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ECOPORT SUSTAINABILITY ANALYSIS CASE STUDY: PORT OF PT PELINDO DUMAI BRANCH

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Abstract

Recently, port operations have continued to increase in line with the increasing demand for trade services. Meanwhile, port operations are accused of being one of the causes of environmental degradation. Therefore, it is necessary to take special steps in creating a port that not only pays attention to the economic sector, but also pays attention to the ecological and economic sectors. The eco port concept was initiated as a way for port operations to run sustainably. This study aims to analyze the value of sustainability at the Port of PT Pelindo Dumai Branch which has adopted the eco port concept. The dimensions to be analyzed are the ecological, economic and social dimensions. The rapfish approach is used to analyze the sustainability status. The results showed that the economic dimension was the dimension with the lowest value, namely 58.25. While the value of sustainability for the ecological dimension is 64.67. The social dimension is included in the good category with a sustainability value of 81.48.

Keyword: Greenport, Rapfish, Sustainability Analysis.

INTRODUCTION

The state of Indonesia consists of large and small islands, which are approximately 17,508 islands. Three-quarters of its territory is the sea, which has an area of 7.9 million km2. Indonesia also has the potential in the form of a long coastline that reaches 95,161 km, the second longest after Canada. Through the Djuanda Declaration on December 13, 1957, Indonesia declared to the world that the Indonesian sea was one unit within the territory of the Unitary State of the Republic of Indonesia (Arianto, 2020). The extent of the coastal and marine areas owned by Indonesia is one of the capitals in the development of the Indonesian state. One of the advantages arising from this geographical condition is the variety of environmental services that can be utilized.

Indonesia's marine resources have long had a strategic role for national development. The area of Indonesian waters which reaches 3.54 million km2 makes Indonesia's position important for marine product trade for the world (Mbay, et al., 2014). The volume and value of Indonesian marine product exports continues to increase from year to year.

The increase in economic activity that occurs at the port not only has a positive effect on the economy, but also has a negative effect in the form of environmental damage. Increased greenhouse gas emissions, water pollution to the destruction of marine life are various negative effects that arise due to high port activity (Moura & Andrade, 2018).

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In recent times, there has been increasing attention regarding the reduction of environmental impacts as a result of port activities. All ports in the world experience a decline in environmental quality (Ahmadi et al., 2016). Even though it causes problems, ports must continue to carry out their operations in order to serve goods transportation services. To overcome this problem, the concept of an environmentally friendly port (ecoport) has begun to be applied in various places in the world.

Ecoport is a concept that offers a balance between environmental impact and increasing economic value (Perawati et al., 2017). Through this ecoport concept, economic and ecological interests are balanced so that economic development does not exceed the capacity of nature. Various efforts in the implementation of ecoport, for example by using environmentally friendly methods in various operational activities and port management. Muninggar et al., (2019), describes an environmentally friendly port (ecoport) as a port that is managed using the principles of sustainable development. The harmonization of the principles of sustainable development must cover all dimensions, namely social, economic and environmental dimensions.

Currently Dumai Port is growing rapidly so that it becomes an international port, especially for export activities of CPO and its derivatives because it is supported by geographical conditions that stretch almost all over the mainland of Riau Province to the borders of North Sumatra, West Sumatra and Jambi Provinces. These various provinces are growing with oil palm, rubber and other plantations as well as the tourism industry which demands the Dumai Port to become the main gate of the Riau Province's regional economy.

In the port area of PT. Pelindo I Dumai Branch, apart from loading and unloading goods, there are also factories engaged in CPO processing, storage tanks, warehousing of both general cargo and dry bulk goods, as well as fields for containers. Various economic activities in the port area cause ecological, economic and social changes to the local community. Disposal of waste, increased labor requirements and social conflicts with local communities are the consequences arising from the increase in port operations of PT Pelindo Dumai Branch.

Port activities have a significant impact on the environment, these impacts mainly arise from energy consumption, waste from ships docking at ports, water use, changes in landscape, waste and waste and changes in ambient air quality from high equipment and human activities. If not handled properly, these things can develop into environmental problems such as pollution (water, air and soil). noise and work safety, odor pollution, dust, and environmental quality degradation, water turbidity and water pollution that have an impact on biodiversity in the waters.

METHODOLOGY

The research was conducted at PT Pelindo Dumai Branch which is located in Dumai City, Riau Province. Data collection is done through primary and secondary data collection. Primary data collection is carried out by means of a survey. The survey was conducted using

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interview and questionnaire techniques. Interviews and distributing questionnaires to selected people, namely respondents who are directly related to the port operations of PT Pelindo Dumai Branch. The subjects of the interviews and questionnaires were local governments, non-governmental organizations and communities around the port location. Secondary data was obtained from documents owned by the manager of PT Pelindo Dumai Branch.

Sustainability analysis was carried out using the Rapfish (Rapid Appraisal for Fisheries) approach. In its application, Rapfish uses the Multidimensional Scaling (MDS) technique. This analysis is carried out by compiling attributes for each ecological, social and economic dimension. Then given a score on each attribute ranging from good to bad.

RESULT AND DISCUSSION

Analysis of the sustainability status of the PT Pelindo Port Dumai Branch is carried out through the Multi Dimensional Scaling (MDS) approach. The dimensions analyzed to determine the status of sustainability are ecological, economic and social. Through this sustainability status, improvements can be made in the future on key factors in the sustainable management of PT Pelindo Port Dumai Branch.The results of the sustainability analysis on the ecological dimension show that the sustainability index of PT Pelindo Branch Dumai Port is 64.67 which is presented in Figure 1. This figure shows the sustainability status for the ecological dimension is in the range of 51-75 which is in the sufficient category.

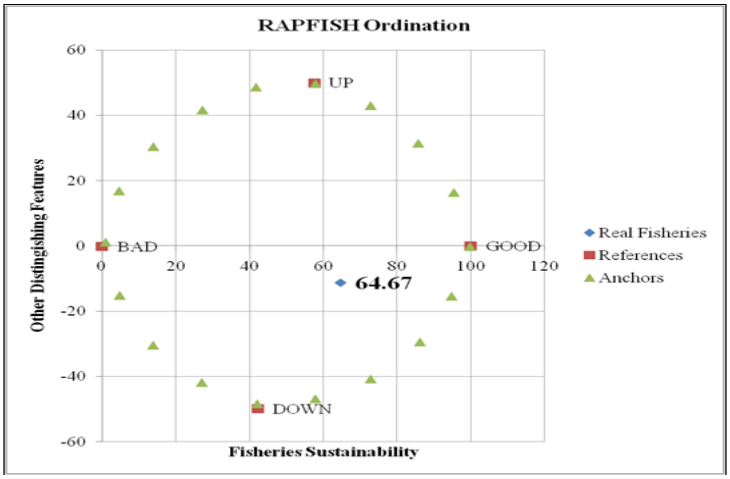

Figure 1: **Ecological Dimension Sustainability Index**

The results of the sustainability analysis for the economic dimension show the number 58.25 which is presented in Figure 2. This figure is in the range of 51-75 which is in the sufficient category. Through further analysis, it can be seen what attributes are the levers of the economic dimension.

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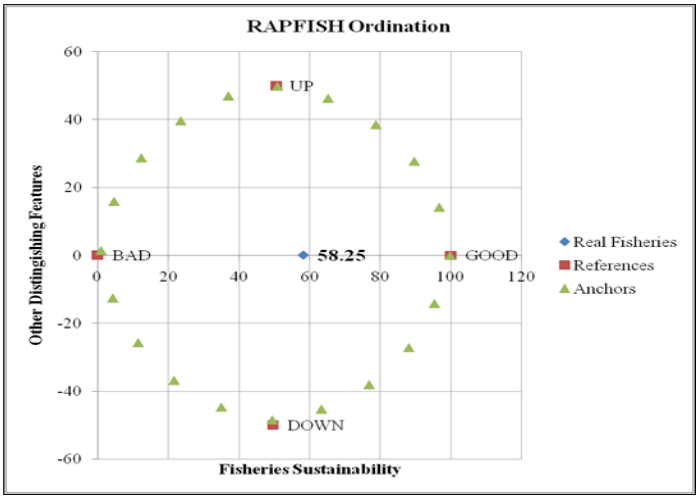

Figure 2:**Economic Dimension Sustainability Index**

Sustainability analysis for the social dimension shows the number 81.48 which is presented in Figure 3. This number is in the range of 76-100 which is in the Good category. This means that the sustainability of the social dimension is in good condition. Through further analysis, it can be seen what attributes are the levers of the social dimension.

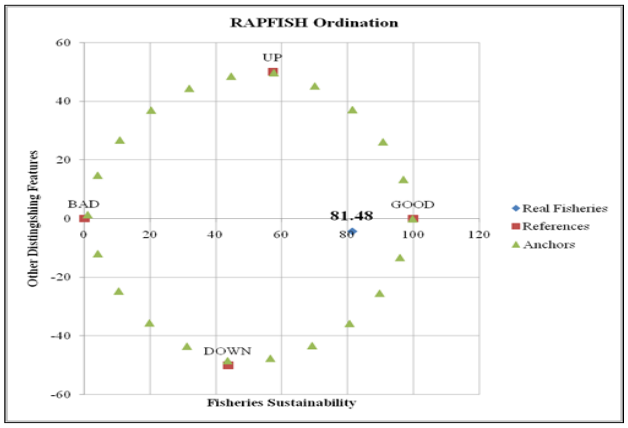

Figure 3: **Social Dimension Sustainability Index**

To find out more about the dominant factors that need important attention in the management of the PT Pelindo Dumai Seaport, a leverage analysis was carried out on each dimension.

In the ecological dimension, reforestation efforts and solid waste management are the two main factors in the sustainable management of PT Pelindo Dumai Branch Port which is presented in Figure 4. Expansion of reforestation areas and solid waste management are two important attributes in realizing a sustainable ecological dimension.

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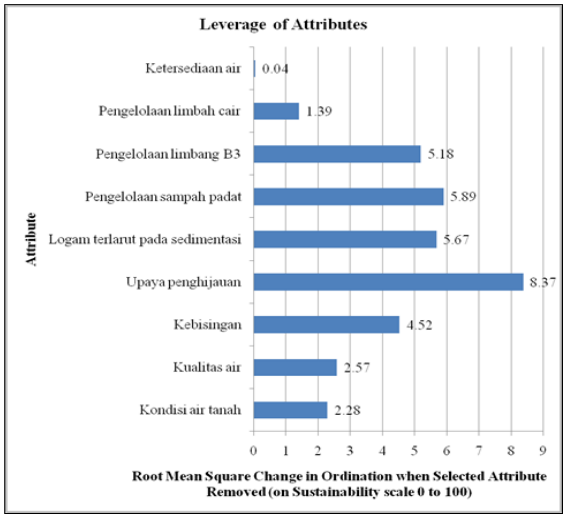

Figure 4: **Analysis of Key Factors in the Ecological Dimension**

On the economic dimension, the contribution to the regional economy and the speed of unloading are the two main factors in the sustainable management of the PT Pelindo Dumai Branch Port which is presented in Figure 5. The port naturally forms the center of economic activity. The competitive advantage of the industry located around the port and the ease of transportation links between the port and the center area are the main determinants of local economic growth. The port can also support tourism activities, be it marine tourism, tourism, to mangrove tourism. Dumai Port's operating income as of July this year 2020 was IDR 324.16 billion, with one of the leading businesses at Dumai Port namely marine services both at public ports and in continuous / TUKS such as: Dumai Industrial Estate (KID), Lubuk Gaung, and Pertamina.

This port is also one of the ports with the largest liquid bulk terminal in Indonesia. In the midst of the Covid-19 pandemic, Dumai remains the highest public port in the shipment of CPO and its derivatives in Indonesia, which is an average of 400,000 tons per month.

The type of liquid bulk sent from the port, which is operated by PT Pelabuhan Indonesia Dumai Branch, is Crude Palm Oil (CPO) which is exported to India, China and Europe. Meanwhile, for dry bulk, the Palm Kernel Expeller (PKE) and Palm Kernel Shell (PKS) are mostly exported to East Asia and Europe.

For container loading and unloading services at Dumai Port, there has been a significant increase. Until July – 2020, Dumai Port served loading and unloading of 8,524 boxes, compared to the same period in 2019 of 5,754 boxes. This figure is equivalent to 8,883 TEUs, compared to the same period last year which was 5,865 TEUs.

Dumai Port is one of the economic arteries of Riau Province, and its performance has so far been able to survive even in the midst of the Covid-19 pandemic. In addition, the overall economic condition in each region can also be seen from the amount of regional expenditure in the region concerned. The greater the value of regional spending allocated for

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development, it will improve the welfare of the population. This means that the economic conditions in the area will also improve. Contribution to the regional economy will provide many benefits to the community. Meanwhile, the loading speed will increase port productivity. These two factors are two important attributes in realizing a sustainable economic dimension.

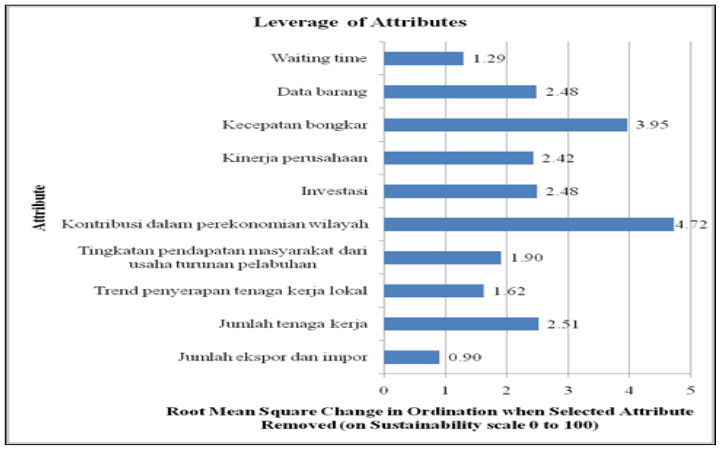

Figure 6: **Analysis of Key Factors in the Economical Dimension**

In the social dimension, empowerment of the surrounding community and the implementation of CSR programs are the two main factors in the sustainable management of the Port of PT Pelindo Dumai Branch which is presented in Figure 7. Community empowerment in environmental management will provide benefits for the surrounding community and the port manager. Meanwhile, the CSR program will provide benefits to the community around port operations. These two factors are two important attributes in realizing a sustainable social dimension.

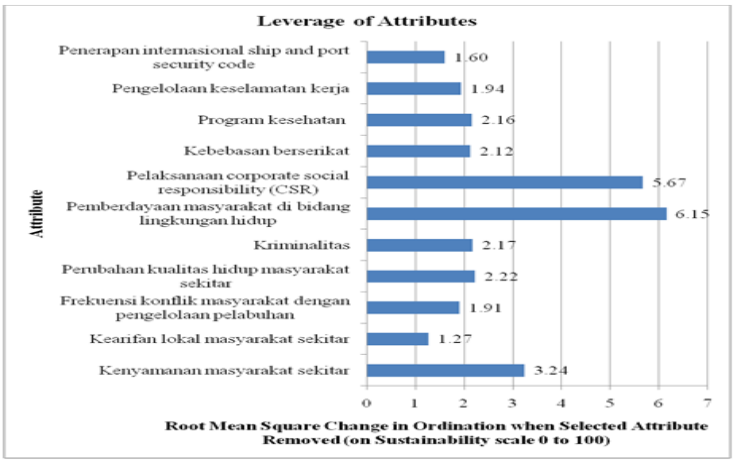

Figure7. **Analysis of Key Factors in the Social Dimension**

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In the social dimension, empowering the surrounding community and implementing CSR programs are the two main factors in the sustainable management of the PT Pelindo Port Dumai Branch. Community empowerment in environmental management will provide benefits for the surrounding community and the port manager. Meanwhile, the CSR program will provide benefits to the community around port operations. These two factors are two important attributes in realizing a sustainable social dimension.

Management realizes that the progress and success of the Company's performance cannot be separated from the environmental and social impacts arising from the operations carried out at the port. Impacts, or consequences arising from business activities, have become a factor that the Company takes into account in all of the operating and business schemes it has developed, whether they are consequences or impacts that occur, as well as stakeholders who are related to the impacts arising from the activities carried out by the Company.

The implementation of Corporate Social Responsibility (CSR), or also known as Social and Environmental Responsibility ("TJSL") is based on compliance with applicable laws and regulations in Indonesia, namely Law no. 40 of 2007 concerning Limited Liability Companies, Law no. 32 of 2009 concerning Environmental Protection and Management, Government Regulation no. 47 of 2012 concerning Social and Environmental Responsibility of Limited Liability Companies, as well as various other regulations and laws that bind companies in carrying out their operations and business activities.

Annual Report 2020 PT Pelabuhan Indonesia Dumai Branch to achieve sustainability goals, namely participation in the achievement of global scale sustainable development goals in the SDGs, the business activities carried out can support the achievement of various sustainable development goals as formulated in the 17 Sustainable Development Goals (SDGs). (TPB), which has been formulated by Indonesia through Presidential Regulation no. 59 of 2017 concerning the Implementation of the Achievement of the Sustainable Development Goals. So that the implementation of the CSR program within the company has clear references, processes and objectives, and requires a planned policy in mapping the relationship between business actors and stakeholders as well as the impacts and risks of operating and business activities. In the scope of environmental management, the company and its subsidiaries carry out various efforts to monitor environmental impacts that may occur from port management activities. In particular, the management has established the SOP for environmental management as stipulated in the Decree of the Board of Directors No. PP.27/1/10/PI-15.TU dated October 23, 2015 regarding Guidelines for the Implementation of Green Ports in the PT Pelabuhan Indonesia Dumai Branch and ISO 14001 Certification on Environmental Management Systems in several ports. This provides a clear framework for port management with a Green Port approach, combined with a regular audit process of certification compliance.

From the dominant factors obtained, then tested with Monte Carlo Validation. Monte Carlo analysis can be used as a simulation method to evaluate the impact of random error in statistical analysis performed on all dimensions. The same thing was also stated by Fauzi (2005) that Monte Carlo analysis can be used as a indicators of error caused by scoring on

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each attribute, variance in scoring that is multidimensional due to different opinions, data analysis processes that are carried out repeatedly and errors in inputting data or missing data.In other words, Monte Carlo analysis in Rapish software is intended as a tool for validating the resulting model.Comparison of the Monte output results with the Sustainability Ordination Value is presented in Table 1.

Table 1: **Comparison of the output results of the Sustainability Ordination Value with Monte Carlo**

Dimension	Sustainability Ordination Value	Monte Carlo Value (%)	Gap (%)	Category < 5%
Ecology	63,52	64,67	1,15	Valid
Economy	57,72	58,25	0,53	Valid
Social	79,22	81,48	2,26	Valid

From the table 12 categories of Dimensions are all valid because the difference is less than 5 percent thus, the analysis output can be accepted as a good predictor model. Furthermore, in this research, a Trade Off (Kite Diagram) is sought. The trade off is a description of the theory of balance (balance theory) in this case is the balance of the level of sustainability of each of the dimensions studied.

CONCLUSION

The level of sustainability for the ecological dimension is in the Enough category, for the economic dimension it is also quite adequate. Meanwhile, sustainability on the social dimension shows a good category. The dominant factors that influence the sustainability of the ecological dimension are reforestation efforts and solid waste management which are the two main factors in the sustainable management of PT Pelindo Dumai Branch Port. The dominant factor in the economic dimension is the contribution to the regional economy and the speed of loading and unloading are the two main factors in the sustainable management of the PT Pelindo Dumai Branch. The dominant factors of the social dimension, empowerment of the surrounding community and the implementation of CSR programs are the two main factors in the sustainable management of the PT Pelindo Port Dumai Branch.

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