike. They have launched micro-mobility hubs in multiple cities and have partnered with other companies to shift the industry towards lower-carbon solutions. Amazon has deployed thousands of electric vehicles across Europe and India, including delivery vans, e-cargo bikes, and e-rickshaws. They have plans to invest EUR1 billion to double their European zero-emissions fleet for middle- and last-mile deliveries over the next five years.

3. Case Analysis: Cainiao

As a global leader in e-commerce logistics from China, Cainiao remains as focused on environmental protection as ever. The "ESG Report" released by Alibaba Group on July 24, 2023, showed that in fiscal year 2023, Cainiao reduced the use of packaging materials by more than 184,000 tons, and Cainiao Station recycled and reused 23.82 million cartons, setting a new high. Currently, Cainiao has built a full-link green logistics system to promote the realization of logistics carbon reduction goals and system transformation from the five main logistics link links: ordering, packaging, transportation, warehousing, and recycling.

With the rapid growth of the e-commerce industry, the efficiency and sustainability of logistics links have become critical factors for corporate competition. This paper aims to deeply explore the intelligent development of logistics links and innovative practices in the packaging field of companies that provide logistics services for e-commerce. Whether it is a detailed analysis of Cainiao's intelligence development or its packaging innovation, it focuses on initiatives to reduce packaging material waste, improve packaging sustainability, and provide customer satisfaction. By profoundly studying these two key areas, this paper aims to provide valuable insights for research in e-commerce logistics and packaging and provide valuable references for future sustainable supply chain and intelligent logistics development.

3.1. Digital Intelligence Circular Logistics

In terms of concrete implementation, in the five significant logistics links of ordering, packaging, shipping, warehousing, and recycling, Cainiao has linked up with consumers and suppliers, exploring ways to optimize digital intelligence, energy transformation, and shift in the use of packaging materials to promote the goal of carbon reduction in logistics as well as the realization of system transformation. According to the calculations, Cainiao has reduced carbon emissions by 21,003.2 tons by installing rooftop photovoltaic and clean energy trading. In comparison, Alibaba's digital supply chain team has reduced carbon emissions of the value chain by 28,771.7 tons through the digital management of the order and transportation links.

DOI: 10.54254/2754-1169/65/20231629

3.2. Smart Packaging

Packaging reduction: Develop simple packaging solutions that meet the characteristics of different industries to reduce the use of cartons from the source; actively promote the shipment of original boxes and old packaging. In fiscal year 2023, the total consumption of packaging materials will be reduced by more than 184,000 tons.

Packing optimization: Develop packaging material planning and algorithm optimization that are suitable for different industries, different warehouses, and different categories, continue to improve the total rate of cartons, and strive to reduce the usage of cartons.

Packaging recycling: Use recycling boxes instead of disposable cartons in logistics warehouse operations and terminal transportation links to reduce the number of cartons used. For example, In Tmall Supermarket, couriers will use recycling boxes and simple packaging instead of disposable cartons.

Packaging recycling: Cainiao will continue to invest energy, time, and resources in the packaging recycling of logistics stations and encourage consumers to leave cartons at Cainiao Station when picking up packages so that the station staff can use them again when sending out packages. When consumers send mail, we also provide them with the option of "sending in old boxes" to guide consumers to participate in the circular economy. In fiscal year 2023, Cainiao Station digitally recorded the number of recycled and reused cartons reaching 23.82 million.

In addition, Cainiao implements a range of strategies to ensure seamless collaboration with merchants. This includes offering real-time recommendations for optimal delivery methods, employing electronic shipping labels for simplified package identification and tracking, utilizing intelligent sorting to provide express companies with the best route options, and optimizing inventory allocation based on historical sales data, allowing merchants to prepare goods at the nearest warehouse. The integration of Caikou partner smart warehouses enhances packaging and shipping efficiency. Cainiao provides food pick-up stations for last-mile delivery solutions, while the Caiguoguo App is a comprehensive platform for one-stop ordering, package tracking, and various logistics services. Furthermore, Caiyu aggregates data across the logistics chain and shares it with partners through its cloud platform.

4. Conclusion

Through case analysis of two world-renowned e-commerce companies, this study provides specific strategies and methods for e-commerce companies to achieve sustainable development goals. By profoundly studying Amazon’s practices, e-commerce companies can learn the following key points to achieve sustainable supply chain development:

First, e-commerce companies should focus on five key areas. The first is promoting climate solutions that include aggressive investment in renewable energy sources such as wind and solar to reduce carbon emissions. Secondly, regarding reducing waste and packaging, e-commerce companies should continue to improve packaging performance and sustainability. In addition, e-commerce companies must actively promote human rights, emphasize support for human rights and dignity based on international human rights standards. Finally, e-commerce companies should continue to innovate products and services, promote the innovation of sustainable products and services.

In addition, e-commerce companies also need to comply with supplier supply standards, especially environmental standards. Suppliers must comply with environmental principles, including environmental regulations, reduced energy use, reduced carbon emissions, reduced waste generation, reduced water use, and reduced use of pollution and hazardous substances while actively supporting environmental sustainability.

DOI: 10.54254/2754-1169/65/20231629

Regarding practical measures to reduce carbon emissions, e-commerce companies can adopt various strategies—first, support platform cooperation and information sharing to improve supply chain transparency. Secondly, e-commerce companies should focus on the transportation sector, especially attempts to decarbonize maritime transport and electric delivery vehicles.

Finally, by learning from Cainiao's successful model, e-commerce companies can gain inspiration in logistics planning and packaging. Cainiao builds a full warehouse green logistics system by connecting the five main logistics links of ordering, packaging, transportation, warehousing, and recycling to promote digital intelligent circular logistics to achieve logistics carbon reduction goals and system transformation.

These points provide e-commerce companies with essential guidance on developing sustainable supply chains, helping achieve sustainability goals, reducing adverse environmental impacts, and meeting growing consumer demands. The e-commerce industry has enormous potential for sustainable supply chains, and this research aims to provide support for emerging e-commerce companies in the future to help them achieve more successful sustainability progress while contributing to the achievement of global sustainable development goals.

References

[1] *Boons, F., Baumann, H., & Hall, J. (2012) Conceptualizing sustainable development and global supply chains. Ecological Economics, 83, 134-143.*

[2] *Eltayeb, T., & Zailani, S. (2014) Going green through green supply chain initiatives toward environmental sustainability. Operations and Supply Chain Management: An International Journal, 2(2), 93-110.*

[3] *Bhardwaj, B. R. (2016) Role of green policy on sustainable supply chain management: A model for implementing corporate social responsibility (CSR). Benchmarking: An International Journal, 23(2), 456-468.*

[4] *Wu, Z., & Pagell, M. (2011) Balancing priorities: Decision-making in sustainable supply chain management. Journal of Operations Management, 29(6), 577-590.*

[5] *Damberg, S. V., Hartmann, J., & Heese, H. S. (2022) Does bad press help or hinder sustainable supply chain management? An empirical investigation of US-based corporations. International Journal of Production Economics, 249, 108504.*

[6] *Mefford, R. N. (2011) The economic value of a sustainable supply chain. Business and Society Review, 116(1), 109-143*

[7] *Hsueh, C. F. (2015) A bilevel programming model for corporate social responsibility collaboration in sustainable supply chain management. Transportation Research Part E: Logistics and Transportation Review, 73, 84-95.*

[8] *Prajapati, D., Chan, F. T., Chelladurai, H., Lakshay, L., & Pratap, S. (2022). An Internet of Things embedded sustainable supply chain management of B2B e-commerce. Sustainability, 14(9), 5066.*

[9] *Wang, Z., & Sarkis, J. (2013) Investigating the relationship of sustainable supply chain management with corporate financial performance. International Journal of Productivity and Performance Management, 62(8), 871-888.*

[10] *Gouda, S. K., & Saranga, H. (2018) Sustainable supply chains for supply chain sustainability: impact of sustainability efforts on supply chain risk. International Journal of Production Research, 56(17), 5820-5835.*