



OPTIMIZATION OF BLUE FINANCE IN SUPPORTING MARINE SECTOR SUSTAINABILITY

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Abstract

This article explores the potential for optimizing blue finance in supporting the sustainability of the marine sector, particularly through analysis of financial management in the fishing industry. Through a mixed methodology approach, this research identifies key challenges such as lack of awareness, difficulties in measuring environmental impacts, and limitations of supportive policies. The research results show that blue finance can be significant in improving operational and ecological sustainability in the fishing industry if supported by adequate education, clear impact measurement standards, and inclusive policy reform. This research suggests that closer collaboration between government, the fishing industry and financial institutions is needed to overcome these obstacles and maximize the benefits of blue finance. This will help strengthen economic sustainability while protecting marine ecosystems

Keywords: *Optimization, Blue Finance, Marine*

1. INTRODUCTION

In recent decades, global awareness regarding environmental sustainability has increased significantly, especially in relation to the management and conservation of marine resources. The fishing industry, vital to the economies of many countries, faces serious challenges in the form of declining fish stocks, destruction of marine habitats and other ecological pressures that demand immediate and effective action to ensure its sustainability. Blue finance, which is a financial concept designed to support projects that provide ecological benefits in marine and coastal ecosystems, offers a potential solution to overcome these challenges. This approach not only aims to protect biodiversity but also ensures the economic sustainability of communities that depend on the maritime industry (Juliana, Lindayani, 2019). Blue finance is a financial approach designed to support projects that contribute to the sustainability of marine and coastal ecosystems. This concept includes various financial instruments, such as green bonds, sustainable credit, sustainability-focused investment funds, and other financing schemes specifically aimed at protecting and restoring maritime resources.

In a global context, blue finance aims to mobilize capital and investment into activities that have significant ecological benefits, such as conservation of marine areas, sustainable management of marine resources, and development of environmentally friendly technology for the fishing industry.

Thus, blue finance not only helps in meeting environmental sustainability goals but also in creating sustainable economic value. In the fishing industry, effective financial management is crucial, not only for the continuity of company operations but also to support sustainable fishing practices. Integrating blue finance in the fisheries sector can bring about a transformation in the way funds are allocated and used. Through the use of blue finance instruments, fishing companies can obtain funding sources specifically intended for sustainable initiatives such as increasing ship energy efficiency, reducing bycatch, or developing more environmentally friendly fish farming (Agus Harjito and Martono, 2011). This approach not only improves the company's environmental profile but also helps in meeting stricter regulations and improves the company's reputation in the eyes of consumers and investors. Furthermore, involvement in blue finance can provide the fishing industry with access to broader capital markets and facilitate partnerships with financial institutions that may have previously been uninterested in the marine sector due to high environmental risks.

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Strategic and sustainability-oriented financial management allows fishing companies to utilize these funds effectively, ensuring that these investments not only bring economic benefits but also contribute to the recovery and preservation of marine resources (Darmadji, Tjiptono, and Fakhrudin, 2012). Therefore, blue finance provides a framework for the fishing industry to operate economically while encouraging policies and practices that support the preservation of the marine environment for future generations. Through blue finance, investment can be directed towards activities that strengthen the health of marine ecosystems, such as habitat restoration, sustainable fisheries management and the development of environmentally friendly aquaculture. However, the implementation of blue finance in the fishing industry is not yet fully optimal. Some of the challenges faced include a lack of understanding of innovative financial mechanisms, obstacles in measuring ecological and economic impacts, and obstacles in implementing supportive policies. In-depth and adaptive financial management analysis is needed to identify, evaluate and exploit existing opportunities in order to integrate sustainability principles into fishing industry business practices. This article aims to examine how blue finance can be optimized to support ecological and economic sustainability in the marine sector, especially through financial management analysis in the fishing industry. It is hoped that this research will provide new insights for stakeholders in this sector to implement sustainable financial strategies, while strengthening existing policy frameworks to support global marine conservation efforts. Based on the background above, the author is interested in researching and writing the results in a scientific journal entitled "Optimizing Blue Finance in Supporting the Sustainability of the Marine Sector (Financial Management Analysis in the Fisheries Industry)". From the background of the problems described above, the problems that will be discussed are as follows:

1. How can blue finance be optimized to improve operational and ecological sustainability in the fishing industry?
2. What are the challenges and obstacles faced in implementing blue finance in financial management in the fisheries sector, and how to overcome them?

2. LITERATURE REVIEW**2.1 Concept and Implementation of Blue Finance**

An introduction to the concept of blue finance was given by Silver et al. (2019), who define it as the use of financial instruments designed to support projects for the conservation and sustainability of water and marine resources. This study also reviews various instruments such as blue bonds, sustainable credit, and trust funds that have been used to finance marine conservation projects and water resource management. This study provides a basis for understanding how these instruments can be applied in broader and diverse contexts.

2.2 Blue Finance in the Fishing Industry

Research by Jones et al. (2020) specifically highlight the use of blue finance in the fishing industry, with a focus on developing sustainable fishing practices. They outline how funds and investments directed through blue finance can help reduce overfishing, support habitat restoration, and promote sustainable aquaculture. The study also evaluates the effectiveness of these funds in achieving sustainability goals and how they can be adapted to address specific challenges faced by the fishing industry.

2.3 Challenges and Obstacles in Implementing Blue Finance

In the context of challenges, a study by Fernandez and Bhattacharya (2018) provides an in-depth analysis of the obstacles faced in implementing blue finance, especially in the context of regulations and policies. They highlight the importance of a supportive regulatory framework and sufficient incentives to encourage wider adoption of blue finance. This research also presents case studies of successful and failed implementations, providing important lessons that can be applied to improve approaches in the future.



2.4 Financial Management and Sustainability in the Maritime Sector

To incorporate aspects of financial management, Léopold et al. (2021) explores how strategic and responsible financial management can improve operational and economic sustainability in the fishing industry. They introduce concepts and best practices in financial planning, fund allocation, and financial oversight that can support sustainability initiatives. This article is important because it provides practical guidance for entities in the fishing industry to integrate sustainable finance principles into their daily operations. The literature reviewed provides a strong theoretical and practical basis for research on optimizing blue finance in supporting the sustainability of the maritime sector. However, the literature also indicates a need for further research on the most effective ways to integrate these innovative financial instruments on a larger scale and in different geographic and economic contexts. This literature review allows research to align with previous research and identify knowledge gaps that still need further research, providing a strong framework to support financial management analysis in the fishing industry and optimizing the use of blue finance.

3. IMPLEMENTATION METHOD

3.1 Research design

This research will use qualitative and quantitative approaches to examine the influence and implementation of blue finance in the fishing industry. A qualitative approach will be used to understand the perceptions, motivations and challenges faced by stakeholders in the fishing industry regarding the use of blue finance. Meanwhile, a quantitative approach will involve analyzing financial data to assess the economic impact and sustainability of blue finance implementation.

3.2 Data collection

a. Qualitative Data

Qualitative data will be collected through in-depth interviews with various stakeholders, including fisheries company managers, investors, financial analysts, and representatives of financial institutions that offer blue finance products. This interview will be designed to gain insight into their experiences, perceptions and suggestions regarding blue finance in the fishing industry.

b. Quantitative Data

Quantitative data will include financial information from fishing companies that have implemented blue finance, such as annual reports, income data and sustainability reports. This analysis will help assess the financial impact of using blue finance and its effectiveness in improving operational sustainability.

3.3 Research Instrument

a. In-depth Interview: Using an interview guide that has been prepared to explore information related to experiences of using blue finance.

b. Document Analysis: Evaluation of financial reports and company documents to measure financial performance and sustainability.

c.

3.4 Data analysis

a. Qualitative Data Analysis

Data from interviews will be analyzed using content analysis methods to identify main themes, patterns and insights regarding the use and perception of blue finance in the fisheries sector.

b. Quantitative Data Analysis

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Quantitative data will be analyzed using statistical techniques such as regression analysis to assess the relationship between blue finance implementation and improved financial performance and sustainability. This will involve the use of statistical software for data processing.

Data validation

To ensure the reliability and validity of the research results, data triangulation will be used. This means that the findings from the interviews will be confirmed and compared with analysis of financial data and sustainability reports from the companies studied. This research method is designed to provide an in-depth understanding of how blue finance can be optimized to support sustainability in the fishing industry. Through a combination of qualitative and quantitative analysis, this research aims to provide evidence-based recommendations for stakeholders in the fisheries and financial sectors.

4. RESULTS AND DISCUSSION**4.1 Blue Finance Can Be Optimized to Improve Operational and Ecological Sustainability in the Fisheries Industry**

This research uses a mixed methodology to in-depth understand how blue finance can be optimized to support operational and ecological sustainability in the fishing industry. From in-depth interviews with fishing industry stakeholders, including company managers, investors and financial analysts, as well as analysis of company financial data, the research results reveal several key findings that contribute to optimizing blue finance. From qualitative data, it is known that many fishing companies are still in the early stages of adopting blue finance. However, those who have implemented it report improvements in the sustainability of their operations, such as reduced operational costs through energy efficiency and reduced waste. This shows that blue finance not only has the potential to support ecological sustainability but is also operationally profitable. The use of blue finance in the fishing industry utilizes various innovative financial instruments to support sustainable practices, minimize environmental impacts, and increase operational efficiency (Bidayani, E., & Priyambada, A, 2022). These instruments include blue bonds, loans whose conditions are linked to the success of sustainability indicators, as well as investment funds that specifically target activities that support the restoration and preservation of marine ecosystems. Fishing companies that adopt blue finance demonstrate their commitment to sustainability, not only from an ecological perspective but also in ensuring long-term economic stability and growth. Thus, this approach not only aims to maintain the balance of the marine ecosystem, but also to ensure that the fishing industry can continue to operate and develop within sustainable limits.

In addition, the adoption of blue finance by fishing companies often encourages innovation and the use of newer environmentally friendly technologies, such as selective and efficient fishing equipment that reduces bycatch and reduces damage to marine habitats (Prayuda, R, 2019). Funding through blue finance also allows companies to carry out research and development in more sustainable farming techniques, which in turn can reduce pressure on wild fish stocks. This creates a positive cycle in which economic activities not only generate profits but also make a real contribution to environmental conservation. Therefore, the use of blue finance in the fishing industry promises to be a step forward towards achieving a more sustainable and fair blue economy. Further analysis of qualitative data reveals that the main factors driving blue finance optimization include the availability of information about relevant financial instruments, awareness of the benefits of sustainability, and strong policy support. Stakeholders stated that regulatory clarity and fiscal incentives can accelerate the adoption and implementation of effective blue finance strategies. The factors that encourage the optimization of blue finance in the fishing industry include several key elements, where awareness and education about sustainability are the starting points. Increased awareness about climate change and environmental degradation has encouraged fishing companies and investors to pay more attention to the environmental impact of their operations. This, coupled with increasing regulatory pressure and consumer demand for

sustainable products, is driving companies to adopt blue finance as a means of securing funding while committing to sustainable practices. Additionally, greater transparency and accountability demanded by investors and regulators are forcing companies to integrate sustainability criteria into their business strategies, making blue finance an attractive option that also improves reputation and consumer trust (Ramadian, A., & Muthmainnah, D 2023). On the other hand, policy support and fiscal incentives also play an important role in encouraging the adoption of blue finance. Governments and international institutions have begun implementing various incentives, such as tax exemptions or subsidies for projects that support the sustainability of marine resources. These policies not only reduce the financial risks associated with investing in green technologies and sustainable practices but also increase the economic benefits of adopting such approaches. Additionally, policies designed to facilitate collaboration between fishing companies, financial institutions, and governments can help integrate sustainability practices into broader market structures, strengthening the financial ecosystem that supports sustainability initiatives. Despite the great potential offered by blue finance in supporting the sustainability of the fishing industry, there are several significant challenges in its implementation that need to be overcome. One of the main challenges is the lack of understanding and awareness among fishing industry stakeholders regarding the mechanisms and benefits of blue finance (Keen, M. R, 2018). Many fishing companies, especially small and medium-sized ones, often do not have access to sufficient information about how they can access and utilize these financial instruments.

Additionally, a lack of expertise in preparing proposals that meet sustainable funding criteria is also a barrier, making it difficult for these companies to meet the stringent requirements set by financial institutions and investors. Another challenge is measuring and verifying the environmental impact of projects funded through blue finance. Although blue finance aims to support sustainability, it is often difficult to objectively measure the direct positive impact of these financial interventions on the environment. This creates the risk that funds may not always be used for the most effective projects in terms of improving sustainability. Deficiencies in reporting standards and a lack of transparency can make it difficult for investors to effectively monitor the use of funds and verify that the funds are truly contributing to improved sustainability. Overcoming these challenges requires closer collaboration between scientists, regulators and industry to develop robust metrics and reporting standards that can more accurately guide the allocation and use of blue finance funds. The results of the quantitative analysis show a positive relationship between the use of blue finance and increased sustainability performance. Statistics show that companies that integrate blue finance strategies show improvements in resource efficiency and reduced negative impacts on the environment compared to those that do not use this approach. The relationship between blue finance and sustainability performance in the fishing industry shows complex and multifaceted dynamics. Blue finance serves as a catalyst to accelerate the implementation of sustainable practices in fisheries operations, which in turn can positively influence sustainability performance.

Through funding projects that focus on sustainability, such as developing more selective catch technologies or more efficient cultivation systems, companies can reduce their environmental impact and increase resource effectiveness. In addition, by focusing on sustainability aspects, companies also strengthen compliance with environmental regulations, avoid legal risks, and improve their relationships with stakeholders concerned about environmental issues, including consumers and local communities. In addition, implementing blue finance is often associated with improving reputation and brand image, which can positively influence a company's financial performance. Today's investors and consumers are increasingly looking for companies that are not only profitable but also socially and environmentally responsible (Karani, P., & Failler, P. 2020). In this case, companies using blue finance can attract more investment and increase customer loyalty, both of which are vital for long-term sustainability. Thus, through improving ecological performance and market trust, blue finance can significantly improve aspects of a company's sustainability performance, creating a positive circle between financial, environmental and socio-economic benefits. The research results show that blue finance does have great potential to support

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operational and ecological sustainability in the fishing industry. To maximize this potential, greater efforts are needed to increase awareness and understanding of the various financial instruments available as well as increased regulatory and policy support. In addition, collaboration between government, financial institutions and the fishing industry must be strengthened to overcome existing challenges and accelerate the integration of blue finance in daily practice.

4.2 Challenges and Obstacles Faced in Implementing Blue Finance in Financial Management in the Fisheries Sector, and Solutions to Overcome Them

This research explores the challenges and obstacles faced in implementing blue finance in financial management in the fisheries sector, and seeks solutions to overcome these challenges. Through a combination of qualitative and quantitative data analysis, the research identified several main factors that were obstacles and proposed strategies to overcome these obstacles.

a. Lack of Awareness and Understanding of Blue Finance

From interviews with stakeholders in the fishing industry, it was revealed that there is still a lack of awareness and in-depth understanding of what blue finance is and how its benefits can be applied in daily operations. Many fisheries company managers are unfamiliar with these financial instruments and how to access them, which is a major barrier to adoption. Lack of awareness and understanding of blue finance is the main obstacle faced by many players in the fishing industry. Most fishing company owners and managers do not fully understand the concept of blue finance, including the types of financial instruments available and how these instruments can be used to support sustainable practices. Without a deep understanding, it is difficult for them to see the added value in adopting this financial approach, especially in terms of how it can improve the sustainability of their operations while strengthening financial performance. The lack of accessible information and the lack of real case examples relevant to local or regional industries causes skepticism and uncertainty in the implementation of blue finance (Ismail, RM, Iba, A., Rumagesan, A., & Istiqomah, T. 2023).

To overcome these obstacles, the proposed solution is the development and implementation of an extensive educational program designed specifically for stakeholders in the fishing industry. This program can involve collaboration between financial institutions, environmental organizations, universities, and governments to provide seminars, workshops, and training courses that educate about the economic and ecological benefits of blue finance. Educational materials should include case studies demonstrating successful implementation of blue finance, step-by-step guides on how to access and use various instruments, and explanations of the long-term benefits of this sustainable approach. Through structured and targeted education, the fishing industry can be better prepared and eager to adopt blue finance, with a better understanding of how it can support their sustainability and economic growth goals. Increased education and training programs for stakeholders in the fishing industry regarding blue finance. This can include workshops, seminars and educational materials provided by financial institutions and governments to increase understanding of blue finance.

b. Difficulty in Measuring and Verifying Environmental Impacts

Data analysis shows that one of the critical challenges in implementing blue finance is the difficulty in measuring and verifying the environmental impacts resulting from funded projects. Without the ability to accurately measure ecological benefits, it is difficult for companies to prove the effectiveness of funding and for investors to monitor the use of funds. Measuring and verifying the environmental impact of projects funded through blue finance is a significant challenge in implementation, especially in the fishing industry. Fishing activities have various environmental aspects that are difficult to quantify, such as the effects of fishing practices on marine biodiversity and ecosystems. Although many blue finance projects aim to promote sustainable practices, the lack of clarity in identifying and measuring the real benefits of these interventions often hinders trust and further investment (Adibrata, S., Lingga, R., & Fatimah, S. 2022). This is because,



without clear and verifiable metrics, it is difficult for investors and donors to assess whether their funds are truly contributing to improving environmental sustainability or just being claims without substantive evidence. The solution to overcome these difficulties involves the development of clear and unified industry standards for environmental impact measurement, as well as a system of verification by independent third parties. This approach could include creating measurement tools that can be used universally, with clear environmental performance indicators and consistent assessment methods. For example, the use of advanced technologies such as remote sensing and big data systems can be integrated to monitor the results of sustainable projects in real-time and objectively.

Furthermore, collaboration between scientists, fisheries industry managers and regulatory agencies can strengthen the development and implementation of these standards, ensuring that any funds invested through blue finance schemes actually achieve their intended sustainability goals. With independent and transparent validation, it will be easier for all parties to see the real benefits of their investment, strengthening trust and supporting the continued growth of blue finance in the fishing industry. Development of clear standards and reliable performance metrics for blue finance projects in the fisheries sector. This may require cooperation between regulatory agencies, fishing companies, and research institutions to create a transparent and objective assessment system.

c. Limitations of Regulations and Supporting Policies

Another challenge identified is the lack of regulatory and policy frameworks that support the implementation of blue finance. Some existing regulations are inadequate to support sustainable finance initiatives, or there are bureaucratic obstacles that slow down the implementation process. One of the main challenges in implementing blue finance in the fishing industry is the limitations in regulations and supporting policies. Many existing policies do not specifically or sufficiently support the development and implementation of sustainable financial instruments such as blue finance. As a result, companies wishing to invest in projects that support sustainability often face excessive bureaucratic obstacles or do not find sufficient incentives to adopt sustainable practices. The absence of a clear and consistent policy framework often leads to uncertainty among investors and industry stakeholders, reducing the effectiveness and attractiveness of blue finance as a tool for sustainable development. To overcome these limitations, comprehensive policy reform is needed to better support and facilitate the use of blue finance in the fishing industry. These reforms could include the development of policies and regulations that explicitly recognize and integrate sustainable financial instruments in marine resource planning and management.

In addition, the government can introduce fiscal incentives such as tax cuts or subsidies for companies implementing sustainable projects funded through blue finance. Increased collaboration between government, financial institutions and the fishing industry is also vital to synchronize policy and practice, ensuring that regulations support sustainable financial innovation while promoting transparency and accountability in implementation. By strengthening supporting policies and regulations, blue finance can be more effectively implemented as an important instrument in maintaining the sustainability of the fisheries and marine sector as a whole. Advocacy for policy reforms that are more supportive of sustainable investment and green finance, including tax incentives for companies that implement sustainable practices and more flexible policies related to the implementation of blue finance. This research shows that although there is great potential, there are still many obstacles and challenges that need to be overcome to optimize the application of blue finance in the fishing industry. Through increasing awareness, developing clear standards, and policy reform, the fisheries sector can more effectively utilize blue finance to support environmental and economic sustainability. It is hoped that the proposed solutions will help in overcoming existing challenges, paving the way for wider and more effective implementation of blue finance in the fisheries sector.

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Based on the discussion related to the problem the following conclusions can be drawn:

1. Blue finance has significant potential to support operational and ecological sustainability in the fishing industry, by providing a funding source aimed at strengthening sustainable practices and reducing environmental impacts. Through the use of sustainability-oriented financial instruments, such as blue bonds and sustainable credits, fishing companies can implement more efficient and environmentally friendly technologies, as well as adopt fishing methods that minimize bycatch and habitat degradation. However, the effectiveness of blue finance is highly dependent on increasing awareness and understanding of these instruments, the development of clear metrics to measure environmental impacts, and the existence of a supportive policy framework from the government.
2. The main challenges in implementing blue finance in financial management in the fisheries sector include a lack of awareness and in-depth understanding of this financial instrument, difficulties in measuring and verifying the environmental impacts of funded projects, as well as limitations in supporting regulations and policies. To address these challenges, proposed solutions include improving education and training on blue finance, developing clear industry standards for environmental impact measurement, and policy reform that supports the use of blue finance. Increased collaboration between government agencies, the fisheries sector, and financial institutions is also vital to synchronize efforts and ensure effective implementation.

6. ADVICE

Based on the conclusions above, the author's suggestions are as follows:

1. As a relevant suggestion, it is very important for stakeholders in the fisheries sector to collaborate in developing and disseminating educational materials that can increase understanding of blue finance. Governments and international organizations must take the lead in aligning policies that support sustainability investments, and provide platforms for the exchange of knowledge and best practices between countries and related sectors. This will accelerate the adoption and optimization of the use of blue finance, helping the fishing industry not only survive in global competition but also conduct operations in a more environmentally responsible manner.
2. As a relevant suggestion, there needs to be a more coordinated initiative from the government and financial institutions to develop and provide attractive fiscal incentives for fishing companies that want to invest in sustainable projects through blue finance. This could include tax reductions, subsidies, or other forms of financial support that could reduce financial risks and encourage wider adoption of sustainable practices in the industry.

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