

Challenges, Opportunities, and Strategies of Pentahelix Stakeholders in Realizing Sustainable Supply Chains in Indonesia

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ARTICLE INFO	ABSTRACT
<p>Keywords: Challenges, Opportunities, Stakeholder Strategy Pentahelix, Supply Chain.</p>	<p><i>The sustainable supply chain sector is increasingly becoming an important concern in Indonesia, especially amidst the threats of climate change, environmental degradation, and exploitation of natural resources. This study aims to identify the challenges, opportunities, and strategies faced by pentahelix stakeholders in realizing a sustainable supply chain in Indonesia. This study uses a qualitative method with a case study approach. The data collection technique in this study is through literature studies. The data that has been collected is then analyzed in three stages, namely data reduction, data presentation and drawing conclusions. The results of the study show that efforts to realize a sustainable supply chain in Indonesia require strong collaboration between the government, academics, business, society, and the media. Pentahelix is the right strategy to ensure that each stakeholder plays its role optimally. By taking advantage of existing opportunities, such as increasing consumer demand for environmentally friendly products and strong government support and overcoming challenges through technological innovation and comprehensive policy development, Indonesia has great potential to become a leader in sustainable business practices at the global level.</i></p>

INTRODUCTION

Climate change and environmental issues have become a global focus, driving increased awareness of sustainability, including in the business and industrial sectors (Hasibuan, 2023). A sustainable supply chain is now an important component in creating a socially and environmentally responsible business. A supply chain is a series of activities and processes involved in the production, management, and distribution of goods or services, from raw material suppliers to final products to consumers. The supply chain includes all parties that contribute to this process, such as producers, distributors, retailers, and end consumers (KHAKIM, 2023)).

In Indonesia, a country with a large population and abundant natural resources, realizing a sustainable supply chain faces various complex challenges, such as imbalances in resource distribution, lack of environmentally friendly technology, and policies that are not yet fully supportive. Pentahelix, which includes five main stakeholders, government, academics, business, society, and the media, is seen as an effective collaboration model to address these challenges.

Each stakeholder plays an important role in ensuring the sustainability of the supply chain. The government is expected to create supportive regulations, academics conduct research and innovation, businesses implement environmentally friendly technology, the community acts as environmentally conscious consumers, and the media is able to educate and mobilize public opinion.

In addition to the challenges, there are great opportunities in Indonesia such as increasing consumer awareness of environmentally friendly products, as well as government encouragement to accelerate the implementation of sustainable business practices through supportive policies. However, without strong collaboration between Pentahelix stakeholders, these opportunities cannot be optimized. Therefore, this study

focuses on the challenges, opportunities, and strategies faced by Pentahelix stakeholders in realizing a sustainable supply chain in Indonesia.

Previous research by (Talsania et al., 2024) shows that sustainable digital supply chains face a number of challenges that need to be overcome, including over-reliance on technology, the risk of cyber-attacks, limited access and infrastructure, and difficulties in integrating different systems. On the other hand, there are opportunities to increase supply chain transparency, optimize processes, improve energy and cost efficiency, and encourage innovative collaboration between stakeholders.

This study contributes to the development of the Penta helix theory, especially in the context of sustainable supply chains. The research findings can enrich the literature on how the Pentahelix model can be applied in other sectors and broaden the understanding of the role of multi-stakeholder synergy in achieving sustainable development goals. This study aims to identify the challenges, opportunities, and strategies faced by pentahelix stakeholders in realizing sustainable supply chains in Indonesia.

METHOD

This study uses a qualitative method with a case study approach. Qualitative research methods are approaches used to investigate objects in natural conditions, where researchers act as the main instrument. Data collection techniques are carried out through triangulation, and data analysis is inductive. The results of qualitative research focus more on understanding meaning than on generalization (Kakar et al., 2023). In this study, data collection techniques were carried out through literature studies, where various reading sources, articles, and related documents were reviewed to obtain relevant information. After the data was collected, the analysis process was carried out in three stages: first, data reduction, where unnecessary information was removed to focus on the most significant data. Second, data presentation, where the reduced data was arranged in an easy-to-understand form and finally drawing conclusions, where the results of the analysis were evaluated to draw conclusions that could provide insight into the topic being studied.

RESULTS AND DISCUSSION

Many countries around the world, including Indonesia, are showing commitment to global agendas such as the Sustainable Development Goals (SDGs) and the Paris Agreement. In Indonesia, since 2016, SDGs-related topics have become an increasing focus of research, in line with efforts to reduce the environmental and social impacts of various sectors, including in business and supply chain activities (Farida et al., 2024). Sustainable Supply Chain Management Practices (SSCMP) are increasingly recognized as an important philosophy for organizations, as they can contribute to the achievement of corporate profitability goals as well as to the achievement of market share (Mugoni et al., 2024).

According to the view of sustainable development, the measurement of company performance is not only seen from an economic point of view, but also from an environmental and social perspective. The existence of sustainable performance indicators plays an important role in ensuring that companies can reduce environmental risks and impacts while improving ecological efficiency, both for the company itself and its supply chain partners (Hadi et al., 2023). With the growing global attention to the integration of environmental dimensions in supply chain management, companies around the world, including Indonesia, cannot afford to ignore this issue if they want to remain competitive and sustainable in their operations.

Sustainable supply chains refer to production and distribution systems that aim to minimize negative environmental and social impacts, while increasing economic efficiency in the long term (Shekarian et al., 2022). This concept has become one of the important aspects of modern business strategies, given global challenges such as climate change, deforestation and environmental degradation that require responses through more responsible business practices. Sustainable supply chains also involve collaboration and communication between all parties involved in the supply chain, including suppliers, manufacturers, retailers and customers. Sustainable supply chains can also contribute to achieving sustainable development goals and mitigating climate change (Abualigah et al., 2023). The implementation of sustainable supply chains encourages companies to help reduce greenhouse gas emissions, environmental damage, and ensure wider social benefits for society.

One concrete example of sustainable supply chain implementation in Indonesia is PT Unilever Indonesia. According to Hemant Bakshi, President Director of Unilever Indonesia, the company continues to be committed to sustainability across its business value chain. In its 2019 report, Bakshi stated that Unilever Indonesia not only strives to improve the quality of life of consumers through their products, but also ensures that its business activities have a positive impact on society and the environment (PT Unilever Indonesia, 2019). Unilever's

sustainability strategy is based on the Unilever Sustainable Living Plan (USLP), and the company continues to strengthen the pillars of sustainability covering economic, social and environmental aspects.

In implementing this strategy, Unilever Indonesia managed to record significant financial achievements despite facing challenges in 2019. The company recorded net revenue of Rp42.9 trillion, an increase of 2.7% from the previous year, with net profit reaching Rp7.4 trillion. This success shows that implementing a sustainable supply chain has a positive impact on the environment and society while driving sustainable business growth. Unilever Indonesia attributes this achievement to its sustainability-focused business strategy, as well as through various campaigns that bring consumers closer to products and brands that have a good purpose.

Furthermore, almost 95% of the brands produced and marketed by Unilever Indonesia have a purpose that is aligned with sustainability principles. This shows the company's ability to prove that having a noble purpose not only has a positive impact on the company's reputation but can also significantly drive business growth. This statement is in line with research that states that companies that implement sustainable practices have greater competitive and economic advantages compared to companies that do not integrate sustainability in their business strategies (Shekarian et al., 2022).

Sustainable supply chain performance focuses on initiatives that aim to minimize negative environmental impacts while ensuring the achievement of business objectives. Companies that adopt this approach typically prioritize developing environmentally friendly products, using sustainable raw materials, and working to improve energy and resource efficiency in their production processes. Implementing these aspects enables companies to meet market demands for more environmentally responsible products and to meet standards that are important in building trust with customers and stakeholders.

Other research also shows that integrating sustainability practices in supply chain planning brings positive impacts to companies. For example, research conducted by (Rajeev et al., 2019) highlighted that the implementation of green practices in the supply chain can help improve ecological outcomes, such as reduced emissions and better resource management and also contribute to improved financial outcomes for the company. This approach provides a competitive advantage as companies that adopt sustainability strategies tend to be more attractive to sustainability-concerned consumers, while meeting increasingly stringent regulatory requirements related to environmental issues.

But while sustainable supply chains offer many benefits, their implementation in Indonesia still faces significant barriers. One of the main challenges is the low awareness of the importance of sustainable supply chains, both among businesses and the general public. According to (Dermawan et al., 2018) many shareholders, vendors, and suppliers still do not have adequate knowledge of the importance of sustainable supply chains and the destructive impact that products have on the environment. This lack of understanding makes the adoption of sustainable practices often hampered in various industry sectors.

In addition, other challenges such as existing regulations in Indonesia related to sustainable supply chains are not comprehensive enough. According to (Purnamasari et al., 2024), there is a gap between government policies and efforts to promote sustainable supply chain practices. The main obstacle lies in the implementation of policies at lower administrative levels, where there is often a lack of coordination and resources to effectively carry out established policies. This lack of robust regulation leaves companies and industries with little incentive to integrate sustainability into their business operations.

Furthermore, challenges also arise due to inadequate infrastructure which is a barrier to the implementation of sustainable supply chains in Indonesia. Many regions in developing countries, including Indonesia, still face limitations in the basic infrastructure needed to support sustainable practices. Limited access to the latest technology and necessary resources slows down the transition towards greener and more efficient supply chains (Purnamasari et al., 2024).

Furthermore, limited resources, be it financial, technological or competent human resources, pose a serious challenge. Budget inefficiencies often occur, especially in the public sector, where most of the allocated funds are spent on operational costs rather than on effective development programs. On the other hand, over-reliance on digital technology, while it can improve sustainability, also poses problems if the infrastructure is inadequate or the cost of implementation is too high. Difficulties in integrating different technology systems, which may use incompatible communication standards, also hinder the interoperability needed to achieve sustainability goals in the supply chain.

In addition, data management is a major challenge in implementing sustainable supply chains. Collecting, storing and analyzing data from various sources is often a difficult task, especially if employees do not have sufficient knowledge of digital technology. Poor data quality can interfere with effective decision-making

processes. Moreover, privacy issues and compliance with data-related regulations add to the complexity of managing accurate and reliable information to support sustainability (Putri et al., 2024).

Meanwhile, in the midst of various challenges, there are a number of opportunities that can be utilized to realize sustainable supply chains in Indonesia. One of the main opportunities is the increasing market demand for environmentally friendly products. Consumer awareness of environmental and sustainability issues continues to increase, creating a huge opportunity for companies that are able to provide products that are in line with this trend. According to (Cam, 2023), consumers are now increasingly prioritizing products that support sustainability, which provides an incentive for companies to adopt greener and more sustainable supply chain practices.

Furthermore, government support is also a significant opportunity in realizing sustainable supply chains. The Indonesian government has shown a strong commitment to environmental conservation through supportive policies. Joko Tri Haryanto, President Director of the Environmental Fund Management Agency (BPDLH), emphasized that the Indonesian government has a strategy that includes comprehensive regulations, governance, business models, and funding mechanisms to support sustainability efforts. The government has established laws, government regulations, and other regulations aimed at protecting the environment, creating a strong foundation for companies to integrate sustainability principles in their supply chains (Kemenkeu, 2023).

In addition, technological developments are also opening up huge opportunities to improve efficiency and transparency in the supply chain. Technologies such as blockchain, IoT (Internet of Things), and artificial intelligence (AI) facilitate organizations to reduce their carbon footprint and ensure ethical practices throughout the supply chain. Blockchain, for example, can be used to record every transaction with high transparency, enabling the tracking of raw materials from source to final product, which increases accountability. The technology also helps companies monitor and optimize energy use through analysis of real-time data collected from IoT sensors in factories and other production facilities.

Indonesia's natural resource potential is also an important opportunity in achieving a sustainable supply chain. Indonesia's rich natural resources, such as agricultural products, plantations, and mines, can be managed sustainably to support more environmentally friendly business practices (Utami et al., 2023). By utilizing these resources efficiently and responsibly, Indonesia can increase its competitiveness in the global market, while preserving the environment.

These opportunities, if managed well, can be a driving force for sustainable supply chains in Indonesia, helping companies optimize operations while meeting increasingly stringent market and regulatory demands for sustainability. To address the challenges and capitalize on the opportunities in sustainable supply chains, a strategy that involves collaboration between various stakeholders is required. One relevant collaboration model is Pentahelix, which involves five main actors such as government, academia, business, community and media. This model is considered capable of producing more comprehensive solutions as each party can contribute their expertise and roles in supporting sustainability (Wijonarko, 2023).

From the government side, the role it can play is crucial in creating comprehensive and effective regulations to encourage sustainable supply chain practices. (Balon, 2020) states that companies operating under strict environmental regulations tend to have better environmental performance compared to companies under weaker regulations. In addition, companies that face high social expectations regarding sustainability are also more likely to adopt and implement green supply chain management (GSCM) practices effectively. Governments can also provide incentives for companies that implement sustainable practices, such as through tax incentive policies for companies that adopt green technologies or through regulations that encourage the reduction of waste and emissions (Khurshid et al., 2022; Ramanathan et al., 2017). Not only that, but the government also needs to build infrastructure that supports the implementation of sustainable supply chains and increase the capacity of human resources to better manage this system (Luthra et al., 2017).

Meanwhile, academics play a key role in supporting sustainable supply chains through research and development. The role of academics as watchdogs in development and scientific studies is highly valued by society, as they are considered to have higher competence in conveying aspirations and knowledge (Solichah & Merita, 2022). Academics can contribute through research on sustainable supply chain management, environmental sustainability, and knowledge dissemination through education and training. In addition, academics can also act as consultants for companies in implementing effective sustainable supply chain practices.

In the business sector, companies need to adopt sustainable business practices along the supply value chain (Sánchez-Flores et al., 2020). Companies can invest in environmentally friendly technologies and build strong partnerships with suppliers and customers who are also committed to sustainability. Companies that make these

investments will meet regulatory and market demands and potentially gain a long-term competitive advantage by gaining the loyalty of consumers who are increasingly concerned about the environment.

The role of society is equally important in supporting sustainable supply chains. Increasing public awareness and participation in environmental conservation efforts can drive demand for environmentally friendly products (Sari, 2017). The choice of more environmentally conscious consumers will affect the company's business strategy in designing products and company practices to meet sustainable market demand.

Meanwhile, the media has a strategic role in disseminating information about the importance of sustainable supply chains. Through positive and educative coverage, the media can strengthen public awareness and influence consumer behavior and encourage businesses to take more steps in implementing sustainable practices. Consistent coverage of sustainability initiatives can also strengthen public trust and encourage more participation from various parties.

The implementation of the Pentahelix strategy in realizing sustainable supply chains in Indonesia is evident through various collaborative initiatives involving various stakeholders. One obvious example is the organic product certification program. In this program, the government plays a role by setting clear standards and regulations regarding organic products, while academics conduct research to ensure the quality and effectiveness of these products based on scientific evidence. Businesses then take steps to obtain organic product certification in accordance with established standards, so that people can consume organic products that are more environmentally friendly. In this process, the media plays an important role in publicizing information about these products, raising awareness and driving consumer demand for environmentally friendly products.

Another example is the development of a green industrial park, which reflects strong collaboration between Pentahelix actors. The government provides land and infrastructure support for the area, while academics provide technical input on sustainable industrial design and development. Companies then build factories by applying environmentally friendly technology, which creates jobs for the local community. In this case, the media has a central role in covering the development process and informing the public about the importance of green industry in maintaining a balance between economic development and environmental sustainability.

In conclusion, realizing sustainable supply chains in Indonesia requires strong collaboration between government, academia, business, society and media. Pentahelix is the right strategy to ensure that each stakeholder plays its role optimally. By capitalizing on existing opportunities, such as growing consumer demand for environmentally friendly products and strong government support and addressing challenges through technological innovation and comprehensive policy development, Indonesia has great potential to become a leader in sustainable business practices at the global level. This close collaboration will help improve supply chain efficiency and transparency, help conserve natural resources, enhance industry competitiveness, and meet the expectations of an increasingly environmentally conscious society.

CONCLUSION

Efforts to realize a sustainable supply chain in Indonesia require strong collaboration between government, academics, businesses, communities, and the media. The pentahelix strategy has proven to be an effective approach to ensure that each stakeholder plays their role optimally. By taking advantage of existing opportunities, such as increasing consumer awareness of environmentally friendly products and stronger support from the government, Indonesia has a solid foundation to transition to a more sustainable supply chain system. On the other hand, challenges such as the lack of technological innovation and policies that are not yet fully supportive need to be addressed through the development of green technology and comprehensive policies. If managed well, Indonesia has great potential to become a leader in sustainable business practices at the global level.

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