



The Impact of the Blue Economy on Financial Distress of Transport and Logistics

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Abstract. The blue economy concept has gained increasing significance in global policy development, particularly in countries like Indonesia, which is rich in marine resources. This study explores the impact of blue economy policies on the transportation and logistics sectors, with a focus on the challenges of adapting to sustainable operations and resource management. Through a bibliometric analysis of existing literature, this research examines current trends and innovations in the blue economy and their connection to financial distress within maritime companies. Findings highlight the pressures faced by these sectors in transitioning to environmentally friendly practices, the financial risks of non-compliance, and the importance of low-emission technologies. The study provides deeper insights into how the implementation of blue economy principles affects financial stability, especially for companies in Indonesia's critical maritime industry. Additionally, the analysis contributes to understanding the broader relationship between sustainability, financial performance, and corporate resilience in a changing business environment.

Keywords: Blue Economy, Finance Distress, Transportation and Logistics

1 Introduction

The blue economy has become an increasingly important concept in the development of global policies, including in Indonesia, which has abundant marine resources. The blue economy aims to promote sustainable economic development through the responsible use of marine resources. In Indonesia, the transportation and logistics sectors are closely linked to maritime activities, making the application of the blue economy relevant. However, companies in these sectors face significant challenges in adapting to blue economy policies, particularly regarding operational sustainability and resource management. [1] In 2020, ocean-based activities reached a value of USD 1.5 trillion. [2] The green economy emphasizes the importance of balancing economic growth with the protection of marine environments, where the management of marine resources is key to sustainable economic success [3]

The blue economy seeks to create a sustainable economy through the responsible use of marine resources. This is similar to the green economy, which also prioritizes sustainable development. The application of the blue economy in the transportation

and logistics sectors, particularly maritime transport, is crucial because these sectors heavily rely on marine resources, and their financial stability may be impacted if sustainability policies are not properly implemented. [2]

The implementation of blue economy policies focuses on sustainable marine resource management and the use of environmentally friendly technology. However, transportation and logistics companies in Indonesia face significant challenges regarding the need to invest in low-emission technologies and efficient resource management. Failure to adapt quickly and manage operational cash flows adequately may increase the risk of financial distress for transportation and logistics companies. [4]

The application of the blue economy in the transportation and logistics sectors presents specific challenges related to financial pressures that may arise from regulatory changes and the need to invest in environmentally friendly technologies. Companies that are not prepared to adopt low-emission technologies and improve resource management practices may face increased operational costs.[5] This situation could lead to a decline in financial performance and heighten the risk of financial distress. Additionally, adapting to sustainability standards also requires major operational changes, affecting companies' efficiency and competitiveness.

As an archipelagic country, Indonesia is highly dependent on the maritime transportation sector for the distribution of goods and services. Blue economy policies require companies in this sector to reduce the environmental impact of their activities, such as through the use of cleaner fuels, improved energy efficiency, and the reduction of marine waste. However, this transition often requires significant investment, especially for companies still using outdated technology.[6] If not properly managed, the transition to blue economy practices could lead to financial instability, exacerbating companies' financial distress.

This study uses a literature review with a bibliometric analysis method of various journals. The main focus of this research is to identify current trends, methodological innovations, and empirical comparisons by examining the relationship between various topics on the blue economy and financial distress in transportation and logistics companies. The aim of this research is to provide deeper insights into the blue economy and financial distress in an ever-changing business environment.[7]

2 Literature Review

2.1 Blue Economy

The blue economy concept focuses on the sustainable use of marine resources to address environmental challenges affecting marine ecosystems, such as overfishing, ocean pollution, and the impacts of climate change. According to the World Bank, the blue economy encompasses all economic activities related to oceans and coasts, including fisheries, maritime tourism, marine energy, transportation, and logistics. In island nations like Indonesia, the maritime sector plays a crucial role in economic growth. However, as blue economy policies are implemented, companies operating in the maritime sector, including transportation and logistics, face demands to reduce their environmental impact, which could affect their financial stability. [8] The

transportation and logistics sectors, especially those involved in sea freight, are key players in supporting the implementation of the blue economy, given the significant use of fuel and greenhouse gas emissions in shipping activities.

The term “blue economy” describes a multifaceted strategy for sustainable development that places a strong emphasis on the responsible use of marine resources. This strategy includes a range of interconnected actions, both directly and indirectly, that support the sustainable utilization of coastal and marine habitats. By encouraging cooperation among stakeholders and ensuring that marine resources are exploited for the benefit of both present and future generations, the goal is to achieve a balance between economic growth and environmental protection. This idea integrates social, environmental, and economic aspects to support long-term sustainable outcomes [9].

2.2 Financial Distress

Financial distress occurs when a business faces difficulties in meeting its financial obligations, often serving as a warning sign before bankruptcy. Bankruptcy occurs when a company can no longer generate enough returns to cover long-term costs. Data on a company’s financial position, performance, and changes in financial conditions can be accessed through published financial reports, which serve as a reference for more accurate decision-making. [10]

Factors influencing financial distress include liquidity, which measures a company’s ability to meet short-term obligations, and leverage, which indicates the level of debt used by the company. Profitability, measured by Return on Assets (ROA), plays a key role, as higher profitability tends to reduce the risk of financial distress. Meanwhile, cash flow from operating activities does not have a significant impact on financial distress. [10]

Damodaran explains that the causes of financial distress within companies are generally micro in nature. Internal factors contributing to this condition include:

High levels of debt

. Misjudging the amount of debt can lead to a company being unable to cover its operational costs. When it comes time to repay the debt, but the company lacks sufficient funds, this can result in the seizure of company assets.

Operational losses over several years

. Continued operational losses can result in negative cash flow due to operational costs exceeding the revenue generated.

Cash flow difficulties

. When a company’s revenue from operating activities is insufficient to cover operational costs, or due to poor cash flow management, it can worsen the company’s financial condition.

2.3 Sustainability Theory

John Elkington explains that sustainability theory encompasses three main aspects: economic, environmental, and social. These three aspects are known as the Triple Bottom Line, an approach requiring companies to focus not only on economic profit but also on the social and environmental impacts of their activities. [11] In the future, successful companies will be those that can achieve a balance between these three aspects or the triple bottom line concept.

Sustainability theory refers to the capacity to maintain or enhance the conditions and availability of resources needed in the long term. The concept of sustainability is linked to socio-ecological systems (SES) and global changes driven by human activities. Sustainability theory encompasses various key ideas, including the importance of choices, place, scale, limits, systems, change, and the interconnection of these concepts in achieving sustainability goals. [12]

3 Methodology

The bibliometric method provides a meaningful reference for management academics and organisations interested in using bibliometric methods to map research specialisations, hoping to increase objectivity in the evaluation of scientific literature and reduce researcher bias. The bibliometric methods introduced include citation analysis to measure the influence of documents, co-citation analysis to link frequently co-cited documents, authors, or journals, bibliographic coupling to measure similarities between documents based on the same references, co-author analysis to analyse collaboration between authors, and co-word analysis to look for relationships between words that appear together in documents. The bibliometric method is used to map the structure and dynamics of scientific fields, producing a visual representation that shows the relationships between research elements, similar to a geographical map. The advantages of these methods include systematicity, transparency and reproducibility in the literature review process, as well as the ability to help researchers find the most influential works. However, citation-based methods also have limitations, such as the inability to explain the reasoning behind certain citations and the potential bias of self-citation practices. [13]

The method applied in this study uses bibliometric analysis combined with a literature review. Bibliometric analysis is a systematic and planned approach to assessing scientific publications in a particular field. By using this method, researchers can reduce bias and random errors that may occur, thus increasing the accuracy and validity of research results. Bibliometric analysis is also recognised for its ability to provide in-depth insights into research trends, collaboration networks between authors, as well as topic developments within a particular field. In addition, this method is recognised as one of the more transparent and reliable approaches to building scientific theory. [14]

This research conducted a search through Google Scholar using the help of the Publish or Perish application and other sources of information using research keywords namely 'Blue economy in transport', 'Financial distress in transport', 'blue logistics'. The period used in the research is from 2010 to 2023. Literature was

searched with the keywords ‘Blue Economy’, ‘Financial Distress’ and ‘Sustainable Development’ on the google scholar data base. The selected keywords are in accordance with the interests of related and integrated researchers. In the initial stage, 300 publications were produced. Exclusion criteria were used articles that focused on the relationship between blue economy and financial distress in the transportation and logistics sector, both in Indonesia and globally, this was done to obtain relevant results. Searching and collecting data resulted in 296 articles. The data analysis technique in this study uses the help of VOSvier software.

4 Results and Discussion

This research focuses on examining the impact of the blue economy on financial distress in transportation and logistics companies. The study was conducted using data from the Google Scholar database, and 296 relevant articles were found that align with the research problem and objectives. The number of scientific documents in a field and the trend in publication growth are important metrics for evaluating the development of a research stream. Additionally, network visualizations generated using VOSviewer software were employed to investigate keyword occurrences in the specific document set. A more in-depth discussion of this will be elaborated as follows. Subsequent paragraphs, however, are indented.

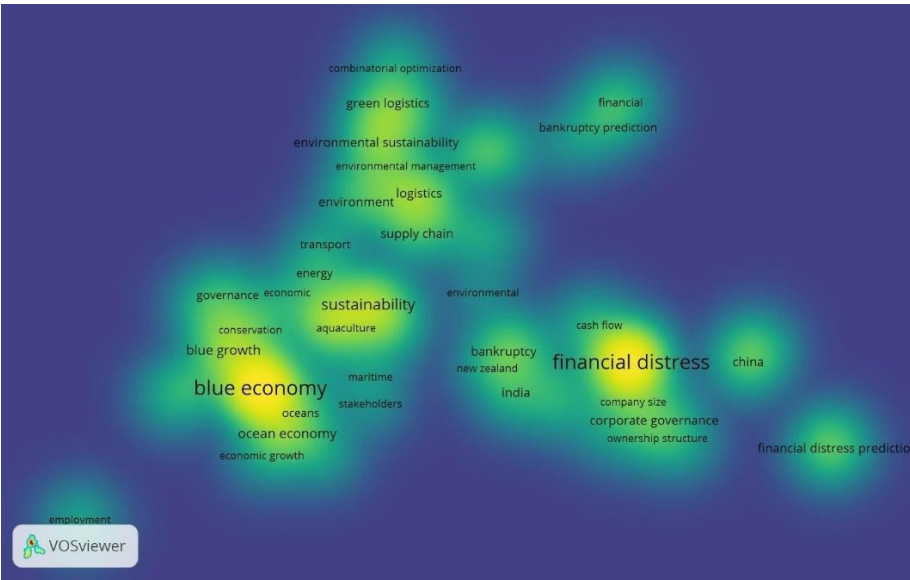


Fig. 1. The image above is a visualization of a bibliometric map.

The image above is a bibliometric map visualization generated by VOSviewer, utilizing density visualization to illustrate the relationships between frequently occurring keywords or concepts in the literature addressing "blue economy," "financial distress," and other related topics. These keywords are connected based on how often they co-occur in the literature. The more frequently the terms appear

The image above shows several clusters of closely related keywords, indicating interconnected research areas. For instance, the Blue Economy cluster focuses on ocean-based economic sustainability, while the Financial Distress cluster is related to research on financial difficulties and corporate governance. Some topics link Blue Economy and Financial Distress, such as Corporate Governance and Sustainability, highlighting how these two themes can be connected in the literature. Key Topics in the image above:

1. **Blue Economy:** Surrounded by terms like Blue Growth, Ocean Economy, Governance, and Conservation, indicating that these concepts are often discussed together in the context of the Blue Economy. This encompasses aspects of marine sustainability and environmental protection.
2. **Financial Distress:** Surrounded by terms such as Bankruptcy, Corporate Governance, Company Size, and Cash Flow, showing a strong link to research on financial management, bankruptcy, and corporate governance.
3. **Sustainability:** Positioned between Blue Economy and Financial Distress, and connected to topics such as Environmental Sustainability, Logistics, and Supply Chain. This highlights the crucial relationship between sustainability and both economic and environmental challenges.

Overall, this visualization illustrates how concepts like Sustainability, Blue Economy, and Financial Distress are interconnected in the analyzed research.

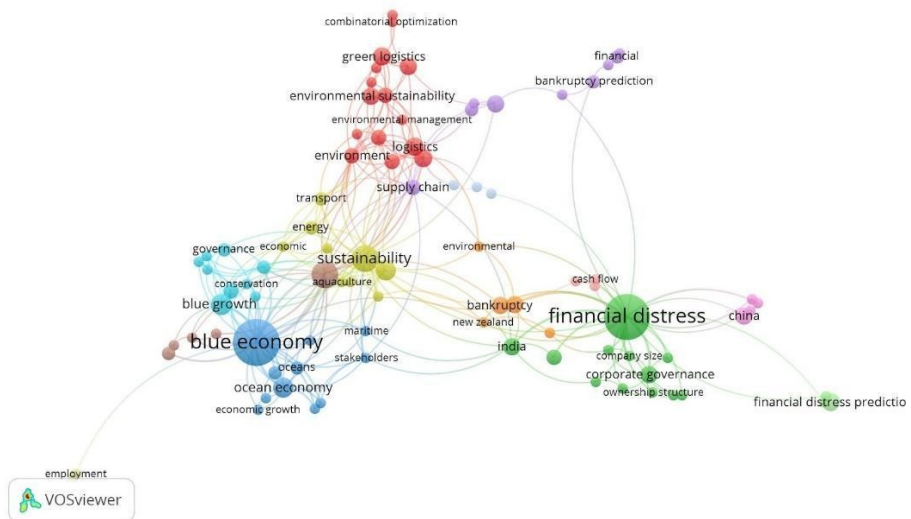


Fig. 2. The image above is a Network visualization of a bibliometric map.

The figure presented is a network visualization generated through VOSviewer, depicting the interrelationships among keywords within the literature. This network highlights how diverse concepts are linked in studies addressing subjects like the blue economy, sustainability, and financial distress. The following is a detailed analysis of the network's structure and the connections between these key topics:

1. **Clusters Based on Color:** This visualization reveals various clusters (indicated by different colors) representing interconnected research topics or themes. The colors signify groups of keywords that frequently appear together in the literature, forming related research clusters. For example: Blue: Focuses on the blue economy and related topics such as ocean economy, blue growth, governance, and conservation. This cluster centers on the maritime economy and its sustainability. Green: Emphasizes financial distress and associated concepts like corporate governance, cash flow, company size, and ownership structure, which concentrate on corporate financial management. Red: Highlights environmental sustainability, logistics, and green logistics, showcasing the link between environmental sustainability and supply chain management. Yellow: Connects sustainability, energy, and aquaculture, bridging sustainability with energy resources and marine agriculture.
2. **Nodes and Relationships:** Nodes: Each circle or point in this visualization represents a specific keyword or concept. The larger the node, the more frequently the concept appears in the analyzed literature. Relationships: The lines connecting the nodes indicate the frequency of co-occurrence between these keywords. Thicker lines represent stronger relationships or a higher frequency of co-occurrence between the concepts.
3. **Interconnection Between Clusters:** The visualization also displays the connections between different clusters. For example, the blue economy cluster (blue) is closely related to the sustainability cluster (yellow), and the financial distress cluster (green) also shows links to topics from the corporate governance and bankruptcy clusters (orange). This suggests that these topics are interconnected in the research.
4. **Main Research Focus:** Blue Economy: This cluster addresses topics related to the management of marine resources, the sustainability of maritime economies, and conservation efforts. Financial Distress: This cluster focuses on corporate financial difficulties, bankruptcy prediction, and corporate governance. Sustainability and Environmental Logistics: This cluster connects environmental sustainability with green logistics and supply chain management.
5. **Use in Bibliometric Analysis:** The network in this figure utilizes a co-occurrence method in bibliometric analysis, showing how often two keywords appear together in the literature. The goal of this visualization is to identify research trends, emerging fields, and the relationships between topics. Clustering: This method helps to understand the structure of the literature and to identify closely related research areas.

Overall, the figure provides an overview of the research structure in the areas of the blue economy, financial distress, and sustainability, highlighting the connections between major topics and their related subtopics.

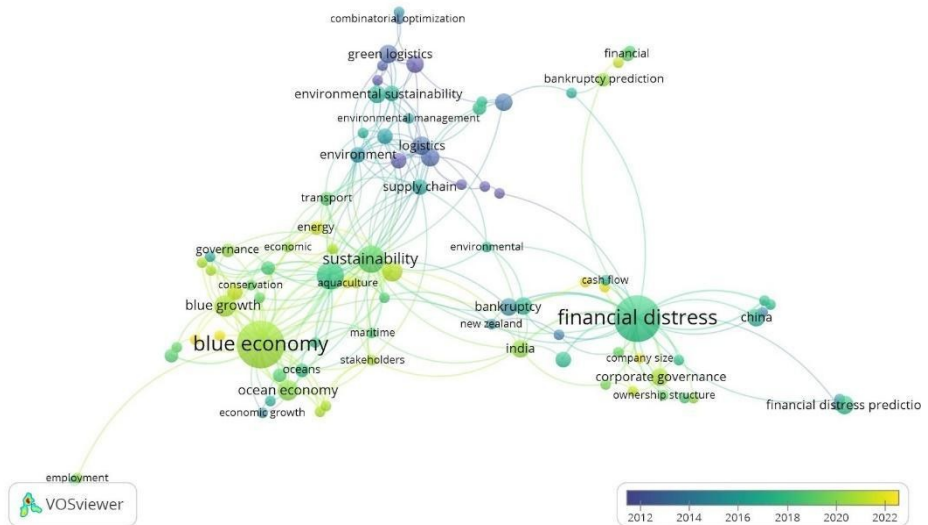


Fig. 3. The image above is an overlay visualization of a bibliometric map.

The figure above is an overlay visualization from a bibliometric analysis using VOSviewer, depicting the temporal development of keywords in the analyzed literature. This explanation focuses on the key elements within the context of bibliometric analysis methods:

1. **Overlay Visualization:** This visualization displays the temporal progression of keywords used in the literature. The colors in the image represent when a topic or keyword gained popularity. Dark purple to blue shades indicate keywords that were frequently mentioned in earlier years (around 2012), whereas yellow represents keywords that have recently gained prominence (around 2022).
2. **Recent and Older Keywords:** New Topics (Yellow): Topics such as financial distress, bankruptcy prediction, and green logistics are highlighted in brighter colors, indicating that these are more recent topics and are trending in the latest literature. Older Topics (Blue-Purple): Terms like blue economy, sustainability, and environment have been present in research for a longer time, with their peak popularity occurring several years ago.
3. **Interconnected Clusters:** Dark Blue Cluster: As seen in the lower-left part of the image, topics related to blue economy and ocean economy emerged earlier (around 2012-2014). Yellow and Green Clusters: In the lower-right

section, topics such as financial distress, corporate governance, and ownership structure have gained increasing popularity closer to 2022.

4. **Relationships Between Topics: Sustainability and Logistics Management:** The relationship between sustainability, environmental management, and green logistics indicates that these topics are frequently discussed together in the context of environmental sustainability and supply chain management, as well as green logistics. **Financial Distress and Corporate Governance:** Topics like financial distress and corporate governance are often linked with research focused on corporate financial difficulties and good governance practices, showing how financial challenges and governance are interconnected.
5. **Research Trends:** The visualization reveals that research on the blue economy and sustainability has been an earlier focus and continues to evolve. Research on financial distress, bankruptcy prediction, and corporate governance has seen rapid growth in recent years, suggesting a rising interest in these topics within the context of global economic challenges and financial difficulties.
6. **Bibliometric Methods in This Context: Co-occurrence Analysis:** This visualization uses co-occurrence analysis to identify how frequently two or more keywords appear together in the same research. **Temporal Overlay:** This method provides insights into the evolution of research trends over time, allowing researchers to identify both emerging and well-established topics

Based on the findings from the article, a map of issues related to the impact of blue-green initiatives on financial distress in transportation and logistics companies has been identified. Key issues include the challenges faced by transportation companies in adopting blue logistics initiatives, particularly due to rising operational costs. These challenges are primarily associated with investments in environmentally friendly technologies, such as electric vehicles and green infrastructure. The implementation of sustainable logistics strategies often increases financial burdens on companies, which can contribute to financial distress. **Impact on Companies:** The high initial costs of capital and new technologies, combined with the uncertainty surrounding the return on investment (ROI) from blue technologies, can lead to an inability to maintain stable cash flow. This exacerbates the risk of financial distress for companies operating in already competitive sectors like transportation and logistics.

In efforts to achieve sustainability, transportation and logistics companies often experience financial pressure due to a lack of incentives and financial support from the financial sector. This exacerbates their inability to fund the blue transformation, leaving many companies financially vulnerable. The lack of access to blue financing is one of the main obstacles for transportation and logistics companies in adopting blue economy practices. Many companies do not have sufficient capital to implement sustainable innovations, putting them at risk of financial distress as they attempt to align their operations with blue standards.

The need to adjust operations to comply with strict environmental policies, without adequate financial support, further increases the risk of financial distress. Many

companies struggle to allocate resources for investments in blue technologies, leading to long-term financial instability. Although there are policies encouraging blue transformation, transportation and logistics companies often face high compliance costs with environmental regulations, such as carbon emissions reduction. This creates significant financial pressure, particularly for small and medium-sized enterprises (SMEs) that have limited capital.

Map of Issues Related to Financial Distress:

1. **High Initial Costs:** Companies are required to make substantial investments in blue technologies, such as environmentally friendly vehicles or sustainable infrastructure.
2. **Limited Access to Green Financing:** The lack of financial incentives or capital support from the financial sector makes the blue transformation more challenging for transportation companies.
3. **Strict Environmental Regulations:** Compliance with stringent environmental policies adds financial pressure, particularly for smaller or financially less prepared companies.
4. **Uncertainty of ROI:** Many companies hesitate to invest due to the uncertainty regarding the return on investment (ROI) timeline for blue initiatives.
5. **High Competition:** The transportation and logistics sector is already a highly competitive industry, and the increased operational costs associated with adopting a green economy can exacerbate financial risks for companies.

5 Conclusion

This study provides an in-depth discussion of the impact of the blue economy on financial distress in transportation and logistics companies in Indonesia. The blue economy has become increasingly significant in global policy development, particularly for archipelagic nations like Indonesia, which possess abundant marine resources. Aimed at promoting sustainable development through the responsible utilization of marine resources, the blue economy presents both challenges and opportunities for the transportation and logistics sector, which heavily depends on maritime activities. The study indicates that the implementation of blue economy policies must be approached cautiously, considering the potential financial risks faced by companies in this sector.

The link between the blue economy and financial distress highlights the challenges companies encounter in adopting environmentally friendly technologies and sustainability practices. This research finds that transportation and logistics companies must invest in low-emission technologies and enhance operational efficiency. However, high initial costs and limited access to green financing remain key barriers, exacerbating the risk of financial distress, especially in the face of intense competition and increasing pressure to comply with stricter environmental regulations.

Additionally, the bibliometric analysis results show a growing trend in research related to the blue economy and financial distress. The network visualization using

VOSviewer software identifies connections between key concepts such as sustainability, corporate governance, and the blue economy's impact. This study emphasizes the need for further research to explore these relationships and to understand how companies can adapt to expected sustainability policies and practices to mitigate negative financial impacts.

From a practical perspective, companies in the transportation and logistics sector are encouraged to seek innovative strategies in financing and investing in green technologies. The government and financial institutions also play a crucial role in providing support and incentives for companies to transition to blue economy practices. With adequate support, companies can not only reduce their environmental impact but also strengthen their financial position in the long term.

Overall, this study underscores the importance of integrating the blue economy into the business strategies of transportation and logistics companies to achieve sustainability. Successful implementation of these policies will not only benefit the environment but also enhance the financial resilience of companies. Therefore, collaboration between stakeholders, including the government, industry, and financial institutions, is vital to support this transition and minimize the risk of financial distress in a sector crucial to Indonesia's economy.

Research Limitations

1. . Scope of Bibliometric Analysis: The study relies heavily on bibliometric analysis, which, while systematic, may not capture the full context behind certain research findings or why specific citations were made. This limits the depth of the conclusions drawn from citation patterns alone.
2. Geographical Focus: Although the article discusses the blue economy in a global context, its primary focus is on Indonesia. The findings may not be fully applicable to other regions with different maritime economies or logistical challenges, reducing the generalizability of the study's results.
3. Time Frame of Analysis: The research uses data from 2010 to 2023. Given the rapid evolution of sustainability practices and technologies, findings based on past literature may not reflect the latest developments in green logistics and blue economy technologies.
4. Data Availability: The study draws on secondary data sources, which could limit the depth of insight into real-world challenges faced by companies. Financial distress and the implementation of blue economy initiatives may vary in practice, depending on company-specific factors that are not captured in published literature.
5. Lack of Primary Data: The article does not incorporate primary data from companies experiencing financial distress due to blue economy initiatives. First-hand data collection through interviews or surveys could provide richer insights into the practical challenges these companies face.

Suggestions for future Research

1. . Primary Case Studies: Future research could utilize primary data from transportation and logistics companies directly involved in the

- implementation of blue economy initiatives. Case studies would provide deeper insights into the practical challenges, adaptation strategies, and financial impacts of sustainability policies in various companies and sectors.
2. International Comparative Analysis: To broaden the findings, future research could conduct a comparative analysis between other maritime nations, particularly those implementing blue economy policies with different geographical and economic characteristics. This would help determine whether the findings from Indonesia can be generalized or whether significant variations exist in the challenges faced by companies in different countries.
 3. Role of Government Policies and Financial Support: Further studies could explore the role of government and financial institutions in facilitating the adoption of environmentally friendly technologies in the transportation and logistics sectors. This could include evaluating incentive programs, green loans, and financing policies that support the transition to a blue economy.
 4. Long-Term Studies on ROI of Green Technologies: Given the uncertainty around the return on investment (ROI) for environmentally friendly technologies, future research could examine the long-term ROI. This is crucial to understand the broader financial benefits of green investments, especially in the logistics sector.
 5. Impact of Technological Innovations on Operational Efficiency: Future research could focus on the impact of green technological innovations on the operational efficiency of logistics companies. This could involve measuring how new technologies help reduce long-term operational costs and enhance the competitiveness of companies.

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