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SUSTAINABLE SUPPLY CHAIN MANAGEMENT STRATEGY: TOWARDS EFFICIENCY, INNOVATION, AND ENVIRONMENTAL RESPONSIBILITY

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Abstract

Sustainable supply chains are becoming increasingly important in this era of globalization, where companies are required to not only achieve economic profits, but also pay attention to the social and environmental impacts of their operational activities. This research aims to analyze and identify sustainable supply chain management strategies to achieve operational efficiency, product innovation and environmental responsibility. This research uses a qualitative approach with descriptive methods. The research results show that the implementation of sustainable supply chain management strategies has a positive impact on company performance in efficiency, innovation and environmental responsibility. Identifying critical points in the supply chain, selecting suppliers committed to sustainable practices, and leveraging technology in production processes drives positive change. Transportation optimization, sustainability performance monitoring systems, and active engagement with stakeholders have also been proven to make a real contribution in establishing a more responsive and responsible supply chain. Through these steps, companies can achieve operational success while minimizing negative impacts on the environment, as social responsibilities are increasingly strengthened and recognized.

Strategy, Supply Chain Management, Sustainability, Efficiency, Innovation, Environmental Responsibility

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INTRODUCTION

In the current era, stakeholders are increasingly urging companies to be responsible for the environmental impacts resulting from their supply chain operations (Trenggana, 2022). There is increasing demand for transparency and accountability by companies regarding their business practices, especially in terms of managing natural resources and reducing carbon footprints (Petro et al, 2023). As the global paradigm shifts towards sustainability, stakeholders, including consumers, investors and governments, are increasingly highlighting the importance of companies being accountable for their supply chain practices (Wibowo & Ifada, 2023).

In the face of this pressure, many companies are adopting sustainable Supply Chain Management practices as a strategic step to expand their environmental responsibility (Maisaroh, 2021). This includes implementing policies that support the use of environmentally friendly materials, wise waste management, as well as selecting business partners who have a similar commitment to sustainability (Damar, 2023). Thus, implementing sustainable Supply Chain Management practices is not only an ethical obligation, but also a relevant strategy in winning the trust and support of stakeholders, while establishing a stronger connection between business sustainability and environmental sustainability (Ghazani & Wibowo, 2021) .

Pressures related to environmental responsibility are increasingly pushing companies to integrate environmental requirements throughout their supply chains. This includes critical activities such as supplier selection, product manufacturing, and the delivery process to end customers (Jayawati et al, 2020). Stakeholders, including increasingly environmentally conscious consumers, often judge companies based on their commitment to sustainable business practices. Therefore, companies adapting to these pressures must carry out careful monitoring of their supply chain practices, including suppliers, to ensure that environmental standards are consistently adhered to (Raharja & Yamit, 2022).

The integration of environmental requirements throughout the supply chain is not only limited to a company's responsibility towards nature, but is also a smart strategy in managing risks and meeting market expectations (Sibarani et al., 2022). Selection of suppliers that comply with certain environmental standards not only creates added value in terms of sustainability, but can also improve brand image and increase competitiveness. Therefore, companies that are successful in implementing environmental requirements in their supply chains are not only able to meet stakeholder expectations, but are also able to create a positive impact in the long term for business and environmental sustainability (Kahfi et al., 2022).

Environmental innovation in supply chains is becoming increasingly urgent as paradigm shifts occur as the vision of strategic environmental management increasingly permeates policy and technology (Ghofar et al., 2020). These changes not only originate from the micro level, where organizations adopt sustainable Supply Chain Management practices, but are also influenced by transformations at the macro level. The government and society, for example, are increasingly pushing for the adoption of new environmental policies to overcome the challenges of climate change and environmental degradation (Fachrurazi et al, 2023). New regulations emphasizing sustainable practices and cutting carbon emissions have become a major driver for environmental innovation across the supply chain, forcing companies to adapt to higher standards and seek creative, environmentally friendly solutions (Hertina et al., 2023).

Apart from changes in the regulatory realm, environmental innovation is also driven by technological advances that provide new solutions to environmental challenges (Tutuhatunewa et al, 2015). Digital technologies, such as the Internet of Things (IoT) and big data analytics, enable more efficient tracking and monitoring of the entire supply chain, facilitating the identification of areas that can be environmentally optimized (Suhari, 2013). The adoption of these new technologies directly impacts the efficiency and environmental resilience of supply chains. In other words, changes occurring in the vision of environmental management, both at the macro and micro levels, open the door to sustainable environmental innovation, triggering positive transformations in the way companies design, manage and evaluate their supply chains (Anwar, 2013).

Sustainable supply chain management practices do include innovation in a number of critical stages, including acquisition, production, distribution and logistics. To be successful in implementing supply chain greening, companies are faced with demands to carry out significant transformations in their products, processes and management (Yekty & Solovida, 2021). In response to these challenges, it is often necessary to implement new businesses or business models that integrate sustainability as a core component. Business innovation processes are a key element in this effort, enabling companies to create cost-effective and effective changes (Hisjam, 2018).

The importance of business innovation in the context of a sustainable supply chain lies in its ability to identify and implement strategic changes that prioritize sustainability (Hasanah, 2021). This could involve restructuring production models to reduce waste and carbon emissions, introducing technology that allows tracking of raw materials to final products to increase transparency, or even the development of new products that meet higher environmental standards (Jayawati et al, 2020). The business innovation process opens the door for companies to design and implement more holistic and integrated solutions, which in turn can provide long-term competitive advantages while minimizing negative impacts on the environment.

The aim of this research is to analyze and identify sustainable supply chain management strategies that can achieve operational efficiency, product innovation and environmental responsibility. With an in-depth understanding of this strategy, it is hoped that it can provide practical guidance for companies in designing and implementing sustainable practices throughout their supply chains. The benefits of this research involve the company's ability to meet the demands of stakeholders who increasingly emphasize responsibility for environmental impacts, as well as being able to increase competitiveness through operational efficiency and sustainable product innovation. Thus, this research can support positive transformation towards a more sustainable and responsible business.

METHOD

This research optimizes qualitative methods, especially the literature study approach, as the main basis for obtaining in-depth technical information. This process includes a series of activities, such as reading, researching, understanding, analyzing and collecting information from various sources of literature and related regulations. In accordance with Yulianah's (2022) perspective, this research adopts a literature study method to investigate and detail a comprehensive understanding of the research topic. By applying the literature review method, data and information were obtained through exploration of previous articles and research results that were considered valid, especially from reference sources such as international journals and related books. The choice of this method gives researchers the flexibility to carry out careful analysis of concepts and findings that have been developed in previous scientific literature. By combining library research and literature review approaches, the aim of this research is to present an in-depth review of the research theme. The adoption of this qualitative method is expected to produce a deeper understanding of the issues discussed, describe their complexity, and provide a solid theoretical basis to support research findings.

RESULTS AND DISCUSSION

Sustainability in supply chain management includes the ability to maintain standard processes without having a negative impact on the environment. The main focus of supply chain sustainability is reducing the impact of environmentally detrimental factors, such as pollution, deforestation, ozone layer depletion, and climate change (Pellondou & Santosa, 2022). Supply chain management itself prioritizes elements such as speed, cost, reliability, optimization and continuous improvement in the entire supply chain process. On a global scale, supply chain sustainability efforts aim to achieve environmentally oriented goals, increase the efficiency of resource utilization, and simultaneously maintain or increase the rate of return on investment (ROI) (Yulita, 2019). A sustainable chain management approach is applied throughout a series of activities, from procurement of goods and services to product delivery with optimal time accuracy.

A sustainable supply chain is a holistic strategic business decision, involving aspects of procurement, production, packaging and delivery of manufactured goods with an optimal and responsible approach. Sustainability initiatives in Supply Chain Management (SCM) are not only about minimizing environmental impacts, but are also an integral part of corporate social responsibility (Setyaning, 2023). By integrating sustainability practices into their operations, companies can drive greener operations, create efficiencies, and ultimately, achieve long-term cost savings. In addition, sustainability aspects in the supply chain not only improve the company's image but can also result in improved overall supply chain performance

(Pratiwi & Susanty, 2016). Therefore, the decision to adopt a sustainable supply chain not only contributes to environmental sustainability, but is also a smart strategy to support responsible and competitive business growth.

Implementing a sustainable supply chain management strategy towards efficiency, innovation and environmental responsibility involves a series of planned and integrated steps. Here are some steps you can take to design and implement such a strategy:

Supply Chain Assessment

Identifying critical points in the supply chain that have significant environmental impacts is an important step in designing a sustainable supply chain management strategy. First of all, attention should be focused on the use of raw materials. Evaluation and choice of environmentally friendly raw materials can reduce the carbon footprint and other environmental impacts throughout the product life cycle. Choosing recyclable resources or materials sourced from sustainable agricultural practices can minimize negative impacts on the environment.

Furthermore, another critical area that requires attention is the production process. This process is often a major source of carbon emissions and industrial waste. Therefore, optimizing production processes to increase energy efficiency and reduce waste can contribute significantly to supply chain sustainability. The use of advanced technology, implementation of lean manufacturing practices, and increased energy efficiency can be key strategies for achieving sustainability goals in production processes.

Apart from that, transportation and waste disposal are also important points that require special attention. Choosing more environmentally friendly modes of transportation, such as the use of electric vehicle fleets or more energy efficient sea shipping options, can help reduce the environmental impact of transportation. Additionally, wise waste management, including recycling and processing waste in an environmentally friendly manner, can help reduce negative impacts on the environment and encourage more sustainable supply chain practices overall. By identifying and addressing these points, companies can effectively design strategies that minimize their environmental impact throughout the supply chain.

Sustainable Supplier Selection

Prioritizing suppliers who demonstrate a concrete commitment to sustainable and environmentally friendly practices is a strategic step in achieving supply chain sustainability. Choosing suppliers that implement environmental policies in their operations and comply with sustainability standards is a long-term investment for the company. Suppliers who integrate sustainability principles into their operations not only support a company's mission to become more environmentally responsible, but can also help create a more reliable and sustainable supply chain.

By prioritizing suppliers who uphold sustainable values, companies can motivate the entire supply chain to adopt sustainable practices. This not only creates positive synergies in terms of environmental responsibility, but can also create stronger and more sustainable relationships between a company and its suppliers. Additionally, sustainable supplier selection can create a positive domino effect within the industry as a whole, driving positive change throughout the global supply chain.

In a business context that increasingly understands the importance of sustainability, a supplier selection strategy that focuses on environmental responsibility not only creates added value in terms of the company's brand image, but is also a wise step to anticipate increasingly high market demands for sustainable and environmentally friendly business practices. . Therefore, choosing suppliers who are committed to sustainability is not only a smart business strategy, but also a real contribution to building a more sustainable and responsible supply chain ecosystem.

Production Process Optimization

Applying technology and innovation is key in efforts to increase efficiency in the production process with a focus on sustainability. First of all, companies can identify and adopt technologies that can optimize the overall production process. It involves implementing intelligent automation systems, smart sensors, and advanced supply chain management software to efficiently monitor and control the entire production workflow.

Furthermore, sustainable efforts can be realized by choosing environmentally friendly technology. Using renewable energy, such as solar power or biomass, to meet energy needs in the production process can significantly reduce a company's carbon footprint. Green technologies can also include smart waste management systems, more effective recycling processes and more sustainable use of raw materials.

In this context, evaluating environmentally friendly technologies becomes crucial. Companies should engage a team of experts to assess the technologies that best suit their production needs and ensure that the investment results in a positive impact on sustainability. Implementing technology that minimizes energy consumption, optimizes the use of raw materials, and reduces waste will help achieve the company's sustainability goals.

By focusing on continuous technological innovation, companies can create an efficient and responsible production environment. In addition, investing in environmentally friendly technology not only helps companies meet environmental obligations, but can also provide long-term benefits in the form of operational efficiency, cost savings, and sustainable creation of added value.

Use of Supply Chain Technology

Utilization of information technology, particularly through sophisticated supply chain management (SCM) systems, can bring significant benefits in improving the performance and sustainability of a company's supply chain. First of all, advanced SCM allows companies to increase the precision of demand forecasting. Using intelligent algorithms and in-depth data analysis, these systems can forecast market trends, consumer patterns, and other variables to produce more accurate demand forecasts. This allows companies to optimize production and distribution efficiently, reducing the risk of overstock or inventory shortages.

Furthermore, efficient inventory management is another benefit of utilizing advanced SCM. This system allows more accurate monitoring and management of inventory levels, location and movement of goods. By minimizing uncertainty and inconsistency in inventory management, companies can avoid unnecessary costs and improve their operational efficiency. Additionally, the integration of SCM with automatic identification technology, such as barcode or RFID technology, allows for more accurate and real-time inventory tracking.

Finally, real-time supply chain tracking is a key element in improving supply chain sustainability. Through information technology integration, companies can monitor the entire supply chain from upstream to downstream in real-time. This enables rapid response to changes in demand, disruptions in the supply chain, or efficiency improvement opportunities. Real-time tracking can also enable companies to evaluate supplier performance, identify weak points in the supply chain, and take preventative or corrective action quickly. By utilizing information technology, companies can create a more responsive, efficient and sustainable supply chain. Advanced SCM implementation not only improves operational precision and efficiency, but can also become the foundation for broader sustainability strategies in managing environmental impacts and increasing corporate social responsibility.

Sustainable Product Innovation

The importance of sustainability in product development is becoming increasingly significant, and companies can explore this opportunity by designing products that are more environmentally friendly or have longer life cycles. First of all, companies can carry out research and innovation to identify materials or raw materials that can be recycled or broken down. Choosing raw materials sourced from recycling can help reduce dependence on limited natural resources and minimize environmental impacts at the production stage.

Next, companies can direct efforts to develop products with longer life cycles. This can include designs that allow for product maintenance, repair, or upgrades over time, reducing the need for disposal of rapidly obsolete products. Longer life cycles can also be achieved through the selection of durable materials and environmentally friendly production methods. Sustainable design thinking can also

include reducing waste throughout the product life cycle. Companies can explore creative ways to use production waste as raw materials for new products or to reduce waste generated during the production process.

More than just a response to market demands, sustainable product development can also be a source of added value for companies. Consumers who are increasingly concerned about environmental issues tend to give preference to products that are produced responsibly. Thus, companies that successfully design sustainable products can capitalize on competitive advantages and build a more positive brand image. By combining innovation and sustainability in product development, companies can play an active role in guiding the industry towards more environmentally friendly and sustainable business practices.

Sustainable Transportation and Distribution:

In maintaining supply chain sustainability, companies can pay special attention to the use of efficient and environmentally friendly transportation. Evaluating greener shipping options is a critical step to reduce the environmental impact arising from the distribution process. One option that can be explored is the use of sea transportation which is more energy efficient. Modern ships equipped with green technology, such as more efficient engines and advanced fuel management systems, can help reduce carbon emissions during shipping. This option is not only more economically efficient but also creates a lower environmental impact compared to other modes of transportation.

Additionally, an emphasis on local delivery options can be a very sustainable strategy. Reducing the distance a product travels from producer to consumer can reduce carbon emissions produced during transportation. Companies may consider investing in a local distribution network or using local logistics providers that have a sustainable approach. Local delivery not only supports environmental sustainability but also speeds up delivery times, increases customer satisfaction, and strengthens ties with local communities.

Steps like these not only help companies meet the demands of a market increasingly concerned about sustainability, but can also reduce long-term operational costs. By implementing efficient and environmentally friendly transportation, companies can not only reduce their carbon footprint but also create added value in the form of efficiency and sustainable competitiveness. As a result, sustainable transportation has become a key element in building a responsive and environmentally responsible supply chain.

Monitoring and Reporting

Establishing a monitoring system is a crucial step in measuring and ensuring supply chain sustainability. By implementing sophisticated monitoring systems, companies can continuously measure their sustainability performance. These systems can include performance indicators such as energy use, carbon emissions,

waste management, and compliance with sustainable practices. This monitoring can be done with the help of information technology and supply chain management platforms that can generate real-time data, allowing companies to proactively identify areas that require further attention.

Furthermore, regular reports that include environmental and social performance indicators are a further step in achieving accountability and transparency in sustainability practices. This report not only provides a holistic picture of the supply chain's environmental impact, but also reflects the company's commitment to social responsibility. These reports may include achievements in reducing carbon emissions, increasing energy efficiency, compliance with environmental regulations, as well as positive impacts on local communities. By presenting this information openly, companies can build customer, stakeholder and wider community trust in their sustainability efforts.

The importance of this routine report is that it can also involve external parties, such as authorities or independent certification bodies, to ensure the objectivity and reliability of the information presented. This helps increase the company's credibility and integrity in implementing sustainable practices. By implementing a solid monitoring system and regular, transparent reports, companies can not only measure the success of their sustainability implementation, but can also make a more tangible contribution to positive transformation in business and the environment as a whole.

Stakeholder Involvement

Actively engaging with customers, suppliers and other relevant parties provides a strong foundation for strengthening awareness and engagement in sustainable practices. Open communication and collaboration with stakeholders are key strategies in embracing sustainability holistically. Involving customers through education and information about the sustainable steps taken by companies can increase their awareness of the impact of products or services on the environment.

Additionally, close collaboration with suppliers is a crucial step to expand sustainable practices in the supply chain. Sharing sustainability principles, providing guidance, and jointly seeking innovative solutions can create a collaborative environment that strengthens supply chain sustainability. Companies can also provide incentives to suppliers who adopt sustainable practices, encouraging the creation of more responsible and efficient supply chains.

Considering input and feedback from stakeholders is key in understanding their needs and expectations. Receiving this input can open up opportunities for better improvements and innovations in line with ongoing demands. Stakeholders often have unique perspectives that can provide valuable insights for improving a company's sustainability performance. So, listening to and responding to feedback

from customers, suppliers, local communities and other relevant parties is an integral step in the journey towards sustainability.

With this active engagement, companies not only build closer relationships with stakeholders, but also create a platform to increase mutual understanding and shared responsibility in achieving sustainable practices. In addition, this involvement can create a positive feedback cycle that strengthens the commitment and contribution of all parties involved in achieving sustainability goals together.

CONCLUSION

Implementation of sustainable supply chain management strategies that lead to efficiency, innovation and environmental responsibility forms a holistic framework for companies in responding to sustainability demands. These steps include identifying critical points in the supply chain that have an environmental impact, prioritizing suppliers who are committed to sustainable practices, utilizing technology and innovation in the production process, and paying attention to environmentally friendly products. Furthermore, optimizing transportation, monitoring supply chain sustainability performance, and stakeholder engagement are key elements in establishing a sustainable supply chain. The use of information technology, real-time tracking, and regular reports provide the basis for measurement, evaluation, and transparency regarding sustainability performance. In conclusion, involving all stakeholders, from customers to suppliers, and considering their input, is an important element in creating awareness and engagement in sustainable practices. All of these efforts, when well integrated, help create a supply chain that is not only efficient and innovative but also responsible for its environmental and social impact. Thus, companies that adopt this approach can achieve long-term competitive advantage and make a positive contribution to sustainable development.

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