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Green Logistics Practice of E-commerce Platform: Taking Douyin as an Example

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Abstract: Green logistics focuses on integrating environmental sustainability into logistics and supply chain management by improving transportation efficiency and reducing environmental impacts. Some short-video e-commerce platforms like Douyin have already run into this problem that high return rates lead to excessive packaging waste and increased carbon footprints. This essay focuses on Douyin's e-commerce logistics operations, examining its environmental challenges and exploring some feasible green logistics practices. By using case study methods and referencing the global best practices in green logistics, this study identifies sustainable logistics solutions tailored to Douyin's operations. The findings suggest that implementing recyclable packaging, optimizing return management, and enhancing distribution efficiency can significantly reduce carbon emissions while strengthening brand reputation. Furthermore, this study highlights that increasing regulatory pressure and consumer awareness are pushing the transition toward sustainable logistics in e-commerce. This research provides strategic recommendations for e-commerce platforms that seek to implement sustainable logistics practices. It also highlights that green logistics is not only essential for mitigating environmental impact but also a key factor in strengthening corporate competitiveness.

Keywords: E-commerce, Green logistics, Douyin

1. Introduction

The rapid expansion of e-commerce has changed consumer behavior such as Douyin that led to the significant growth in online sales. This digital transformation brings a lot of convenience to consumers which allows consumers to shop anytime and anywhere. The ease of access combined with personalized recommendations driven by AI, has accelerated online consumption patterns, increasing the pressures on supply chains and significantly impacting the environment.

However, this convenience has caused some environmental problems which are related to the distribution of goods impacting the air condition, increasing carbon emissions, and contributing to global warming [1]. In response, governments and the industry worldwide are emphasizing low-carbon development and encouraging businesses to adopt eco-friendly practices. Policies such as carbon neutrality targets, green supply chain initiatives, and environmental regulations push the company to integrate sustainability into their operations. Businesses that fail to transition to greener models may face increasing regulatory pressures and reputational risks.

Douyin's e-commerce activities nowadays face a significant issue – high return rates, which largely increased the environmental burdens through the reverse logistics process. This includes handling

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returned goods, managing excess packaging, and addressing the carbon emissions that are associated with transportation [2]. These challenges make it urgent for Douyin to adopt sustainable green logistic practices.

Green logistics offers a solution for supply chain management to enhance logistics efficiency and reduce the environmental impact [3]. For Douyin, several strategies can be implemented to mitigate its environmental footprint. Eco-friendly and recyclable packaging can significantly reduce waste and using electric and low-emissions delivery vehicles can optimize transportation routes and cut down carbon emissions. Additionally, using AI to forecast inventory can help minimize unnecessary delivery.

This essay underscores the necessity for Douyin to adopt green logistics solutions to address its high return rates and reverse logistics challenges. While previous research has explored green logistics in traditional supply chains, limited studies focus on its application within high-return e-commerce models. This study aims to bridge that gap, highlighting how a rapidly growing platform like Douyin can balance growth with environmental responsibility. By implementing sustainable logistics strategies, Douyin can not only improve operational efficiency but also align with global sustainability efforts, ultimately contributing to a greener e-commerce ecosystem.

2. Douyin's E-Commerce Model and Environmental Challenges

Douyin, originally a short video platform, has become a major player in e-commerce through live streaming and influencer-driven sales [4]. Live streaming allows the sellers to engage with consumers in real-time, providing interactive demonstrations and answering questions that pop up instantly, which can enhance consumers' trust and push impulsive purchases. Douyin's unique business model leverages a combination of social commerce, AI-driven recommendations, and interactive shopping experiences to engage consumers [5]. Unlike traditional e-commerce platforms, Douyin integrates entertainment with shopping, making the purchasing process more dynamic and engaging.

2.1. Douyin's E-commerce Model

There are several e-commerce models in Douyin. The first model is the basic model through short videos and live-streaming sales where influencers and merchants promote products by engaging content. This kind of model can increase high engagement and rapid transaction conversions. Additionally, Douyin uses multi-channels for sales including direct merchant stores, influencer partnerships, and third-party brand collaborations that can enable diversified revenue streams. Furthermore, Douyin also integrates social elements such as user-generated content, live comments, and influencer endorsements so that the users can seamlessly purchase products displayed in the videos or live streams [6]. While Douyin's e-commerce model has revolutionized digital shopping, it presents several environmental challenges that require urgent attention.

2.2. Environmental Challenges

One of the primary environmental challenges is the high return rate, particularly in the clothing sector where the return rates can reach 30-40% [7]. According to recent studies, the acreage return rate for online purchases is between 20-30%, significantly higher than traditional retail [8]. The ease of returns on Douyin encourages consumers to purchase multiple sizes or styles with the intention of returning unwanted items, which significantly increases logistic waste. The environmental cost of reverse logistics includes additional transportation, secondary packaging such as plastic bags, and disposal. All these processes can contribute to excessive emissions and inefficiencies in the supply chain. A large volume of returns pushes some additional pressures on the environment, leading to

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serious concern [8]. More broadly, logistics is the top source of carbon emissions from Chinese e-commerce, accounting for 29.16% of total emissions, compared to packaging at 18.04% [9].

Another critical challenge is excessive packaging. In 2020, more than 16 million tons of waste came from packaging in China, with over 80% generated by e-commerce orders. The waste from express deliveries in 2018 is responsible for 44.03% of cardboard boxes and 33.5% of packaging released. The production, use and disposal of such packaging releases 13.03 million tons of carbon dioxide [9]. Many e-commerce sellers on Douyin rely on plastic wraps, bubble mailers, and some other non-recyclable materials to protect goods during delivery. While these materials can ensure the safety of products, they also contribute to rising environmental waste and pollution. Additionally, consumer expectations for fast and free shipping push unsustainable logistics practices, increasing emissions and resource consumption [10].

Beyond logistics and packaging, Douyin also faces increasing pressures from China's environmental policies aimed at promoting low-carbon development. Policies such as the "Green Packaging Guidelines and Incentives" emphasize sustainable practices in logistics and e-commerce, encouraging companies to adopt eco-friendly packaging, optimize transportation networks, and reduce carbon footprints [11]. Regulations like China's "Plastic Restriction Order" limit the use of non-degradable plastic packaging, pushing e-commerce platforms to implement greener alternatives [12]. While these policies promote a more sustainable industry, they also give some financial and operational challenges for small and medium-sized merchants on Douyin that must balance regulatory compliance with cost efficiency.

Moreover, shifting consumer expectations toward sustainability adds to Douyin's challenges. Consumers are increasingly favoring eco-friendly products and brands, pushing e-commerce platforms to integrate green supply chain practices. However, maintaining a balance between affordability, quality, and sustainability is very complex.

3. The Role of Green Logistics in Addressing Douyin's Challenges

Green logistics can provide practical solutions for Douyin to address its environmental challenges. One of the primary approaches is eco-friendly packaging. Leading global e-commerce platforms such as Amazon have implemented sustainable packaging initiatives by reducing unnecessary packaging materials, promoting recyclable options and optimizing package sizes. Amazon's "Frustration-Free Packaging" Program, for example, encourages suppliers to use minimal, recyclable and easy-to-open packaging to reduce waste [13]. Douyin can follow this trend by giving some incentives to merchants to transition to plant-based plastics, biodegradable materials and reusable packaging solutions. This solution can not only reduce waste but also appeal to environmentally conscious consumers.

Another solution is optimizing reverse logistics. By enhancing product descriptions and applying stricter return policies, Douyin can help reduce unnecessary returns. Additionally, Douyin can collaborate with its logistics patterns to establish centralized returns hubs to consolidate delivery and reduce the number of individual returns which can highly lower carbon emissions.

The last solution is the widespread adoption of electric vehicles (EVs) for delivery operations. The use of EVs significantly reduces greenhouse glass emissions and lowers dependence on fossil fuels, which can make the logistics more sustainable. By partnering with green logistics providers, Douyin can transition its delivery model towards EVs, ensuring that most deliveries are handled through low-carbon transportation. EV adoption aligns with global trends in sustainable e-commerce logistics where companies like Alibaba and JD.com have invested in electric delivery fleets to minimize their carbon footprint [14].

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4. Challenegs in Implementing Green Logistics for Douyin

Though there are some benefits, there are still several challenges with green logistics practices. The first challenge is the cost. Using electric vehicles and sustainable packaging often needs high and substantial investment. So Douyin needs to balance the high cost with the long-term environmental benefits. Another challenge is supply chain complexity. Doyin's merchants source products from a wide range of suppliers, many of whom may not meet the sustainability requirements. Ensuring all stakeholders comply with green logistics practices, partners may resist the transition due to technology limitations or concerns over cost and efficiency. Consumer behavior also plays a role in the success of green logistics. While sustainability is becoming a priority for many shoppers, price and convenience often remain the primary consideration when purchasing products. Encouraging consumers to adopt eco-friendly delivery options may require some incentives.

5. Application of Emerging Technologies

In addition, emerging technologies such as Artificial Intelligence (AI)and Blockchain are playing an important role in optimizing operations and reducing its environmental footprint. For example, AI can help Douyin improve delivering routes and manage returns more efficiently which can help reduce carbon emissions. Al can also help Douyin identify the high-demand area and suggest the optimal delivery routes by analyzing historical data.AI can also enhance product recommendations to minimize returns by ensuring consumers receive accurate size and product details.

Blockchain technology can provide transparency in the supply chain which can allow the consumers to track the sustainability of their purchases. These can build the customer's trust and encourage environmentally conscious purchasing decisions. A case study of Walmart's use of blockchain in food tracking shows how the technology can ensure product sustainability. By implementing blockchain, Walmart can reduce food waste and improve the supply chain efficiency which can allow the consumer to track their food from farm to table. Douyin can leverage this similar technology to improve transparency in its e-commerce operations.

6. Conclusion

The rapid growth of Douyin in the field of e-commerce has driven business development, but at the same time, it has also caused severe environmental challenges, especially the problem of excessive packaging and waste caused by high return rates. Therefore, adopting green logistics practices has become a key path for Duyin to address environmental challenges. By introducing environmentally friendly packaging materials, optimizing reverse logistics processes, and promoting electric vehicles for cargo distribution, Douyin can not only reduce environmental burdens but also establish a positive corporate image. In addition, combining cutting-edge technologies such as artificial intelligence and blockchain can significantly improve logistics efficiency, further reduce carbon emissions, and enhance the transparency and traceability of the supply chain.

Future research should explore in depth how diversified green logistics strategies affect consumer purchasing intentions and the overall profitability of e-commerce. Faced with increasingly strict environmental regulations, Duyin's flexible adaptability and innovative ability in the field of sustainable logistics will become an important factor in leading the trend of green e-commerce development and setting industry benchmarks.

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