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Seeking the Opportunities and Challenges of Blue Economy Sustainable Development: A Case Study of Sidoarjo, Indonesia †

Vindaniar Yuristamanda Putri *, Stephanie Nuriani Janice and Tiara Ramdhan Azzahra

Vocational Program, University of Indonesia, West Java 16424, Indonesia
* Correspondence: vindaniar.putri@ui.ac.id
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Abstract: A sustainable ocean economy is achieved by improving economic, environmental, and social performance. Unfortunately, Indonesia's marine and coastal ecosystems are threatened by overfishing, mangroves and coral reefs, and marine debris degradation. Thus, this research analyses the blue ocean business model in one of the coastal areas of Java, Sidoarjo Regency, East Java. Through SWOT Analysis, this study found that the blue economy business model does not stop at the use of the sea for economic prosperity, but also includes how to manage marine products from upstream to downstream continuously, known as a circular economy.

Keywords: blue economy; SWOT analysis; sustainable development

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1. Introduction

Recently, society has been concerned about the impact of over-exploitation in the ocean to fulfil human needs and economic development. Oceans are more likely to attract humans than other areas on the planet because they contain many resources. As evidence, OECD (2016) reported that the global ocean economy will increase from USD 1.5 billion in 2010 to USD 3 billion by the year 2030 [1]. About 80% of global trade is carried out via water, ports, and international shipping [2]. However, the ocean also has its fishing quota. Overexploitation can cause the decline of many fisheries and consequently destroy the ecosystem in the ocean [3]. Moreover, global climate challenges such as rising sea levels, temperatures, and extreme weather threaten the ecosystem [4]. Furthermore, the United Nation's 2030 Agenda for sustainable development included oceans and marine resources as the 14th sustainable development goal [5].

The relationship between the economy and the ocean is evolving in significant ways. Dr Gunter Pauli argued that using locally available ocean resources and employing renewable inputs addresses the scarcity of resources and enables sustainable development [6]. The concept called blue economy, the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of the ocean ecosystem, was proposed by the World Bank in 2017 [7]. The blue economy aims to ensure that the ocean can fully support countries in improving nations' conditions for sustainable ocean development as the critical component of blue ocean is balancing triple bottom lines of sustainable development [8]. Nowadays, the blue economy concept has broadened to not only using the ocean for economic growth, but also producing no waste and more benefits by processing parts of the fish that become waste, and using it as raw material for other products.

The blue economy contemplates two areas, opportunities for growth and development and the protection of endangered species [9]. Four issues lead to the persistence of a socially inequitable and harmful blue economy. First, the economic system prioritizes economic growth by using Gross Domestic Product (GDP) as the primary measure of status or

progress for both nations and sectors and corporate profits. Second, social sustainability and equity in international and national blue economy policy lack attention as national development priorities. Third, the private sector is insufficiently committed to upholding human rights and improving social conditions [10].

With more than 70% of its territory being sea territory, Indonesia has enormous marine economic potential. In 2014, it was reported that 6 large marine ecosystems out of 64 in the world were located in Indonesia [11]. In 2017, the marine and fisheries sector contributed up to 23,186,442 tons to the national Gross Domestic Product. Additionally, in 2017, Indonesia reached 1078.11 thousand tons, equalling USD 4.52 billion of fishery production for export [4].

Apart from the marine economy potential, about 38% was coming from overfishing [12], there was still a lot of unregistered and unmonitored small-scale domestic fishing ship, and one-third of Indonesia's precious coral reefs are in poor condition [13]. Moreover, World Bank stated that about 38% of Indonesia's marine captured fisheries are overfished. Additionally, numerous garbage in the sea harms the tourism, fisheries, logistics and ecosystem sectors in Indonesia, with losses reaching more than USD 450 million per year [14]. Indonesia has become the world's second most significant plastic waste contributor after China. In other words, Indonesian fish species, mangroves, and marine life are dying.

As the fishery sector becomes one of the most significant contributors to Indonesia's national GDP, Indonesia is committed to restoring ocean health and accelerating the development of a sustainable economy by 2045. Nevertheless, future challenges cannot be denied. The Ministry of Marine Affairs and the Fishery Republic of Indonesia (KKP) divided into three main pillars to restore the ocean's health and accelerate the development of a sustainable ocean economy, which has ecological, economic, and social factors.

The blue economy concept is based on practical experience that with innovation and creativity, economic activities can be managed without damaging the environment. Nevertheless, it can generate economic benefits and save the environment from damage. This concept was introduced to answer the challenge that the world's economic system has tended to be exploitative and damaging to the environment because of human greed. This paper seeks to address the challenges and identify the opportunities of the blue economy in Indonesia from economic factors. The research outcome suggests some critical areas of blue economy development in Sidoarjo, Indonesia.

2. Materials and Methods

Indonesia's blue economy (BE) prospects are promising since it consists of 17,500 islands and has 108,000 km of coastline. Research shows that Indonesia has many opportunities to implement BE in the future. The concept of BE is to challenge entrepreneurs to develop BE business models so that investments and businesses are more economically and environmentally profitable, use more natural resources efficiently, and do not damage the environment. Additionally, production systems are more efficient and cleaner, producing more excellent economic value products, increasing employment, and providing equal opportunities for each contributor [15].

Thus, the following problems arise: (1) What is the current state of BE implementation in Sidoarjo, Indonesia? (2) How can we determine the strategy through SWOT analysis? This paper aims to identify the problems and solutions using SWOT analysis.

The research method uses a qualitative approach and focuses a systematic literature review methodology. A content analysis technique was implemented to sort out the descriptive materials from the data. The data sources are (1) the Ministry of Marine Affairs and Fishery Republic of Indonesia (KKP), (2) research from BRIN (National Innovation Research Agency), (3) the Sidoarjo Regency Fisheries Office, (4) the government (Subdistricts and Kelurahan), (5) POKDAKAN (Fish Cultivation Group), and (6) research articles in the Web of Science.

Figure 1 shows a map of the Sidoarjo Regency in the East Java Province. Sidoarjo Regency has an area of 71,424.25 ha, which is administratively divided into 18 subdistricts,

31 urban villages, and 332 villages. Geographically, Sidoarjo Regency is located between 112.5° East Longitude—112.9° East Longitude and 7.3° South Latitude—7.5° South Latitude. Sidorajo Regency is divided into three regions. First, 40.81% of the area is located in the middle and has fresh water. This area includes housing areas, commercial areas, and the government. Second, 29.99% of Sidoarjo Regency, which is located on the east side, is a coastal area and involves aquaculture. Lastly, in the western part, the area accounts for 29.20% and consists of agriculture [16].

Figure 1. Map of Sidoarjo Regency, East Java, Indonesia.

Sidoarjo Regency is one of the coastal areas in East Java that has the potential for fisheries and marine products. The total coastal and aquaculture area is 30% of the total area. The area goes from Waru District to Jabon District, which is about 30 Km in length [17,18]. Sidoarjo Regency is famous for its fishery and marine products. This regency is also known as the City of the Delta because it is located between two large rivers that break off the Brantas River, namely Kali Mas and Kali Porong.

3. Results

3.1. Developing the Blue Economy

The fisheries business in Sidoarjo is divided into three sub-sectors: the captured fisheries sub-sector, the aquaculture sub-sector, and the fishery product processing and marketing subsector. Meanwhile, fish production can be classified based on location, which includes pond, general, and tank production. Based on BPS's definition, the fishery production value is expressed in the live weight of fish when they are freshly caught. For example, the "round fresh", "round whole", or ex-water weight equivalent of the quantities recorded at the time of landing [19].

3.1.1. Captured Fisheries Sub-Sector

Sidoarjo Regency is well known with fishery products or ponds. The area is known to have a reasonably large pond area with the production of milkfish, shrimp, and other types of fish. Of the total aquaculture production, milkfish and shrimp commodities reach more than 85%, of which 70% comes from milkfish production. The most extensive ponds in Sidoarjo Regency are located in Banjar Kemuning Village, Kalanganyar Village, and Segoro Tambak Village.

3.1.2. Aquaculture Sub-Sector

One clear example of implementing the blue economy in the KKP education unit is the KP Sidoarjo Poltek. In aquaculture activities, this polytechnic has implemented a fish and shrimp cultivation system by utilizing artificial mangrove forests at the Pulokerto field practice station, Pasuruan, East Java, under the Mangrove Study Center.

3.1.3. Fishery Product Processing and Marketing Sub-Sector

The milkfish without thorns (Batari) produce many benefits reflecting the blue economy's implementation. There is also shrimp cultivation using the technology of a mini plastic pond (Busmetik), which is an innovation of shrimp farming technology through a measurable scientific study.

Milkfish is one type of fish that has been cultivated in ponds. This animal was originally a side job for fishermen who could not go to sea. According to Sulardiono (2013), milkfish is a fish that can live in freshwater, saltwater, and brackish water. Milkfish (*Chanos chanos sp*) is a type of brackish water fish that has a specific taste and is known in Indonesia and even abroad [20].

Sidoarjo milkfish is unique because it does not smell of mud and tastes delicious. The taste of milkfish is not of earth, and physically it has a unique characteristic: red lips as if wearing lipstick. Therefore, most people refer to it as "Bandeng Gincu".

The colour of the milkfish is also influenced by the water used. If using fresh water, the colour is more yellowish. Sidoarjo's typical milkfish colour is unsightly at first glance. The appearance is not convincing. It is greener in colour and looks dull when compared to milkfish from other regions. However, when it is put in ice, the colour fades and turns silvery.

By implementing the blue economy, marine and fisheries human resources become more creative in utilizing waste in innovative activities, which encourages the creation of new entrepreneurs, both from education and training units, by mentoring extension workers in the field, and then implementing and practising it.

3.2. SWOT Analysis

SWOT analysis is a basic framework used to evaluate the competitive business position and to develop strategic planning. We used SWOT analysis to find internal and external factors that have an impact on the marine product industry. Table 1 below shows the SWOT matrix based on the analysis data processing:

Table 1. SOWT matrix.

Opportunity	**Strategy S-O**	**Strategy W-O**
a. Export to foreign countries. b. Sidoarjo Milkfish have a unique characteristic. c. The number of demands. d. Fishery products become Sidoarjo local wisdom.	a. Ornamental Fish Cultivation Group (POKDAKAN) maintains varied and well produced aquaculture products, such as smoked milkfish, seaweed, shrimp, etc. b. Pay attention to good business management. c. POKDAKAN Samudera Hijau seaweed production has been able to meet export criteria.	a. Conduct business while paying attention to the surrounding environment. b. Improve human resource skills well through training activities. c. Implement knowledge sharing with the surrounding community.
Threat	**Strategy S-T**	**Strategy W-T**
a. Lack of product promotion. b. Low prices given by collectors. c. The risk of the impact of the pandemic.	a. Using promotional media that does not require high costs, through social media, as an alternative to sales.	a. Involve all fisheries to participate in training.

3.3. Discussion

The concept of a 'blue economy' was initiated at the 2012 United Nations Conference on Sustainable Development. Potentially increasing the Indonesian economy by limiting

dangerous fishing activities, preventive measures can be taken through various community outreach programs.

One of the components of the blue economy is to improve the welfare of fish cultivators and fishermen. Traditional maritime industries such as fishing and shipbuilding no longer dominate the maritime sector in many countries. Financial plans and multisector stakeholder agreements between the government and its public utilities, private organizations, and environmental protection groups can work together so that a blue economy business model can maximize the increase in the income of coastal communities. The blue economy for corporate sustainability does not stop at the use of the sea for economic prosperity, but also includes how to continuously manage marine products from upstream to downstream, known as a circular economy.

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Informed Consent Statement: I understand that the data collected in this research will be used for journal publication and I consent for it to be used in that manner.

Data Availability Statement: The data presented in this study are openly available in Web of Scince, Scopus, and other open access journals. The data also available at https://www.bps.go.id/.

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