Implementation of a Green Supply Chain in Increasing Competitive Advantage in the Manufacturing Industry

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Abstract

Green supply chains include strategies and practices that aim to reduce environmental impacts and increase resource efficiency throughout the production process. With global attention to sustainability, implementing green supply chains is considered a critical step in maintaining a balance between industrial growth and environmental conservation. This research aims to investigate the impact of implementing a green supply chain on increasing competitive advantage in the context of the manufacturing industry. This research uses a qualitative approach with descriptive methods. The results of this research show that implementing a green supply chain in the manufacturing industry can have a significant positive impact. By optimizing the use of natural resources and energy, reducing production waste, and involving suppliers who adhere to sustainable practices, companies can achieve high operational efficiency. Production cost savings obtained from green supply chain practices can increase a company's profitability, while a company image that cares about the environment can attract customers who increasingly prioritize sustainability. In addition, close engagement with suppliers and encouragement of innovation in production processes results in economic sustainability and flexibility that allows companies to respond more effectively to changing markets and customer needs.

Keywords: *Green Supply Chain, Competitive Advantage, Manufacturing Industry.*

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A. INTRODUCTION

Changes in the new industrial era have given rise to a new paradigm where companies are expected to not only focus on growth and profit alone, but must also be responsible for the environmental impacts produced by their operational activities (Drucker, 1998). In this context, the concept of Green Supply Chain Management (GSCM) emerged as a strategic approach that aims to integrate sustainability practices into the entire supply chain (Malviya & Kant, 2015). GSCM emphasizes the importance of reducing waste and pollution, as well as increasing the efficiency of resource use in the production process (Singh & Trivedi, 2016).

Green Supply Chain Management requires companies to achieve a balance between marketing performance and environmental issues (Yidiz et al., 20190. This drives the adoption of practices focused on saving energy, reducing waste and increasing operational efficiency. As consumers increasingly care about the environment, companies are faced with the need to improve their supply chains to be more sustainable (Laosirihongthong et al., 2013)

The importance of improving work networks and improving supply chains is the main cluster in implementing GSCM. This involves a revolution in process

management, including the delivery of products and services (Chan et al., 20120. Companies recognize that to achieve waste reduction and operational efficiency, they need to pay attention to their entire supply chain, from raw materials management to final product disposition (Abdallah & Al-Ghwayeen, 2020).

The main goal of the Green Supply Chain is to consider the environmental impact of the entire product life cycle and production process. This involves a holistic evaluation of each stage, from procurement of raw materials to production, distribution, use of the product by consumers, to finally disposition of the product (Tseng & Geng, 20120. In doing so, companies are expected to be able to identify opportunities to reduce their environmental footprint and simultaneously increase their efficiency and competitiveness in the market (Shrivastava, 1995).

According to Dheeraj & Vishal (2012), Green Supply Chain Management (GSCM) is an innovation in implementing a supply chain strategy that is rooted in the environmental context. This concept includes a number of activities, such as reduction, recycling, reuse and material substitution. GSCM is not only limited to sustainability during the production process, but involves the entire product life cycle from start to finish (Verma et al., 2018).

Kalpande & Toke (2021) provides further explanation by illustrating that GSCM involves the integration of an environmental perspective into supply chain management. This includes product design, selection and selection of raw material sources, manufacturing processes, delivery of the final product to consumers, and even management of the product after its end of life. In other words, GSCM pays attention to the environmental impact of the entire supply chain, ensuring that each stage is carried out with sustainability principles in mind (Muma et al., 2014).

Overall, the GSCM concept is based on an environmental perspective, which focuses attention on how to reduce waste and environmental impacts generated by all industrial company supply chain activities (de-Oliveira et al., 2018). Understanding and applying this concept is a very important long-term non-financial aspect. Companies are expected to be able to consider this environmental responsibility in maintaining good relations with stakeholders, as well as to achieve sustainability of their supply chain activities in the longer term (Ghobakhloo et al., 2013). Thus, GSCM is not only a business strategy, but also an ethical basis for maintaining a balance between industrial growth and environmental preservation (Balon, 2020).

This research has an in-depth aim to investigate the real impact of implementing a Green Supply Chain in the manufacturing industry. By identifying concrete practices implemented by companies, this research aims to provide a deeper understanding of how implementing green supply chains can increase competitive advantage, reduce negative impacts on the environment, and change operational dynamics in manufacturing company supply chains. The benefits of this research are not only limited to conceptual understanding, but will also provide useful practical insights for manufacturing companies in their efforts to achieve harmony between efficient operational performance, competitive advantage, and environmental responsibility which is increasingly important in the current industrial era.

B. METHOD

This research uses qualitative methods to analyze socio-political phenomena in society. This method was chosen because the author wanted to understand the relationship between variables in more depth, as stated by Sugiyono (2011). Qualitative research is often used to describe events chronologically, explain complex relationships between variables, and investigate meanings or values that emerge in society. The choice of this method allows researchers to explore and collect information from informants as they are, according to their own views. By giving respondents the opportunity to share their thoughts, this research ensures that the responses given are comprehensive and accurate according to the language and views of the informants.

C. RESULTS AND DISCUSSION

Green Supply Chain Management (GSCM) covers the entire product life cycle, starting from the design, production and distribution phases through to product use by end consumers, and even in the disposal stage at the end of the product life cycle. GSCM embodies the integration of environmental thinking into supply chain management (SCM), creating a holistic approach that looks at the environmental impact of each stage of the process (Wong et al., 2015). It is important to note that GSCM is not a concept that has been around for a long time, but rather is a recent innovation in the field of SCM. GSCM provides added value to organizations by prioritizing sustainable and responsible practices, ensuring that the entire supply chain works efficiently while minimizing negative impacts on the environment (Ninlawan et al., 2010). Nekmahmud et al. (2020) explains that there are several operational functions and activities in GSCM, including green procurement.

Green procurement is an important aspect related to environmental sustainability in the purchasing context. This includes engaging in purchasing reduction, reuse and recycling activities during the purchasing process of a product or service (Eltayeb & Zailani, 2014). The concept of green procurement not only provides a solution for environmental protection, but also becomes a conservative economic strategy for businesses. By prioritizing the reuse and recycling of materials in the purchasing process, companies can effectively reduce negative impacts on the environment and stimulate sustainable economic growth. Among the activities in green procurement include selecting suppliers, promoting recycling activities and green manufacturing (Chin et al., 2015).

Within the framework of a green procurement system, supplier selection becomes a strategic step that involves collaboration with "green partners." This selection is based on strict environmental quality standards and the supplier's passing through a thorough audit process. A "green partner" is a supplier that not only complies with environmental requirements, but also actively contributes to sustainable environmental management practices (Shah & Soomro, 2021). By prioritizing suppliers that have obtained ISO certification and related certificates of achievement in a green context, organizations can ensure that their supply chains

contribute to overall sustainability goals. Involving suppliers that meet these standards can help reduce the environmental impact of the entire product life cycle, while strengthening the company's image as an entity committed to environmental responsibility (Yu et al., 2019).

Through green procurement that focuses on partners who are committed to environmental quality standards, companies not only promote sustainable practices at the supplier level, but also stimulate market growth for sustainable products and services. By making sustainability criteria a priority in supplier selection, companies not only support responsible business practices, but also contribute to positive changes in the industrial paradigm towards a greener and more sustainable economy (Kannan, 2018).

Furthermore, promoting recycling activities is a strategic step in an effort to increase environmental awareness and effectively reduce the use of materials that are harmful to the ecosystem. Recycling is an approach that focuses on collecting and reprocessing used materials into new products, which can significantly reduce negative impacts on the environment (Ling et al., 2006). By introducing and encouraging recycling activities, companies not only participate in natural resource conservation efforts, but also contribute to reducing waste and carbon emissions. In addition, efforts to build environmental awareness around recycling activities can motivate the public and other business people to adopt sustainable principles in their daily lives (. Therefore, promoting recycling activities is a proactive effort to support the global vision of creating a cleaner, healthier and more sustainable environment (Sing & Ordonez, 2016).

Finally, green manufacturing represents a paradigm in the production process that focuses on the use of inputs with minimal environmental impact, high efficiency, and produces little to no waste or pollution. In practice, green manufacturing creates a more sustainable production system by minimizing the environmental footprint. The main benefits obtained from implementing green manufacturing include reducing raw material costs, increasing production efficiency, and improving the company's image. By reducing raw material usage and minimizing waste, companies can save on operational costs, while improved production efficiency leads to increased productivity and reduced production costs. Additionally, green manufacturing has a positive impact on a company's image, with consumers and stakeholders increasingly appreciating and supporting companies committed to environmentally responsible production practices. Thus, green manufacturing not only brings financial benefits, but also plays an important role in creating long-term sustainability for companies amidst demands for social responsibility and environmental sustainability.

Green supply chains provide significant benefits in increasing the competitive advantage of the manufacturing industry through several key factors:

1. Production Cost Efficiency

Green manufacturing focuses on optimizing the use of natural resources and energy, which not only supports environmental sustainability, but also helps reduce dependence on limited resources. Furthermore, by reducing production waste and

negative impacts on the environment, companies can minimize their ecological footprint and help maintain ecosystem balance. Apart from providing environmental benefits, green supply chain practices also open up opportunities to reduce production costs. By minimizing waste and optimizing resource use, companies can increase operational efficiency, generate cost efficiencies, and directly have a positive impact on company profitability. Thus, optimizing resources, reducing waste and cost efficiency through green supply chains not only supports environmental sustainability, but also creates opportunities for economic growth and increased competitiveness in the manufacturing industry market.

2. Reputation and Consumer Attractiveness

The importance of meeting the demands of consumers who are increasingly concerned about the environment has become a key factor in modern business strategy. Today, consumers not only consider product advantages in terms of quality and price, but also increasingly prioritize the environmental impact of the products they purchase. In this context, green supply chain practices not only align companies with consumer values, but can also significantly improve a company's reputation. Companies that are known as environmentally responsible entities have their own appeal in the market. This reputation can create consumer trust, expand market share, and even support the company's marketing strategy. Therefore, taking consumer environmental concerns into account and creating a reputation as a responsible company can be a key factor in strengthening a company's position in the market and ensuring long-term sustainability.

3. Reliability of Supply

Providing reliable supply of raw materials and components is a critical element in a green supply chain strategy. By integrating sustainable practices in supplier selection, manufacturing companies can ensure consistent and reliable availability of raw materials. This not only reduces the risk of production disruptions due to material shortages, but also strengthens the resilience of the supply chain as a whole. In addition, green supply chain practices also serve as an effective risk management tool in dealing with price fluctuations and resource availability. By partnering with suppliers who are committed to sustainable practices, companies can reduce vulnerability to price changes and minimize the impact of market fluctuations. Thus, securing the supply of raw materials and reducing risks related to price fluctuations becomes a strategic advantage that can increase the operational sustainability and competitive advantage of manufacturing companies in a dynamic market.

4. Corporate Social Responsibility

Demonstrating a company's commitment to social and environmental responsibility through implementing a green supply chain is not only an important ethical aspect, but can also have a significant positive impact on the company's image in the eyes of stakeholders. By highlighting sustainable practices throughout the supply chain, companies effectively convey the message that they prioritize the values of social and environmental responsibility. This decision creates a positive perception among customers, employees, investors and the general public, who increasingly

appreciate companies committed to sustainability. By proving that the company does more than seek financial gain, but also contributes to social welfare and environmental preservation, the company's image is strengthened as a caring and responsible entity. Therefore, green supply chain practices are not only an integral part of business strategy, but also a valuable investment in building a positive corporate reputation in an era where social and environmental responsibility is increasingly becoming a key focus for stakeholders.

5. Relationship with Suppliers

Increasing collaboration and engagement with suppliers who implement green supply chain practices is a strategic basis for building sustainable business relationships. By setting sustainability standards in the supply chain, companies create a framework that encourages suppliers to adhere to sustainable practices. This not only improves collaboration, but also creates stronger, mutually beneficial business relationships. With closer engagement between companies and suppliers committed to green supply chains, information and experiences can be more easily shared, increasing transparency in the supply chain as a whole. In addition, strengthening business relationships through this engagement can increase supply reliability, reduce the risk of uncertainty in the supply chain, and create stability in production. By reducing the risk of uncertainty in prices and availability of raw materials, companies can be more proactive in responding to market changes and minimize the impact of economic fluctuations. Thus, strengthened collaboration with suppliers who adhere to green supply chain practices not only builds sustainable relationships, but also creates a safer, more efficient and innovative business environment.

6. Innovation and Flexibility

Encouraging innovation in production processes and supply chain management is a vital aspect of implementing a green supply chain. With a focus on sustainability, the company encourages internal teams and business partners to look for new, more efficient, environmentally friendly and sustainable ways to run their operations. Innovation in production processes not only creates methods that are more energy and resource efficient, but also introduces technology that can reduce environmental impacts. Additionally, green supply chain practices stimulate improvements in overall supply chain management, including the selection and evaluation of suppliers who adhere to sustainable practices. The importance of this innovation is not only limited to reducing environmental impacts, but also involves increasing flexibility in responding to changing markets and customer needs. By understanding that markets and customer preferences can change, companies implementing green supply chains can more quickly and effectively adapt their operations. This flexibility creates a competitive advantage, allowing companies to remain relevant and responsive to evolving market demands. Thus, through encouraging innovation and increasing flexibility, implementing green supply chains not only makes companies more ecologically efficient, but also increases competitiveness and adaptability in dynamic markets.

7. Energy and Raw Material Savings

Improving the efficiency of energy and raw material use throughout the supply chain is a major milestone on the journey towards sustainability. With a focus on a green supply chain, the company implements initiatives designed to reduce energy and natural resource consumption from production to distribution. These efficiency measures include not only the use of more energy-efficient technologies, but also careful logistics management strategies to reduce waste and minimize resource loss. This practice has a tremendous positive impact on environmental and economic sustainability. By reducing energy and raw material consumption, companies directly reduce their carbon footprint and other negative environmental impacts. Additionally, these efficiencies lead to savings in production costs, increase company profitability, and create a more economically sustainable business environment. By implementing a green supply chain, companies not only play a role in maintaining environmental sustainability, but also create conditions that support sustainable economic growth in the long term. As a result, optimizing energy and raw materials in the supply chain is not only a sustainable strategy, but also a smart investment for companies and the environment in which they operate.

D. CONCLUSION

Implementing a green supply chain in the manufacturing industry has a significant positive impact. Practical steps such as optimizing the use of natural resources and energy, reducing production waste, and selecting suppliers that adhere to green supply chain practices can bring diverse benefits. Firstly, this practice not only reduces environmental impact by minimizing carbon footprint and waste, but also contributes to economic sustainability. Increased operational efficiency can result in production cost savings, increase profitability, and provide higher competitiveness in the market. Second, a green supply chain can improve a company's image in the eyes of consumers who are increasingly concerned about environmental issues. By meeting sustainability-oriented consumer demands, companies can build stronger relationships with customers and expand market share. Furthermore, engaging suppliers who adhere to green supply chain practices can strengthen engagement in the supply chain as a whole. Closer collaboration with suppliers not only increases transparency, but also minimizes risks related to price fluctuations and raw material availability. In terms of innovation, implementing a green supply chain encourages the development of product solutions that are more energy efficient and environmentally friendly. This not only creates environmental sustainability, but also increases the company's flexibility in responding to market changes and meeting changing customer needs.

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