Quantitative Economics and Management Studies (QEMS) *ISSN: 2722-6247 (online)*
Vol. 6 No. 3 (2025)
https://doi.org/10.35877/454RI.qems3991

Blue Economy Financing: Sustainable Aquaculture in Indonesia

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Abstract

The aquaculture sector is a strategic component in Indonesia's marine development, but its sustainability faces serious challenges such as environmental degradation, limited access to finance, and low adoption of environmentally friendly practices. This study aims to analyze the influence of Blue Economy Financing (BEF) on Sustainable Aquaculture (SA), considering the mediating role of environmental, social and governance (ESG) factors. The study uses an explanatory quantitative approach using the Partial Least Squares–Structural Equation Modelling (PLS-SEM) method, based on sample data of 120 seaweed farmers in the coastal area of South Sulawesi. The results of this study show that BEF strongly supports the sustainability of sustainable aquaculture. However, ESG mediation has no effect on increasing the role of BEP in the development of SA. Although the model has adequate predictive capabilities for sustainability, the influence of BEF on ESG is not strong enough to explain and convince the public, investors and the government for the development of SA. To optimize the role of ESG as a catalyst for sustainability, supporting strategies such as institutional strengthening, technological innovation, and integrated policy interventions are needed. This research confirms that BEF is an important instrument in encouraging sustainability transformation in the aquaculture sector. These findings provide practical implications for the development of a more adaptive blue financing scheme in supporting Indonesia's sustainable marine development agenda.

Keywords: Blue Economy Financing, ESG, Sustainable Aquaculture, Aquaculture, Sustainable Financing.

Received: 9 May 2024 Revised: 12 June 2024 Accepted: 25 June 2025

1. Introduction

Indonesia as the largest archipelagic country in the world has great potential in the aquaculture sector, with an area of aquaculture waters reaching around 17.91 million hectares, and a potential economic value estimated at USD 250 billion per year (KKP, 2024). Latest data from (FAO, 2024) noted that in 2022, global aquaculture production reached around 130.9 million tons, of which Indonesia occupies the third largest position after China and India, with a contribution of about 7% of such global production. Nationally, Indonesia's aquaculture production has increased, reaching a total of around 17.17 million tons in 2024 from the previous around 16.97 million tons in 2023 (KKP, 2024). The growth of the aquaculture sector has a positive impact on strengthening national food security, creating jobs, and encouraging the development of small and medium enterprises (SMEs). However, the rapid development of this sector also faces various significant challenges, such as climate change, diseases in aquaculture commodities, degradation of the coastal environment, limited access to modern technology, and minimal capital for small business actors.

This sector not only contributes significantly to national food security but also provides employment for millions of coastal communities. However, the rapid growth of aquaculture in Indonesia faces various sustainability challenges. Unfriendly aquaculture practices have led to the degradation of coastal ecosystems, including the conversion of mangrove forests into shrimp ponds, resulting in the loss of natural habitats and a decline in environmental quality. In addition, the unsustainable use of feed and water pollution from aquaculture waste worsen the condition of aquatic ecosystems. On the other hand, access to finance is a major obstacle for small-scale fish farmers to adopt sustainable aquaculture practices. Limited capital, lack of collateral, and high risks in the fisheries sector make financial institutions

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reluctant to provide credit to aquaculture business actors. As a result, many farmers are forced to maintain traditional practices that are less environmentally friendly and less efficient (Riany et al., 2023).

Sustainable Blue Economy development can only be achieved if it ensures equitable access to marine resources, inclusive distribution of benefits, and protection of vulnerable groups from social and environmental risks. For this reason, the marine sector financing scheme must avoid human rights violations, including the rights of indigenous peoples, and ensure the sustainability of coastal communities' livelihoods. Additionally, it is important to ensure that investments do not pose additional risks to safety, health, or discriminate based on age, gender, disability, or socio-economic status (Sri Yanti et al., 2022). To overcome these challenges, the concepts of Blue Economy and Blue Financing emerged as innovative solutions. The Blue Economy emphasizes the sustainable use of marine resources for economic growth, improving social welfare, and preserving the environment. Meanwhile, Blue Financing includes financial instruments such as blue bonds, blended finance, and investments based on Environmental, Social, and Governance (ESG) principles aimed at supporting sustainable marine projects (Choudhary et al., 2021). The Blue Economy offers opportunities to maximize Indonesia's maritime potential, but faces challenges such as limited funding from the State Revenue and Expenditure Budget (APBN), suboptimal management of Fisheries Management Areas (WPP), inadequate infrastructure, and the threat of increasing tourist numbers to coastal destinations. For this reason, it is necessary to accelerate the realization of Blue Finance, better WPP management, and investment in waste management infrastructure and coastal cleanup. The contribution of the maritime sector to national GDP is still not optimal and land-oriented development policies cause an imbalance in the allocation of resources between land and sea areas. The 2020-2024 National Medium-Term Development Plan (RPJMN) emphasizes the importance of marine management for the sustainable development agenda. With a funding need of USD 1,641.3 billion, the state budget is only able to cover 20-25%, so funding innovations such as Blue Finance are needed to support the marine and fisheries sectors (Kusumawardhani et al, 2023).

There are three main barriers to Blue Economy financing such as a lack of understanding of the contribution of the ocean economy to the global economy, the absence of universally accepted definitions and standards for sustainable ocean economy investments, and market distortions. These barriers hinder Blue Economy financing efforts and threaten biodiversity sustainability and ocean-based economic opportunities (Sumaila et al., 2021) To overcome these challenges, it is necessary to strengthen relationships between stakeholders to create incentives that can encourage private investment and public contributions. This can be achieved through a regulation-based financing mechanism that integrates the concept of Blue Finance in marine governance both internationally and domestically (Shiiba et al., 2022). The goal of Blue Finance is to manage and direct financial capital to support the health and sustainable governance of the oceans This includes various sectors such as fisheries management, tourism, marine pollution, coastal agriculture, and other activities that affect marine ecosystems. Marine finance utilizes public, private, and cross-sector financial instruments. However, concepts such as Sustainable Funding and Conservation Finance often face challenges in achieving sustainable income goals (Walsh, 2018).

Farmers in the marine and fisheries sectors have an important role to play in supporting the economy on the coast. They help provide jobs, maintain food security, and directly harness the potential of the ocean. However, many of these farmers still face difficulties in running their businesses sustainably, mainly due to limited access to financing and the use of cultivation methods that are less environmentally friendly. Based on the results of the author's initial observations on one of the private cooperatives that is a forum for empowering coastal communities in the South Sulawesi region, one of the cooperatives has played a strategic role in fostering farmers, especially in the aquaculture sector. Cooperatives not only function as economic entities, but also as facilitators of capacity building for fishermen and seaweed farmers through training, technical assistance, and opening up access to markets and distribution partners. The cooperative has built a network of partnerships with academics, the private sector, and local governments, including the Marine and Fisheries Service, as well as donor agencies such as UNDP. Against this background, it is important to analyze how Blue Financing can be an effective solution in encouraging the sustainability of the aquaculture sector in Indonesia. This analysis will provide insights into the potential, challenges, and implementation strategies of Blue Financing in supporting sustainable aquaculture practices, as well as provide relevant policy recommendations for relevant stakeholders.

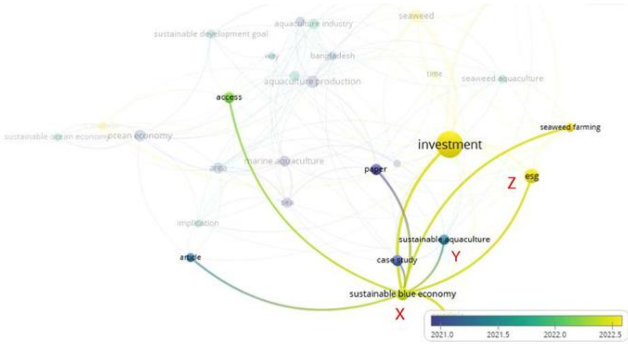

Figure 1. Vos viewer Analysis Results

Source: Vos Viewer

The results of bibliometric analysis using Vos viewer on the themes of 'sustainable blue economy' and 'aquaculture financing' show that in the last five years there has been a close relationship between keywords such as 'sustainable blue economy', 'financing', 'aquaculture production', and 'investment'. This visualization shows an increasing trend of academic and policy interest in blue financing as a catalyst for the sustainability of the aquaculture sector. In particular, terms such as 'blue economy development', 'sustainable aquaculture', and 'aquaculture system' are the latest discussions in 2022–2023.

This research departs from the importance of sustainable financing for farmers in the aquaculture sector in Indonesia. Blue Economy Financing is not only about funding, but also encourages business practices that pay attention to environmental sustainability. When financing is directed to environmentally friendly aquaculture activities such as reducing waste, using green technology, and protecting coastal ecosystems, this can help farmers more in line with the Sustainable Development Goals (SDGs), especially in the fields of food, environment, and economic inclusion. In this context, the role of blue economy financing becomes very relevant and strategic. Blue Economy Financing offers financial instruments specifically geared towards sustainable marine economic sectors, including aquaculture. This financing not only aims to support economic growth, but also ensures that development takes place in accordance with the principles of sustainability, paying attention to socio-economic and environmental aspects in a balanced manner. Through the targeted implementation of Blue Economy Financing, Indonesia's aquaculture sector is expected to not only be able to increase production and competitiveness in the global market, but also make a real contribution to preserving aquatic ecosystems and the welfare of coastal communities. Thus, this study wants to see how Blue Economy Financing encourages the realization of environmentally friendly aquaculture, and how these practices contribute to the suitability of aquaculture aquaculture with the SDGs framework

2. Literature Review

2.1. Sustainability

Sustainability is a principle that emphasizes meeting current needs without sacrificing the ability of future generations to meet their own needs. This concept was first formally introduced through a report (Brundtland Report, 1987) by the World Commission on Environment and Development. In the context of finance, sustainable finance is an approach to financial and investment management that considers economic, social, and environmental impacts in a sustainable manner. Unlike conventional finance which is oriented towards short-term profits, sustainable finance focuses on long-term value creation by considering Environmental, Social, and Governance (ESG) factors (Coleton et al., 2020). Therefore, sustainable finance requires further development in terms of regulation, standardization of impact measurement, and integration into the global financial system. With increasing awareness of climate change and social responsibility, sustainable finance has the potential to become mainstream in the financial world, ensuring that investments are not only financially profitable, but also contribute to sustainable development (Cunha et al., 2021)

2.2. Blue Economy

The marine economy, also known as the Blue Economy, refers to all sectors of the economy that have a direct or indirect relationship with the ocean. The marine economy encompasses a wide range of economic activities related to the sea and oceans, which presents many opportunities for social and economic development and the sustainable diversification of coastal businesses. The concept includes various opportunities stemming from the development of the traditional marine sector, the marine science and technology-based industrial sector, the tourism sector, and environmental conservation initiatives (Mathew et al, 2021)). The Blue Economy concept is a sustainable development paradigm that emphasizes the exploitation and responsible use of marine and coastal resources, with the aim of achieving a balance between economic growth, improvement of social welfare, and conservation and restoration of marine ecosystems (World Bank, 2023). The Blue Economy includes economic activities that depend on or have an impact on the use of coastal and marine resources. Like the broader Green Economy concept, of which the Blue Economy is a part, it advocates the sustainable use of resources to minimize negative impacts on the marine environment. Investing in the Sustainable Blue Economy recognizes the importance of the ocean and its resources, as well as the increasing threats to the marine environment due to climate change, overexploitation, and ocean pollution (Katharine Thoday, 2023).

2.3. Sustainable Aquaculture

Aquaculture is the cultivation of aquatic organisms in a controlled environment. According to FAO, "aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants". In other words, aquaculture includes the production of fish, shrimp, shellfish, seaweed, and other aquatic plants through controlled maintenance to improve production and yield quality. The scope of aquaculture is very wide, including inland pond systems, brackish/marine ponds, offshore floating cages, to circulating closed systems (RAS) and aquaponics (Food and Agriculture Organization, 2024). This practice aims to increase fisheries productivity through domestication techniques (the creation of environmental conditions similar to the original habitat of biota) and economically oriented business management. Thus, aquaculture is an important element in the fisheries sector that targets various ecosystems (freshwater, brackish, marine) to meet the needs of food and economic commodities (Irawan, 2024).

Aquaculture is now a key sector in ensuring food security and farmers' income in many countries, including Indonesia. Aquatic production from aquaculture globally reached a new record – in 2022 the total aquaculture production (including algae) reached 130.9 million tons, while the production of aquaculture animals (fish, shellfish, crustaceans) was 94.4 million tons. For the first time, the world's aquaculture output surpasses the catch fisheries. This increase is important to meet the world's growing demand for animal protein, as global fish consumption now stands at around 162.5 million tonnes per year. In Indonesia, aquaculture also makes a big contribution. Indonesia's aquaculture fish production is expected to reach 18.44 million tons (58% of total fishery production) in 2022. The aquaculture sector is showing rapid growth – for example, national aquaculture production will increase by 13.6% in 2024 (to ~18.26 million tonnes of all farmed fisheries). More than 2.8 million coastal households depend on akuakulturijirss.com cultivation for their main income. Cultivated products are rich in proteins, vitamins, and essential minerals that help increase people's nutritional intake, especially in areas with high levels of malnutrition. Thus, aquaculture is important in the national economy (a provider of employment and export foreign exchange) while supporting food security and nutrition programs (FAO, 2024).

Although productive, intensive aquaculture brings serious environmental issues if not managed properly. Solid waste (feed and manure) from ponds and cages can increase nutrient levels (nitrogen, phosphate) in water bodies, triggering eutrophication and a decrease in dissolved oxygen. In addition, the use of antibiotics and pesticides to control shrimp or fish diseases can contaminate the surrounding environment. Traditional shrimp farming practices have been criticized for deforestation of mangroves, causing habitat destruction and declining local biodiversity. Other threats are the spread of diseases (WSSV virus in shrimp, fungal diseases in fish) and the risk of cultivated species escaping and becoming invasive. Mining swamp water for ponds can also damage ecosystems. These issues have sparked global concern for sustainability: Integrated Multi-Trophic Aquaculture (IMTA) farming practices and closed systems such as RAS are proposed as solutions to reduce waste and ecological impacts. Nevertheless, in general, awareness of sustainable cultivation is increasing. FAO and international agencies are calling for a "Blue Transformation" and the application of sustainability principles in aquaculture policies to safeguard economic benefits without sacrificing ecosystems. In the field, aquaculture sustainability scores vary; There are systems that manage to balance economic and environmental growth, but there are still many that need to improve practices and close oversight ((Riany et al., 2023).

Sustainable aquaculture is an approach to aquaculture that simultaneously prioritizes ecological sustainability, economic feasibility, and social responsibility. According to (FAO, 2024), this practice must be able to take place without damaging the natural resources on which it is based. World Bank (2023) emphasizes the importance of increasing productivity and income without disrupting biodiversity and ensuring social justice and food security. Institutions in the European Union (2021) highlight aquaculture practices that are efficient in the use of resources and support the resilience of local food systems. Aquaculture practices must not exceed the carrying capacity of the ecosystem and must minimize pressure on wild fishery stocks. Sustainability is achieved through adaptive management and technological innovation. Sustainable aquaculture must promote inclusive economic growth, maintain biodiversity, and improve food security and nutrition. Therefore, this concept reflects cross-sectoral and cross-interest integration in the long-term management of aquaculture resources.

2.4. Conceptual Framework and Research Hypothesis

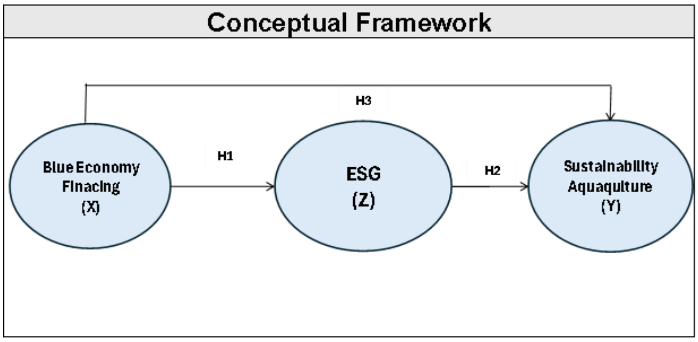

Figure 2. Conceptual Framework

Source : Author (2025)

This study examines the relationship between three main constructs in the framework of sustainability of the aquaculture sector based on the blue economy. The variables studied consist of independent variables, mediation variables, and dependent variables, each described as follows:

a. Blue Economy Financing (X)

This variable describes a form of financial support that is specifically directed to support sustainable marine and fisheries activities. Blue Economy Financing includes various financial instruments such as blue bonds, green finance, and investments based on ESG principles, (Katharine Thoday, 2023). In the context of this research, Blue Economy Financing is expected to be able to provide access to financing for aquaculture business actors, especially small and medium-scale, to transition to more environmentally friendly and sustainable business practices (Wenhai et al., 2019) .

b. Environmental, Social and Governance (Z)

ESG is a construct that reflects the application of sustainability principles in three main dimensions: environmental, social, and governance. As a mediating variable, ESG plays a role in bridging the influence between Blue Economy Financing and aquaculture sustainability. This means that the financing received by business actors will have a positive impact if it is distributed and managed in accordance with ESG principles (Klerk, 2023). ESG is also an important indicator in assessing whether incoming investments or financing can produce balanced ecological, social, and governance impacts (Avramov et.al, 2024).

c. Sustainable Aquaculture (Y)

This variable measures the extent to which aquaculture activities are carried out in a sustainable manner, both in terms of ecology, economic efficiency, and social responsibility. Sustainable aquaculture emphasizes the practice of aquaculture that does not damage the environment, utilizes resources efficiently, and has a positive impact on the welfare of coastal communities. The success of this sector is not only measured by the amount of production, but also by the extent to which these cultivation practices are able to maintain the quality of the ecosystem and support long-term food security (Irawan, 2024)

Based on the conceptual framework that has been built, the hypothesis formulation in this study is as follows:

- H1: Blue Economy Financing has a Positive Effect on ESG
  Explains that the greater the financing support based on sustainability principles, the higher the application of environmental, social, and governance aspects in aquaculture businesses.
- H2: ESG has a positive impact on Sustainable Aquaculture
  Testing whether the application of ESG principles really has an impact on improving sustainability in aquaculture.
- H3: ESG mediates the influence of Blue Economy Financing on Sustainable Aquaculture
  Assess whether ESG is a significant connecting channel in transforming blue economy financing into sustainable aquaculture practices.

3. Methods

This study uses an explanatory quantitative approach to analyze the relationship between Blue Economy Financing, Environmental, Social, and Governance (ESG), and Sustainable Aquaculture in the context of empowering seaweed farmers in coastal areas. Data was collected from 120 seaweed farmers in two coastal villages, namely Laikang and Punaga in Takalar Regency, South Sulawesi, who are members of local cooperatives that actively support sustainable cultivation practices. The research instrument was prepared in the form of a structured questionnaire that measured three main constructs: Blue Economy Financing (X), ESG (Z), and Sustainable Aquaculture (Y). Each construct indicator is measured using a Likert scale of 1–10, where a score of 1 indicates "strongly disagree" and a score of 10 indicates "strongly agree". The use of this scale allows researchers to obtain a more detailed range of responses and increases the sensitivity of the measurement of respondents' perceptions of each statement. Data analysis was carried out using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS 4 software. This technique was chosen because it is able to test complex models with moderate sample counts and non-normal data distribution. The path significance test was carried out through a bootstrapping procedure with 5,000 resampling to obtain t-statistics and p-values from each path of inter-construct relationships. Model evaluation includes testing for reliability and construct validity (AVE), discriminant validity, and testing for direct relationships and mediation between latent variables. The findings of this analysis are the basis for understanding the strategic role of Blue Economy Financing in promoting the sustainability of the aquaculture sector through an ESG approach, especially for small-scale farmers in Indonesia's coastal areas.

4. Result and Discussions

The results of the PLS-SEM analysis show that Blue Economy Financing (BEF) has a positive and significant effect on the Environmental, Social and Governance (ESG) variable with a coefficient of 0.280. These findings support the hypothesis that blue economy-based financing is able to drive the application of ESG principles in the aquaculture sector. This is in line with findings of Choudhary et al. (2021) and Shiiba et al. (2022) which emphasize that instruments such as funding in the form of environmentally friendly investments can encourage business practices that are inclusive, socially responsible, and pay attention to the sustainability of the marine environment. Practically, this financing allows business actors in the aquaculture sector, especially MSMEs, to adopt clean technology, increase production efficiency, and strengthen social aspects through training and coaching of farmer groups. Thus, blue finance is not only an economic instrument, but also a driver of sustainable governance in the marine and fisheries sectors.

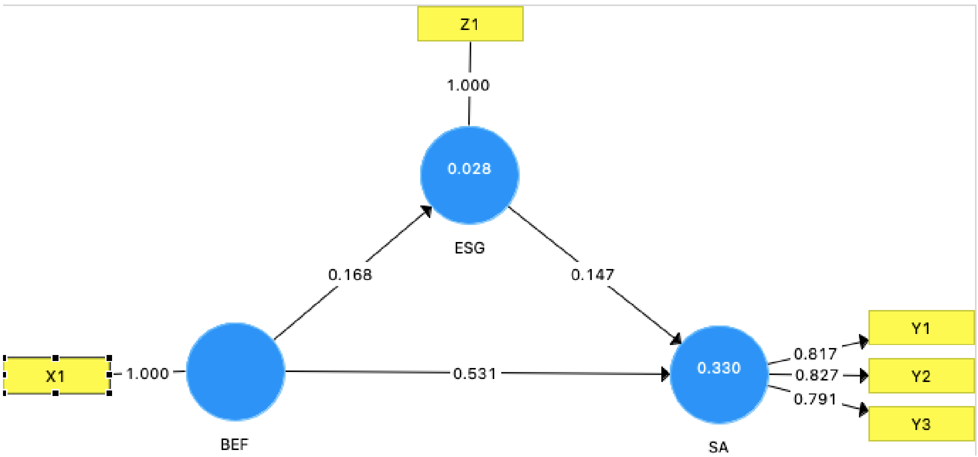

Figure 3. Structural Models

Source : SEM PLS data processing

The direct relationship between BEF and Sustainable Aquaculture (SA) was also found to be significant with a coefficient of 0.330. This indicates that the availability of financing specifically directed to the blue sector can improve the sustainability of aquaculture cultivation. This result strengthens the argument of FAO (2024) and World Bank (2023) The World Bank stated that financial support plays an important role in transforming the aquaculture sector to be more environmentally friendly and economically efficient.

Table 1. Outer Loading

	BEF	ESG	SA
X1	1,000		
Y1			0,817
Y2			0,827
Y3			0,791
Z1		1,000	

Source : SEM PLS data processing

The evaluation of the outer model aims to measure the validity of indicators in reflecting the latent constructs studied, namely Blue Economy Financing (BEF), Environmental, Social, and Governance (ESG), and Sustainable Aquaculture (SA). The validity of the convergence is tested using the outer loading value, where each indicator is assessed based on its strength in representing the construct in question. Based on the results of data processing through SmartPLS, the indicators used mostly show an outer loading value above the minimum recommended limit. As stated by (Hair et al., 2017), The outer loading value of ≥ 0.70 is considered to indicate the contribution of a strong indicator to the latent construct. Values between 0.60–0.70 are still acceptable if the composite reliability and AVE (average variance extracted) values meet the standards. In the Blue Economy Financing (BEF) construct, the X1 indicator has a loading value of 1,000 each, which means that it is valid and strong in measuring the construct. Construct Sustainable Aquaculture (SA) is measured by three indicators, with Y1 (0.817) and Y2 (0.827) showing excellent results, while Y3 has an acceptable loading value of 0.791. Meanwhile, the ESG construct is measured by two indicators, namely Z1. The Z1 indicator has a very high outer loading value of 1,000, indicating the consistency of the indicator against the ESG construct. Overall, these results show that the measurement models used in this study have met the criteria for convergent validity, with most of the indicators having a significant contribution to their respective constructs. Strong loading values support data reliability in measuring relationships between latent variables under study.

Table 2. Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BEF	1,000	1,000	1,000	1,000
ESG	1,000	1,000	1,000	1,000
SA	0,750	0,771	0,853	0,660

Source : SEM PLS data processing

Construct reliability evaluation is carried out to measure the extent to which the indicators in one construct have adequate internal consistency. In this study, the reliability and validity test was carried out using three main measures, namely Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). The results of data processing through SmartPLS show that all constructs have a Composite Reliability value above the minimum threshold of 0.70 suggested by (Hair et al., 2017), is the BEF of 1,000; ESG of 1,000; and SA of 0.771. This shows that all three constructs have good internal reliability. Although Cronbach's Alpha values for the BEF and ESG constructs are above 0.70, this indicates an adequate value. In PLS-SEM, CR and Cronbach's Alpha are considered to be accurate measurements in measuring the internal consistency of reflective constructs. The AVE value result for all constructs was above the minimum value of 0.60 (BEF = 1,000; ESG = 1,000; SA = 0.660), which indicates that each construct has met the convergent validity. This means that the indicators in each construct have managed to explain the variance of their constructs substantially. Thus, despite the weaknesses in the BEF and ESG alpha values, the construct as a whole can be declared valid and reliable, and feasible for use in subsequent structural model analysis.

Table 3. Discriminant validity

	BEF	ESG	SA
BEF	1,000		
ESG	0,168	1,000	
SA	0,556	0,236	0,812

Source : SEM PLS data processing

The validity of the discriminator is tested to ensure that each construct in the research model actually measures concepts that are different from each other. The test was carried out using the Fornell-Larcker Criterion approach, where the value of the square root of AVE (√AVE) of each construct is compared to the correlation value between constructs. Based on the results in Table 3, the √AVE value for the three constructs is above the correlation values between the other constructs. The value of √AVE for Blue Economy Financing (BEF) and ESG construction was 1,000 each, while the Sustainable Aquaculture (SA) construct was 0.812. All of these values are greater than the correlation between the constructs (all above 0.78), so it can be concluded that the model has met the discriminant validity. Thus, each construct has adequate discrimination from the other, which means that the indicators in one construct do not overlap with the other. These results confirm that the measurement structure in this PLS-SEM model can be relied upon for use in further testing of the relationships between variables.

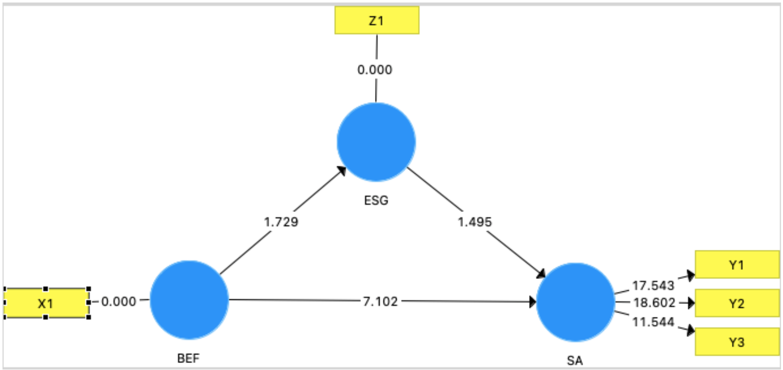

Figure 4. Structural Model Bootstrapping

Source : SEM PLS data processing

Table 4. Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decission
BEF -> ESG	0,168	0,164	0,098	1,719	0,086	Not Significant
BEF -> SA	0,531	0,541	0,071	7,512	0,000	Support
ESG -> SA	0,147	0,144	0,100	1,469	0,142	Not Significant

Source : SEM PLS data processing

The results of the path analysis using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach showed that Blue Economy Financing (BEF) had a significant effect on Sustainable Aquaqulture (SA), with a statistical t-test value of 7.512 and a p value of 0.000. This reinforces that BEF-oriented funding has a profound effect on more sustainable aquaculture practices. Meanwhile, the effect of ESG mediation in Table 5 below shows that it does not affect BEF on SA, this can be seen in the results of the statistical t test of 1.095 which is smaller than the t in Table of 1.661 and p value of 0.274 which means that ESG as a mediator does not significantly encourage the implementation of BEF in this sector. This is also shown in Table 4 which explains that the direct relationship of the BEF variable to ESG and the direct relationship of the ESG variable to SA at a p value greater than 0.05 are both proven to be insignificant.

Tabel 5. Mediation Result

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decission
BEF -> ESG -> SA	0,025	0,021	0,023	1,095	0,274	Not Significant

Sumber : SEM PLS (data diolah)

This confirms that ESG variables have not been able to play a role as an effective linking mechanism.

Tabel 6. R-square adjusted

	R square	R square adjusted
ESG	0,028	0,018
SA	0,330	0,316

Sumber : SEM PLS (data diolah)

Based on the results of the adjusted R-square test, it was found that the model has predictive capabilities that explain that the SA variable that is influenced by BEF is quantitatively shown in the results of the R-square test of 0.330, meaning that the influence of BEF on SA is 33%, while the magnitude of the direct influence of ESG as a mediator is 0.028 or only 2.8%. This result reinforces the results of the previous analysis that BEF has a direct influence on SA, but there are still other factors of 64.2% that can have an influence on SA.

5. Conclusions

This study examines the strategic contribution of the Blue Economy Financing scheme to the sustainability of the aquaculture sector in Indonesia, by positioning Environmental, Social and Governance aspects as a mediating variable. Through a quantitative approach based on Structural Equation Modeling–Partial Least Squares (SEM-PLS) and primary data from 120 respondents in the coastal area of South Sulawesi, a number of significant findings were obtained that clarify the relationship between variables in the conceptual model developed. The results of the analysis show that Blue Economy Financing has no significant influence on the implementation of Environmental, Social and Governance principles. This indicates that the concept of funding or investment in the blue economy sector is still less in demand by the public and less responded to by the government. Financing allocation must be more directed towards the sustainable marine sector. Meanwhile, Blue Economy Financing has proven to have a significant effect on Sustainable Aquacultur, this indicates the direct contribution of the financing to the improvement of concrete actions that support marine ecological sustainability. In addition, Environmental, Social and Governance factors directly do not provide a boost to the development of sustainable aquaculture today. Overall, these findings underscore that Blue Economy Financing plays a key role in driving the aquaculture sector's transition to sustainability, although ESG has not yet shown a major role. The practical implications of these results emphasize the importance of increasing institutional capacity, strengthening regulations that encourage increased ESG roles in the development of environmentally friendly aquaculture technologies, and providing incentives that are in line with sustainability principles in accelerating sustainable and inclusive aquaculture development in Indonesia's coastal regions. This opens up space for further research to explore the role of other factors, such as governance and local community participation, more specific regulations, and technological innovation.

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