

# A Blue Economy for Better Economic Development: A Case Study of East Nusa Tenggara, Indonesia

Sofia Mahardianingtyas  
*Faculty of Economics and Business*  
*Universitas Indonesia*  
 Depok, Indonesia  
 sofia.mahardian@gmail.com

Dhian Adhetya Safitra  
*Faculty of Economics and Business*  
*Universitas Indonesia*  
 Depok, Indonesia  
 dhian.safitra@gmail.com

Alfado Agustio  
*Faculty of Economics and Business*  
*Universitas Indonesia*  
 Depok, Indonesia  
 alfadoagustio@gmail.com

**Abstract**—East Nusa Tenggara (NTT) is one of the highlights in Indonesian development programs, along with other areas in eastern Indonesia. Some indicators show that NTT is lagging behind other states compared to others, although it has abundant natural resources. Supported by extensive waters, coastal areas, and strategic geographical conditions, NTT's marine sector should be the dominant sector that sustains the economy of NTT. Exploiting these opportunities aligned with the concept of the Blue Economy, which turns the maritime sector into a key economic development basis, in addition to the preservation of nature. Accordingly, the concept of a blue economy is very suitable to be developed in NTT. This study analyzed the topic using a combination of qualitative and quantitative methods, namely LQ analysis, AHP analysis, literature review, and interview. The results indicate that the concept of a blue economy significantly assists the economic development of NTT to create a sustainable economic development.

**Keywords**—blue economy; NTT Indonesia; economic development

## I. INTRODUCTION

Decentralization has been an important part of institutional reform agendas around the world [1]. In Indonesia, Law Number 22 Year 1999 on Regional Government marked a milestone in the new era of economic development for the country. This regulation requires regional autonomy marked by decentralization, namely the shift of many of the central government's affairs to local governments<sup>1</sup>. Decentralization has created new regional divisions: in 1999, 26 provinces and 292 districts grew to 34 provinces and 511 districts [2]. This division gives local governments the authority to manage natural resources endowment, geographic dispersion, and political and ethnic diversity and has been accompanied by fiscal incentives from the central government [3]. The central government, however, still has room to intervene through government policies and expenditures administered by its ministries and technical institutions. Although regional autonomy has been implemented in Indonesia for almost two decades, unfortunately, in reality, the country's regions have not developed as expected. Each region has different abilities

in fostering development; as a result, there are still inequities among regions

One of the disadvantaged areas is Nusa Tenggara Timur (NTT), an archipelago province northwest of Australia and Timor Leste. Data from the Central Bureau of Statistics in 2013 show that, based on the Human Development Index (HDI), NTT Province is one of the bottom three provinces at 68.77, well below the national average of 73.42 [4]. This low HDI value is one of the reasons why the government has identified NTT Province as a lagging region, in which 18 out of 22 districts is about 82% of all districts/municipalities in the province are disadvantaged areas and require special attention from the government<sup>2</sup>. This lagging condition persists in sharp contrast to NTT's wealth of abundant natural resources [4] as follows:

NTT is an archipelago province comprising seas and 1,192 islands with a tropical climate, of which 42 are populated and the rest are uninhabited.

The 1,781,181.86 ha of forests covering about 38.2% of the total area can be utilized to produce industrial raw materials such as wood and can serve as a natural tourist attraction.

Commodities, especially food crops and livestock products, can be produced on 210,773.6 ha of paddy fields, 527,397.2 ha of plantation area, and 832,228 ha of grazing land area.

In 2015, the mining and quarrying sector had the largest number of investment projects, with a total investment value of about US \$85 million, indicating that NTT has a promising potential in mining products, especially in metals.

In fishery, the sea waters of NTT contain almost every type of tuna; the waters of NTT are on the migration path of several types of tuna [5]. This is not surprising; the Ministry of Maritime Affairs and Fisheries (the KKP) reported that in 2014, of the 64 large marine ecosystems (LMEs) that exist around the world, six are in Indonesia, and three of those six LMEs are located close to NTT. NTT also has the advantage of tourism potential: Komodo Island, for example, has been a famous tourist draw since the early 1980s, even when it was managed

<sup>1</sup>Article 10 of Law Number 22 Year 1999: Local regions have the authority to manage the available national resources in their area and are responsible for maintaining environmental sustainability in accordance with the laws and regulations.

<sup>2</sup> Presidential Regulation No. 131 of 2015 on the Determination of Disadvantaged Regions 2015–2019 states that underdeveloped regions are districts whose territories and communities are less developed compared to other regions on a national scale based on the criteria: a) economy; b) human resources; c) facilities and infrastructure; d) regional financial capacity; e) accessibility; and f) regional characteristics.

conventionally and had poor infrastructure and limited accommodations [6].

Despite this abundant natural wealth, the government, the private sector, and the people of NTT have not been able to take advantage of these potentials as capital to improve the economy and improve the welfare of the society in general. The economic structure in NTT showed no significant change in the 25 year span from 1987 to 2012. The province's economy has been sustained by the agricultural sector, and the industrial sector remains stagnant. The tertiary sectors, such as services and tourism, are contributing to the economy, although not significantly [7]. Research shows that economic growth relies heavily on competitive advantages that are prioritized by local governments [8]. Thus, both the central and local governments are required to select development priorities in NTT that maximize the endowments from the region, namely natural resources and culture. Utilizing the wealth of abundant natural resources in a wise manner will improve the local economy toward prosperity. Similarly, as stakeholders, the private sector and the public must work together with the government to save the province from adversity.

This paper is an academic contribution that seeks to understand the existing conditions and analyze the opportunities in NTT and the strategies that stakeholders should develop to boost the economy. The analysis considered the Blue Economy as a new concept/policy in the blueprint of economic development in the province of NTT. This paper analyzes the suitability of the concept as applied to the economic sectors in NTT, particularly those related to the marine sectors.

## II. LITERATURE REVIEW

### A. Reviews on the Economic Development of NTT

Regional economic development cannot be discussed without an understanding of the character of a region's economic development. This character is formed by a complex composition of natural resources, labor skills, socio-cultural factors, and the role of the government, both central and regional, in directing development in the area. Looking at regional macroeconomic data, the structure of the gross regional domestic product (GRDP) in NTT in 2012–2015 shows that the agricultural sector is still a prime-mover sector. By 2015, the contribution of this sector dominates with a share of 29.65% of NTT Province's GRDP.

TABLE I. NTT PROVINCE GRDP STRUCTURE IN 2012–2015 ON THE BASIS OF CONSTANT PRICES (IN BILLION RUPIAH)

Industrial Origin	2012	2013	2014	2015
Agriculture	12,348.7	12,654.5	13,029.5	13,360.2
Forestry	68.3	70.6	73	75.6
Fisheries	2,253.0	2,344.6	2,508.5	2,631.8
Mining – Quarrying	705.2	740.6	780.7	830.8
Manufacture Industry	622.4	652.6	674.6	709.9
Electricity and Gas	27.8	29.8	34.1	37.6
Water supply, Waste and Sewerage	35.0	37.4	39.2	40
Construction	5,178.5	5,450	5,733.4	6,032.8
Trade	5,422.1	5,825.8	6,121.6	6,494.6
Transportation	2,402.9	2,536.2	2,702.3	2,850.5
Accommodations and beverages	279.1	299.6	318.3	337.9
Information and Communication	4,023.0	4,595.3	4,595.3	4,923.6
Finance and Insurance	1,730.9	1,933.8	2,058.3	2,176.8
Others	13,766.3	19,239.4	15,437.5	16,318
TOTAL GRDP	48,863.2	51,505.2	54,106.3	56,820.1

Source: Nusa Tenggara Timur in Figures (BPS, East Nusa Tenggara in Figure. Kupang: BPS NTT, 2016)

The agricultural sector has dominated the economy in the NTT in the last 25 years. There was no significant economic structure change in NTT: agriculture remained the primary sector by a large margin, and the manufacturing sector remained stagnant. On the other hand, tertiary sectors, like services, trade, hotels, and restaurants, continue, albeit slowly, to increase their contributions to the GRDP [7].

Using an analysis of the output, the NTT Regional Economic Review concluded that industry (1.837), services (1.746), and banking (1.869) are the production sectors with dominant backward linkages, whereas the sectors with dominant forward linkages are industry (2,123), services (2,462), and communications (2,552) [9]. Using the concept of input–output analysis, the final demand for a downstream product affects the upstream production sectors. The forward linkage condition is the opposite.

The agricultural sector as a prime mover of the NTT economy actually has a less important relationship, although in the structure of the GRDP, it has a very dominant contribution. We can conclude that the industrial sector and the service sector both have an important role in providing a multiplier effect on the economic performance of NTT. To improve effectiveness and efficiency, local governments need to pay attention to the above phenomena in determining policy direction.

### B. Blue Economy Concept

Introduced by Gunter Pauli in 2010, the concept of “the Blue Economy” is a notion of economic development that considers the wise local management of natural resources by encouraging creativity, innovation, efficiency, and effectiveness without generating waste. The basic principle of Pauli's concept is to maintain ecosystem sustainability by creating an economic activity without residuals, waste, or garbage. At first glance, this concept is a part of sustainable development theory. This concept is a bio-inspired industrial ecology or a self-profitable circular economy and simplified the concept of a blue economy to the following equation [10]:

$$\text{waste} + \text{knowledge} = \text{asset}. \quad (1)$$

Translating the concept of sustainable development into action is different in every country because each government has its own interpretation of the concept of sustainability [11]. For Indonesia, the Blue Economy is more directed to sustainable marine and fisheries development [12]. This is in line with the concept introduced by the United Nations Environment Program [13] that is, in areas like the Pacific Island countries, the development of a sustainable economy is not just about the sea, but has a broader scope, involving many sectors on many different scales.

The Blue Economy is in contrast to the conventional definition of economics that focuses only on the production and allocation of resources [14]. “Ecological economics” is closer to the explanation of sustainable development and the concept of a blue economy promoted by the United Nations (UN). Both the World Commission on Environment and Development [15] and the concept of the “green economy” promoted by the Economic and Social Commission for Asia and the Pacific [16] show an integration and collaboration between ecology and economics. The debate over the concept of sustainable economic growth is still continuing.

This disagreement still shows the importance of financial or economic growth in choosing what kind of growth argument to promote [16].

The concept of a blue economy began to be known in Indonesia around 2012 [17]. Later, discussions related to the implementation of a blue economy began to be discussed and even became part of Indonesian maritime regulation<sup>3</sup> and translated further as part of the strategic plan of the Ministry of Marine and Fisheries in 2015–2019.

Law No. 32 of 2014 on Marine economy describes the blue economy as follows:

*The concept of a blue economy is an approach to improving sustainable marine management as well as marine conservation and coastal resources along with its ecosystem in order to realize economic growth with the following principles:*

- *community involvement;*
- *resource efficiency;*
- *minimize waste; and*
- *multiple value added (multiple revenue).*

The Blue Economy mentioned in the marine law is an indication that Indonesia is committed to implementing sustainable development policies. The concept of a blue economy aims to stabilize sustainable economics with long-term sustainability bonuses of natural potential [18] in line with the principle of sustainable development that maintains intra- and intergenerational equality [15].

The government of President Joko Widodo through Nawa Cita (9 National Development Priorities Agenda) emphasized the Indonesian government's commitment to improve the utilization of the sea as a source of human life and to utilize marine and fishery resources optimally, efficiently, effectively, and accountably, with the ultimate aim of improving the welfare of the society in a sustainable manner<sup>4</sup>.

From Figure 1, it appears that Indonesia is intensively changing the direction of its development policy to become a maritime country. This means that the marine and fisheries sector is expected to increase its contribution to economic growth as well as equitable distribution for all levels of society.

The concept of the blue economy that involves marine and fishery resources can be applied to several sectors as follows [12]:

1) Sea transportation

The concepts of the blue economy can drive an economic network between centers of production and inter-island settlements that are integrative, efficient, and environment-friendly. One way to accomplish this is

to use low-carbon fuel and innovative sea transportation technology that is environment-friendly.

2) The maritime industry

Indonesia seeks to increase the productivity of the maritime industry, for example, to turn shipyards into modern facilities.

3) Salt industry

The salt industry is actually a strategic industry, but less of a concern of the government. Indonesia achieved self-sufficiency in salt by 2012. Unfortunately, the result is mainly for consumption. Indonesia has not been able to produce viable industrial salt as an input for other industries.

4) Utilization of deep-sea water

Seawater that has a higher economic value is located at a depth of over 200 m. This is a potential sector in Indonesia. A series of studies have been conducted, including one in the city of Kupang, the provincial capital of NTT, to test the feasibility for the development of Marine Techno Park – Indonesia's first deep seawater deployment. In addition, many products can be produced from deep seawater such as bottled water, high-quality salt, cosmetic ingredients, ingredients for the food and beverage industries, and many other potential uses.

5) Maritime energy

With the geographical character of NTT, there are several marine alternative energy sources that can be developed, such as the following: tidal energy, ocean thermal energy, wave energy, ocean current energy, solar energy, wind energy, biofuel energy, and algae energy.

6) Seabed minerals

Harvesting of seabed minerals is still in the exploratory stage, including determining the locations suspected to contain minerals with economic value. The Bandamin I expedition in 2001 discovered a potential mineral content of gold (Au) of 300 parts per billion (ppb) and copper (Cu) of 100 part per million (ppm) in the sea around Komba, North Flores [19].

7) Shiploads of shipwrecks

In the Indonesian territory, as estimated, there are 463 potential points of sunken shiploads with significant historical and material values. Eight of these points are located in the waters of NTT and West Nusa Tenggara (NTB).

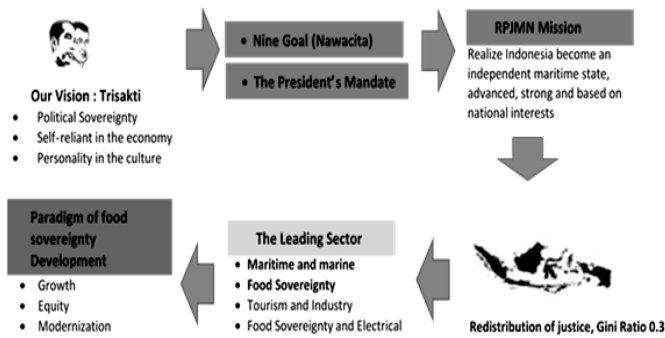
8) Marine tourism

The marine waters in Indonesia cover 76.94% of the total area of the country; this has tremendous natural potential for the economy, including as a tourist attraction.

<sup>3</sup> Law Number 32 Year 2014 on Marine Article 14 paragraph (1) reads:

*State government and local government in accordance with the authority to conduct marine management for the greatest prosperity of the people through the utilization and exploitation of marine resources with the blue economic principles.*

<sup>4</sup> Regulation of the Minister of Maritime Affairs and Fisheries Number 45 of 2015 on CTF Strategic Plan 2015–2019 page 9.



Source: Strategic Planning 2015–2019, Ministry of Marine Affairs and Fisheries

Fig. 1. The Direction of the National Development in the Maritime Sector

Of the total coastline length of 95,181 km in Indonesia, only a small portion has been utilized as tourist attractions. This is also the case in NTT. In addition, ecotourism has great potential in the tourism sector.

9) Fisheries

NTT has tremendous fishery potential because of the vastness of its marine waters and its strategic geographical position as a migratory path of some species of fish; this can be utilized more optimally to improve the economy of this region. The fishery port profile data 2013–2015 released by the Central Bureau of Statistics (2016) show that the fishing activities in NTT—marked by the presence of fish auction sites (TPI), boat landings/ship frequencies at ports, and fish selling rates—are still far behind those in the other parts of Indonesia. Meanwhile, despite its small contribution of 3% to 4% of the total GDP, the KKP [20] calculated that the growth of the marine and fisheries sector is significantly better than the general GDP growth<sup>5</sup>.

C. Blue Economy Model for Economic Development

After studying the concept originated by Pauli in 2010 and other theories about economic development and economic sustainability, considering Indonesia's regulations, Figure 2 shows a model of applying the concept of the blue economy in the country. The blue economy concept emerged as a complement to the concept of a green economy, in which ecosystem integrity is a fundamental part of achieving a sustainable use of socio-economic resources [11]. On the basis of the studies of [13] and [21], the implementation of sustainable development in its operational activities involves three aspects: economic, social, and ecological. The economic aspect aims to provide immediate effects of funding that can be channeled to environmental conservation activities and the indirect effect of maximizing economic benefits in the long run. The emphasis of the long run term in this aspect is important because, in the short run, the economic benefit seems greater when the economic activity is carried out conventionally than when applying the blue economy principle that considers the sustainability factor.

The simple goal of the blue economy concept is to turn scarcity into abundance, which emphasizes the principle of cyclical production system (CPS) [22]. The concept of CPS is one of the principles of the Blue Economy that emphasizes the concept of learning from nature [1], i.e., how we model the efficient workings of nature, and the logic of ecosystems, where, from the ecosystem pattern, we find a cyclical pattern [2]. One example is the grass eaten goat, then goat dung into fertilizer plants. Waste for one living being becomes a source of food for other living beings, and [3] inspired by 100 innovations [23], found the difference between those two concepts [24]: in the concept of green economy, the economy moves in a linear system, whereas in the Blue Economy, the economy moves in a circular system. CPS can provide multiple effects on labor employment, purchasing of labor goods and services, and increase in contribution to the GDP. In the end, there will be economic growth, which is one measure of the success of economic development in the region.

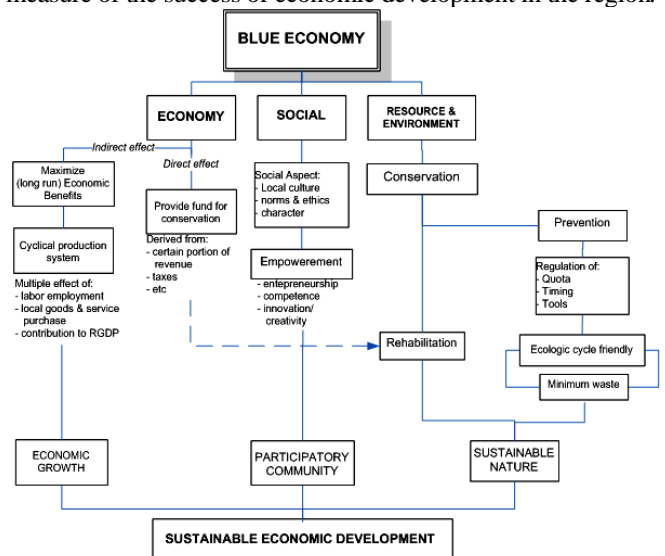


Fig. 2. Blue Economy Model for Economic Development (Processed from Several Sources)

In the social aspect, a successful implementation of the Blue Economy is highly dependent on the existence of active community participation generated by the empowerment of competence, entrepreneurship, creativity, and innovation. The Blue Economy needs innovation; extra attention on innovation may increase budgets but allows economies to stay competitive [25]. Members of the community must be directly involved as a workforce in the production activities of goods and services, along with the society as a whole. How to shape this awareness is largely determined by the presence of local culture, applicable norms, and community character. Radical social transformation is needed. Countries need to inspire people first before expecting transformation [25]. Strategies to increase community participation are important.

Regarding natural resources and environment, the Blue Economy requires conservation, including prevention of damage to the environment and nature as well as rehabilitation. Conservation efforts must be supported by government regulations and supervision, for example, in the following forms: quota restrictions on the utilization of natural resources in economic activities, regulations of times

<sup>5</sup> Satellites GDP growth of marine and fisheries is taken into account from the contribution of marine and fisheries to the economy as a whole, consisting of the contribution of capture and aquaculture activities, salt extraction, small- and large-scale fish processing industry, fish trade, salt and other processed products, and marine tourism (Ministry of Maritime Affairs and Fisheries, 2016).

to use or benefit from nature, and restrictions on the use of tools that are allowed in such activities.

These efforts will encourage minimum waste and ecologically friendly practices. Thus, nature and the environment will not experience degradation and may still be utilized as a resource to meet needs for a longer period of time. "Use what you have and generate value" [25] is an appropriate slogan related to resource utilization. The combination of the successful implementations of the Blue Economy in economic, social, and natural aspects will work simultaneously to produce a sustainable economic development with the support of institutional and technological factors [26].

### III. RESEARCH METHODOLOGY

The methodology used in this study is a combination of quantitative and qualitative techniques by taking NTT as the object of a case study. Quantitative techniques are performed with Location Quotient (LQ) analysis, whereas qualitative techniques were conducted with interviews and literature reviews processed further with an analytical hierarchy process (AHP) approach.

#### A. Case Study

A case study approach is used because it is considered the most appropriate to the exploratory nature of this research [27]. Case studies also provide rich and nuanced insights into how policies and regulations are implemented, as well as the real-world political-economy factors affecting practice [28].

#### B. AHP Method

Developed by Thomas Saaty in the 1970s, the AHP is a multi-criterion decision-making method used to solve complex problems [29]. AHP makes it possible to solve complex problems with a hierarchy of objective-criterion-sub-criteria-options. Basically, AHP consists of three principles: 1) problem segmentation and decomposition, 2) comparative decision-making, and 3) synthesis of priorities [30].

##### 1) Problem Partitioning and Creating Hierarchy (Decomposition)

The purpose of this study is determined by the criteria decided by weighting using AHP. According to the criteria to be evaluated, the decision makers (in this case, an expert) compare and weight the criteria [31].

##### 2) Comparative Judgment

On the basis of the criteria used, the expert will compare the criteria to one another. Saaty developed scales from 1 to 9 for comparison between criteria and between options [32], which are then evaluated by pairwise comparisons [33].

##### 3) Synthesis of Priorities

For the weighting results, Expert Choice version 11 software will stand as the expert, ranking each of the criteria and options. The application will also calculate the consistency ratio (CR). If the CR value is less than 0.1, then the model is considered to be consistent [32].

#### C. The Significance of the Sectors using LQ Analysis – Multiplier Effect

To examine the significance of the sectors that can be developed in NTT, this research uses time series data in the period 2000–2015. Those statistical data were derived for

NTT in figures and other supporting sources. The analysis techniques used are as follows:

##### 1) Location Quotient Analysis (LQ)

The LQ analysis is used to determine whether the sector chosen to be developed within the blue economy concept is the leading sector in NTT's GRDP during the period of 2000–2015. The formulation of the equation is

$$LQ_i = \frac{\left(\frac{T_i}{T_t}\right)}{\left(\frac{V_i}{V_t}\right)} \quad (2)$$

Where

LQ = Location Quotient

T<sub>i</sub> = Sector Revenue selected to be developed with the Blue Economy concept

T<sub>t</sub> = Gross Domestic Product of Region provinsi NTT

V<sub>i</sub> = Sector Revenue selected to be developed with the Blue Economy concept on a national scale

V<sub>t</sub> = Gross Domestic Product

##### Assessment criteria

LQ > 1: The sector is a leading sector in the area and has potential to be developed as a driver of the regional economy. Local production is higher than the average purity of the reference region (we call it the "basis sector").

LQ < 1: The sector is not a leading sector and is less potentially developed as a driver of Indonesia's economy. Local production is relatively lower than the average production of the reference area (we call it the "non-basis sector").

This approach is used to determine which sectors have the best potential to develop with the Blue Economy concept.

##### 2) Multiplier Effect

The multiplier effect is calculated using the equation

$$BE_{ir} = \left[1 - \frac{1}{LQ1}\right] * E_{ir} \quad (3)$$

Where

BE<sub>ir</sub> = location quotient in the sector

LQ1 = basic employment in sector i in region r

E<sub>ir</sub> = reference area employment in sector i in region r.

The multiplier effect is used to find out how the activities of the workforce in the less superior sectors will create jobs in the leading sector [34]. The increase in the base sector creates a multiplier effect on the economy of the whole region [35]. The increase in activity in the base sector adds to the revenue stream into the region, which increases the demand for goods and services and increases economic activity in the base sector. Owing to increased revenue streams, consumption and investment grow, resulting in increased incomes of local people and increased employment [36].

The Multiplier Effect in the short term can be formulated as follows:

$$MSy = \frac{\Delta Y}{\Delta Yb} \quad (4)$$

where

- MSy = Coefficient of the short run multiplier for the income indicator
- ΔY = Changes in income of NTT Province
- ΔYb = Changes in revenue of the favored sector/NTT Province “base” sector

**D. Qualitative Approach**

This approach is used to develop sustainable development strategies in accordance with best practices from other regions or based on the literature review, tailored to selected strategies and sectors using the AHP approach.

**E. Analytical Flow**

In summary, the flow of analysis in this paper is described as follows (Figure 3).

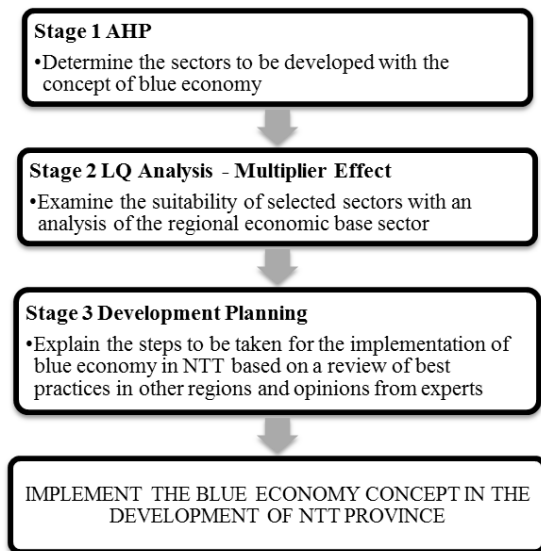


Fig. 3. Analytical Flow

**IV. DISCUSSION/RESULT**

**A. Application of the AHP Approach**

As explained in the literature review in Section 2, there are nine potential sectors to be developed with the concept of the Blue Economy in Indonesia. Furthermore, for the province of NTT, the determination of the selected economic sectors was elaborated with the analytical hierarchy process (AHP). On the basis of the judgment of two experts on the topic of blue economy and environmental economic sustainability, the AHP conducted data analysis using the application, “Expert Choice 11.”

The criteria used in the AHP are in accordance with the research model: they are the capabilities of each model to achieve the following: 1) economic growth (economic aspect), 2) a participatory community (social aspect), and 3) a sustainable nature (nature and environment aspect), in the main objective of creating sustainable economic development

in NTT Province. The analysis yields an answer as shown in Figure 4.

From the AHP results, the marine tourism sector is ranked at the top, with a weight of 0.123, followed by the fishery sector with a weight of 0.121, the marine energy sector (0.118), deep sea water (0.112), deep sea minerals (0.112), the salt industry (0.108), shiploads of shipwreck (0.105), sea transportation (0.102), and the maritime industry (0.098). The consistency ratio (CR) of the AHP scoring is 0.08. When the CR is below 0.1, the model can be declared consistent, and the results can be used for the next approach. On the basis of the above ratings of the alternatives, the two priority sectors with the highest AHP score are selected for further development under the concept of the blue economy. Those sectors are fisheries and tourism; these two sectors will be further tested with LQ analysis to determine their significance in the regional economy.

**B. LQ Analysis – Multiplier Effect**

The calculation of the contribution of the fishery sector to the GRDP is represented by the fishery sub-sector. Meanwhile, the tourism sector is represented by the art, entertainment, and recreational activity sub-sectors.

Regional economic activity is classified into two sectors of activity, namely base activities and non-base activities. The activity of an export-oriented base provides benefits outside the economic boundaries, and a non-base is an economic activity oriented to supplying goods and services needed by society within economic boundaries [37]. The more base sectors in a region, the more revenue inflows into the region, driving the demand for goods and services, leading to an increase in non-base sector volume [38]. The results of the LQ analysis of the province of NTT show that the marine-related sectors, represented by the fishery sub-category, and other services sectors are included into the base sectors of the regional economy.

Table 2 shows that, while the decline continues, the fisheries sector still has the potential to contribute more to NTT's economy. The LQ score of fisheries is still above one (LQ > 1), which means that it is likely to become a base sector in the next few years. Similarly, other service sectors, particularly the art, entertainment, and recreation subsectors,

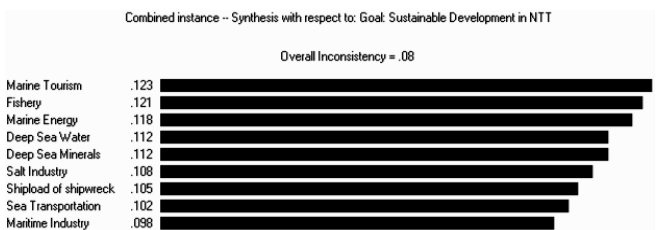


Fig. 4. AHP final score Determining the sectors related to marine and fisheries

TABLE 2: THE RESULTS OF THE LQ ANALYSIS – THE MULTIPLIER EFFECT OF THE PRIORITY SECTORS DEVELOPED IN NTT USING THE BLUE ECONOMY CONCEPT

Marine Sector	2015	2014	2013	2012	2011	2010	Sector
Other Services (Art, entertainment, and recreation)	2.04	2.10	2.11	2.17	2.16		Basis
Supporting sector	2.51	2.58	2.62	2.81	2.69	2.93	Basis
Accommodations	0.05	0.05	0.05	0.05	0.05		Non Basis
Foods and drinks	0.31	0.31	0.31	0.29	0.29		Non Basis

TABLE 3. THE MULTIPLIER EFFECT OF OTHER SERVICES AND THE FISHING SECTOR

Multiplier Effect	Y	ΔY	Yb	ΔYb	M
<b>Other Services</b>					
2011	46,334,128		1,057,151		
2012	48,863,188	2,529,060	1,081,499	24,348	103.8722
2013	51,505,189	2,642,001	1,123,027	41,528	63.61923
2014	54,106,271	2,601,083	1,172,220	49,194	52.87439
2015	56,820,098	2,713,827	1,215,834	43,613	62.22475
<b>Fishing</b>					
2011	46,334,128		2,124,012		
2012	48,863,188	2,529,060	2,253,032	129,020	19.60208
2013	51,505,189	2,642,001	2,344,554	91,522	28.86739
2014	54,106,271	2,601,083	2,508,466	163,912	15.86877
2015	56,820,098	2,713,827	2,631,782	123,316	22.00709

are still in the base sector. The existence of supporting sectors, like provision of accommodations and foods and drinks, which are not classified in the base sector, does not affect the final conclusion that the tourism sector can be considered a base sector. Furthermore, the calculation of the multiplier effect is only performed on the base sectors because only the base sector can cause multiple effects in multiple ways. The calculation of the multiplier effects of the two sectors on the basis of the indicator of regional income (the ratio of the changes in total revenue versus the revenues of the sector) is shown in Table 3.

Table 2 and Table 3 show that the multiplier effect of the fishery sector and other services sector is fluctuating. For example, by 2015, the increase in added value to the fishery sector is Rp 1,000, which increases the added value of the non-base sector by Rp 22,007. The increase of value added in the other services sector of Rp 1,000 increases the added value of the non-base sector by Rp 62,225. This considerable multiplier effect signifies that the development of the fisheries and tourism sectors within the Blue Economy concept can provide a very large multiplier effect in the short run (in the mindset as an indirect effect of the implementation from an economic aspect).

### C. Development Planning

Revenues from both of the Blue Economy priority sectors, fisheries and tourism, are expected to boost non-base sector revenues by increasing investment, employment, income, and consumption. This multiplier effect is instrumental in spurring the growth of the region [39]. Noting that the agricultural sector still dominates as a prime mover in the economy of NTT over the past decades, persistent efforts from stakeholders are needed to prioritize the development of the fisheries sector and tourism sector to boost economic development in NTT. This is very important because, although, in sum, the contribution of these two sectors to the NTT GRDP is still far below the agricultural sector, both are base sectors and have a very large multiplier effect on the economy.

Meanwhile, the results of Bank Indonesia's (2008) input-output analysis on the regional economy of NTT show that the two sectors with the largest forward and backward linkages are the industry and services sectors. Combined with

LQ-ME analysis here, the next best strategy would be to change the character of fisheries so that they are not confined to conventional fisheries, but rather to industrialize the fishery sector. This will facilitate the application of the Blue Economy principle of cyclical production of systems that can only be run with the presence of the industry.

Efforts to change the structure of the economy from the dominance of the agricultural sector to the fishing industry and other services (such as tourism) do not mean that the people of NTT need to change their daily jobs that support their livelihood. Ari Suhandi<sup>6</sup> explains that, for example, the main economic activities of the people of NTT, most of which are farmers, need not be converted into tourism businesses. In fact, farming activity can be an attraction for tourists visiting NTT, just as the Subak rice field in Bali became an attraction for foreign tourists.

Similarly, in the fisheries sector, synergizing the marine tourism sector and fisheries is also a challenge. Synergizing means making sectors interrelated and dependent so that growth in one sector encourages the growth of the other sectors, causing the economy to grow more rapidly [40]. Thus, the abundant natural wealth supports the economic growth and transformation of the economic structure [7].

NW Giri Adnyani<sup>7</sup> explains that for Indonesia, tourism is a contributor to the GDP, foreign exchange, and most convenient and low-paying jobs. From World Bank (2016) data, tourism in Indonesia is experiencing GDP growth above the industry average, with the contribution to general GDP being around 10%, the highest in the ASEAN. As the fourth largest contributor of foreign exchange, the tourism sector experienced the highest revenue growth. In addition, in the last five years, there was an increase in employment by 30%.

The Tourism and Creative Economy Agency of NTT Province (2017) in the tourism profile of NTT shows that almost every regency/city in this province has its own natural attractions (including marine tourism) and culture attractions. In total, there are 1,146 destinations in NTT. Some of them are already internationally renowned, such as the Komodo National Park, Labuan Bajo, and Nihiwatu. The natural wealth that can be used as a tourist attraction is an extraordinary boon for the people of NTT. Nevertheless, data from the World Economic Forum (2017) show that the weakness of Indonesia's tourism competitiveness lies in its poor assessment of health and hygiene, environmental sustainability, and tourist service infrastructure. Therefore, the concept of a blue economy needs to be implemented immediately in NTT because, in addition to providing benefits to the sustainability of economic development in the long term, it can improve the competitiveness of tourism in Indonesia, in general, and NTT, in particular. The implementation of this concept requires a close cooperation between governments as regulators and financial aid providers, the community as workers and as cultural

<sup>6</sup> Ari Suhandi is a professional in the environment economic sustainability field who became one of the interviewees, an activist in a non-governmental organization in the ecotourism sector.

<sup>7</sup> NW Giri Adnyani, an official at the Deputy of Abroad Tourism Marketing, Ministry of Tourism

attractions, and the private sector as industry players who will open employment.

The model compiled earlier can help in determining whether applying the concept of a blue economy can benefit regional development in NTT. In the topic of sustainable economic development, the concept of a blue economy assumes that profit for society cannot be viewed solely in the perspective of short-run economic terms. However, these benefits should be viewed in the long term, namely recognizing nature and a sustainable environment in meeting the needs of human economy.

Of course, in addition to this sustainability principle, the concept of a blue economy also emphasizes the need for a cyclical production system that uses resources optimally with no trace and no waste; this further magnifies the impact of the multiplier on the economic benefits that can be obtained by humans while preserving nature. Although there are still issues related to resource utilization because it is difficult to assess the capital of natural resources and determine the optimal scale of human activities as there is always a human tendency to over-expand the scale of the economy or allocate too many resources from the ecosystem [41].

Equally important to note is that the implementation of the blue economy in Indonesia can learn from the success stories of countries such as Barbados, which implemented policy on a national scale; Norway, which implemented inter-institution collaboration at the state and regional government levels; and Gambia and Madagascar, which apply community-based approaches [13]. Noting the success story of some of these countries and taking into account the character of NTT, the community-based approach, involving third-party non-government agencies (NGOs), is a reliable choice. Some case studies document that the application of a blue economy is valued and worthy of upfront investment, especially if applied over the long term, because it collaborates both vertical and horizontal governmental and non-governmental entities [13].

## V. CONCLUSION AND RECOMMENDATION

From the analysis, tourism and fisheries are the best sectors to be developed in NTT under the concept of a blue economy. Choosing the most promising sectors and implementing the blue economy concept will lead the region to a better and sustainable economic development. Accordingly, this disadvantaged region will be able to boost its development and increase its people's welfare.

As previously described in the case study, the "blue economy" is a high-profile issue not only in NTT but also in other areas of Indonesia that have a similar character. This can be seen from the analysis of LQ and multiplier effect, in which the blue economy sectors scored  $LQ > 1$  and has a large multiplier effect for the development of other non-base sectors. Different regions may use different approaches depending on the endowment that they have. For NTT, the ideal approach used in sustainable development is a community-based program that involves NGOs engaged in the socio-economic field to help local communities engage and implement the Blue Economy concepts. NGOs must be invited to assist the local community in understanding how the natural cycles that have provided economic value for

them in the past can be disrupted if people exploit them unwisely, which will affect long-term prosperity.

Taking into account that each policymaker may interpret the concept of a blue economy in different ways, it is necessary to develop guidelines that provide legal certainty and sustainability policies unaffected by the political business cycle. The effects of the changes in conventional economic activities, with or with the concept of the Blue Economy, can only be really seen in the long run.

## ACKNOWLEDGMENT

This work was supported by Mr. Darmadi Aries Wibowo and Mrs. ML Liana (Ministry of Maritime Affairs and Fisheries), Mr. Ari Suhandi (INDECON), Mr. Sunoto (the expert of Blue Economy concept), Mr. Irvan Faisal and friends (Ministry of Tourism). The authors would also like to appreciate the support given by Ibu Dr. Telisa A. Falianty, Ibu Ashintya D, MSE, and the big family of MPKP Faculty of Economics and Business, University of Indonesia

## REFERENCES

- [1] World Bank. World Development Report 2004: Making Services Work for Poor People. Washington DC: World Bank and Oxford University Press, 2003.
- [2] K. Kis-Katos and B. S. Sjahrir, "The impact of fiscal and political decentralization on local public investment in Indonesia," *J. Comp. Econ.*, vol.45, no.2, pp.344-365, 2017.
- [3] F. Fitriani, B. Hofman, and K. Kaiser, "Unity in diversity? The creation of new local governments in a decentralising Indonesia," *Bull. Indones. Econ. Stud.*, vol.42, no.1, pp.57-79, 2005.
- [4] BPS, "Statistik daerah NTT 2016," NTT: BPS NTT, 2016.
- [5] A. M. Syamsuddin, Najamuddin, and Sudirman, *Analisis Pengembangan Ikan Cakalang Berkelanjutan di Kupang Nusa Tenggara Timur*. 2007.
- [6] M. Erb, "Understanding Tourist interpretations from Indonesia," *Annals Tourist Research*, vol.27, no.3, pp.709-736, 2000.
- [7] F. X. L. Aba, O. M. Yussof, and S. B. Mohd, "Analysis of economic structure in poverty eradication in the province of East Nusa Tenggara Indonesia," *Procedia Soc. Behav. Sci.*, vol.211, pp.81-88, 2015.
- [8] A. Barnett, B. Broadbent, A. Chiu, J. Franklin, and H. Miller, "Impaired capital reallocation and productivity," *Natl. Inst. Econ. Rev.*, vol.228, no.1, pp.R35-R48, 2014.
- [9] BI. *Kajian Ekonomi Regional NTT Triwulan I*. Jakarta: Bank Indonesia, 2008.
- [10] I. J. Aberkane, From Waste to Kwave: On the Blue Economy in Terms of knowledge. *CS-DC*. in World E-Conference, Sep 2015., Tempe, United States: CS-DC'15 World e-conference.2015;15.
- [11] J. J. Silver, N. J. Gray, L. M. Campbell, L. W. Fairbanks and R. L. Gruby, "Blue economy and competing discourses in International oceans governance," *The Journal of Environment & Development*, vol.24, no.2, pp.135-160, 2015.
- [12] KKP, *Blue Economy: Pembangunan Kelautan dan Perikanan Berkelanjutan*, M. S. E. Sunoto, Ed. Jakarta: Kementerian Kelautan dan Perikanan, 2014.
- [13] UNEP, *Blue Economy: Sharing Success Stories to Inspire Change*. UNEP Regional Seas Report and Studies No. 185. United Nations Environment Programme, 2015.
- [14] P. Wonnacott and R. Wonnacott, *Economics*. New York: McGraw-Hill, 1979.
- [15] WCED, *World Commission on Environment and Development (WCED): Our Common Future*. Oxford: Oxford University Press, 1987.
- [16] ESCAP, *Green Economy in a Blue World*. Bangkok: Economic and Social Commission for Asia and the Pacific, 2012.
- [17] WWF Indonesia, [Desember 10.] from WWF Indonesia. Available at: [wwfindonesia.or.id](http://wwfindonesia.or.id). Retrieved March 2017; 2017. Available at: <http://www.wwf.or.id/226820/Tantangan-Blue-Economy-untuk-Indonesia>, 2012.



- [18] CSIRO, CSIRO, *Innovations for the Blue Economy: Workshop Summary*. Canberra: CSIRO and Australian Department of Foreign Affairs and Trade, 2015.
- [19] Susilohadi, "Survei dan penelitian energi dan sumber daya mineral lepas pantai Indonesia," *Mineral dan Energi*, vol.30, no.4, pp.80-90, 2015.
- [20] KKP, *Informasi Kelautan dan Perikanan Januari 2016*. Jakarta: Pusat Data, Statistik, dan Informasi Kementerian Kelautan dan Perikanan, 2016.
- [21] M. Lehman, B. d. Leuw, and E. Fehr, *Circular Economy: Improving the Management of Natural Resources*. World Resources Forum & Swiss Academy of Engineering Sciences, 2014.
- [22] N. Kathijotes, *Keynote: Blue economy - environmental and behavioural aspects towards sustainable coastal development*. Procedia - Social and Behavioral Sciences. AMER Intl. Conf. on Quality of Life, Holiday Villa Beach Resort & Spa, Langkawi, Malaysia, April 6–8 2013; 2013;101:7-13.
- [23] D. Kelautan, Indonesia. *Kebijakan Ekonomi Kelautan dengan Model Ekonomi Biru Indonesia*. Jakarta: Dewan Kelautan, 2012..
- [24] D. Smaragdina, *Notula: Seminar Blue Economy - Promoting Blue Economy in Community Participatory Based New Models Business*. Universitas Indonesia. 2015, 2015.
- [25] G. Pauli, *Notulen: Seminar Blue Economy - Promoting Blue Economy in Community Participatory Based New Models Business*. Indonesia. Depok: Universitas; 2015.
- [26] M. R. Keen, A.-M. Schwarz, and L. Wini-Simeon, "Towards defining the Blue Economy: practical lessons from pacific ocean governance," *Mar. Policy*, vol.88, pp.333-341, 2018.
- [27] K. M. Eisenhardt, "Building theories from case study Research," *AMR*, vol. 14, no. 4, pp. 532–550, 1989.
- [28] B. Flyvbjerg, "Five misunderstandings about case-study. Research," *Qual. Inq.*, vol. 12, no. 2, pp. 219–245, 2006.
- [29] H. Demir and A. Yilmaz, "Measurement of urban transformation project success using the analytic hierarchy process: Sulukule and Tepeustu – Ayazma case studies Istanbul," *J. Urban Plann. Dev.*, vol.138, no.2, pp.173-182, 2012.
- [30] T. L. Saaty, *The Analytical Hierarchy Process (AHP)*. Newyork: McGraw Hill International, 1980.
- [31] O. Demir, B. Uzun, and Y. E. Çoruhlu, "Progress of cost recovery on cadastre based on land management implementation in Turkey," *Surv. Rev.*, vol.47, no.340, pp.36-48, 2015.
- [32] Z. A. Polat, M. Alkan and H. G. Sürmeneli, "Determining strategies for the cadastre 2034 vision using an AHP-Based SWOT analysis: A case study for the Turkish cadastral and land administration system," *Land Use Policy*, vol.67, pp.151-166, 2017.
- [33] T. L. Saaty, "How to make a decision: the analytic hierarchy proses," *Interfaces*, vol.24, no.6, pp.19-43, 1994.
- [34] A. K. Alhowsai, M. A. Alsharikh, M. A. Alasmal, and Z. A. Alghamdi, "Location quotient technique and economy analysis of regions: Tabuk Province of Saudi Arabia as a case study," *Int. J. Sci. Res.*, 2013.
- [35] J. Glasson, *Pengantar Perencanaan Regional, Indonesia*. Jakarta: Fakultas Ekonomi Universitas, 1977.
- [36] Kadariah, *Ekonomi Perencanaan. Indonesia*. Jakarta: Lebag Penerbit Fakultas Ekonomi Universitas, 1985.
- [37] Adisasmita. *Dasar-dasar ekonomi wilayah*. Yogyakarta: Graha Ilmu, 2005.
- [38] J. Glasson, *An Introduction to Regional Planning: The Built Environment. in Fitzroy Square*. London: Hutchinson & Co (Publisher) Ltd., 1974.
- [39] Tarigan, *Ekonomi Regional: Teori dan Aplikasi*. Jakarta: Bumi Aksara, 2009.
- [40] D. A. Wijaya, "Analisis pengembangan wilayah dan sektor potensial guna mendorong pembangunan di kota Salatiga," *Dinamika Pembangunan*, vol.3, no.2, pp101-118, 2006.
- [41] R. Costanza and H. E. Daly, "Natural capital and sustainable development," *Conserv. Biol.*, vol.6, no.1, pp.37-46, 1992.