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BLUE ECONOMY BASED FISHERIES AND MARINE BUSINESS MODEL DEVELOPMENT

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Abstract: *This study aims to develop blue economy based business model and develop a blue economy based information system about fisheries and marine resources in 60 (sixty) areas of KIMBis (Fish Innovation and* ***Business*** *Development* ***Clinic****) in Brebes Regency. The methodology used is a research-based design (DBR) which consisted of eight stages of development.* Based on the development and discussion results, the canvas business model developed can create advantages in the KIMBis fisheries and marine business; (a) efficient fishery production activities through a polyculture system and integrated with agricultural activities. (2) The creation of new fisheries marketing channels that support efficiency and reduce the domination of middlemen's role. (3) Diversification of fishery products includes new product variants at low prices and environmentally friendly. (4) Environmentally friendly fishery and marine businesses. The information system in the form of a website developed can provide information related to the company profile, which contains the Vision, Mission of KIMBis, products sold, product stock-taking, ordering and purchasing via connected WhatsApp, membership, and business contacts.

Keywords*: blue economy, circulair economy, KIMBis*

Introduction

Indonesia is an archipelagic country where the fisheries and marine sectors are potential sectors that are contributing to GDP growth and reducing poverty in coastal areas of Indonesia. The total production produced by aquaculture reaches 16 million tons annually, absorbs 12.5 million workers, and seaweed reaches more than 19 million tons (BPS, 2018).

The great potential of the marine and fisheries sector needs to be supported by various strategic development efforts. However, the current strategic efforts still leave problems, including; overfishing, environmental damage, marine pollution, and poverty in coastal areas (Durianto et al., 2015). Therefore, the development target of the marine and fisheries sector must be in line with the three pillars of national development, namely pro-poor (poverty alleviation), pro-job (employment absorption), and pro-growth (growth).

The phenomenon of poverty is inherent in the fishing community that lives in the coastal area of Brebes Regency, Central Java. Brebes Regency has the highest poverty rate of 364,900 (BPS, 2018). The poverty that occurs in fishermen groups is increasingly widespread with a very concerning level of poverty depth. Supporting factors that alleviate the poverty, such as (1) low human resources; (2) low capital and technology; (3) the fishery business climate has not been op-

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timally profitable; (4) low diversification of fisheries and marine businesses; (5) depending on marine income; (6) low business marketing system; (7) and damage to the ecosystem (Sofianto *et al*, 2020). So it is important to re-orient the circular economy system in coastal areas with a blue economy-based approach.

The blue economy is a strategic choice in reducing the poverty rate while preserving coastal areas. The blue economy aims to support economic development using the environmentally friendly approach, to create sustainable management of natural resources (KKP, 2014). The results of studies confirm that redesigning a suitable business model can reduce poverty, namely: (a) strength and potential of coastal areas; (b) added value to ecosystems; (c) community empowerment by strengthening fishery and marine production factors; (d) economic, ecological and social sustainability (Rini, 2020)

The blue economy is defined as a business model oriented to (1) natural resources efficiency, and this includes that the blue economy works by utilizing existed resources as efficiently as possible. (2) Zero waste: leave nothing to waste - waste for one is food for another - waste from one process is energy resource for the other: This principle explains that the waste generated from an economy is used as a source of nutrition for others to achieve sustainability without waste. (3) Development of social inclusiveness, blue economy oriented to resource efficiency (self-sufficiency for all - social equity), absorption of labour (more jobs), and reducing community poverty through new business products (more opportunities) for the poor.

Zamroni et al. (2018) explained that the application of the blue economy in the fisheries business could create a multiplier effect in commodity diversification to improve the household economy of fishermen groups and benefit environmental sustainability. The blue economy is proven to create added value from fishery production, alternative jobs and additional income for fishermen households and coastal communities (Mira et al., 2014).

The blue economy concept in fisheries and marine businesses has been implemented in several work areas of the KIMBis, among others; Grinting Village, Kaliwlingi Village, and Randu Sanga Village through polyculture cultivation (shrimp, milkfish and seaweed) (Mira et al., 2014). However, in implementing polyculture cultivation, there is still a lack of data, information related to fish, shrimp, and seaweed resources, including maps of potential distribution, types of fishery and marine commodities, and their production quantity. Besides that, the low development of KIMBis 'business model is an obstacle in expanding KIMBis's potential products.

Fisheries and marine sector data and information integrated with a comprehensive business model can support strategic actions and control fisheries and marine sector development efforts. The blue economy in its application in aquaculture still has to be expanded with the availability of adequate technology. Several studies have shown that the development of information systems and technology will positively impact economic growth (Sassi & Goaied, 2013; Khayyat et al., 2014; & Alam, 2014). This study aims to (1) develop a blue economy-based fisheries business model and (2) develop a KIMBis fisheries and marine business information system.

Method

This study uses a qualitative approach, while the research method used in this study is grounded theory. The development of fisheries

and marine business information system design in this study adopts a research-based dessaign model. This study's development model stages are described in eight stages: (1) The problem analysis stage. This stage aims to identify potential problems that need to be developed to implement fisheries and marine businesses. This stage includes concept analysis and the formulation of the development's objectives. (2) The product development formulation stage aims to prepare a syntax prototype and product scenario, including (a) compiling an information system planning; this stage determines the system's scope, which can cover all aquaculture activities within the scope of KIMBis Brebes.

The information systems analysis stage consists of identifying the information needed to formulate problems in the management process of aquaculture resource data collection. (3) The designing stage has a goal to design the website based on the findings from the first stage. The designing stage activities such as data input, process and present the results (output). At this stage, it includes the validation of the prototype design of the experts. (4) The design trial stage. (5) The evaluation stage aims to get constructive feedback by collecting KIMBis' members' responses regarding the prototype. (6) The completion stage is where the prototype is adjusted based on the feedbacks (7) Iteration cycle is the stage that involves other stakeholders, namely, users (KIMBis members), researchers, and related practitioners. (8) Reflection.

This study uses primary data collected from several activities, such as (1) observation of KIMBis fishery and marine business activities, (2) interviews with administrators and managers of KIMBis, (3) Focus group discussions (FGD) with all stakeholders of KIMBis activities. The secondary data used includes the history of KIMBis, business activities, profiles, and data of fishermen groups and business actors. Data analysis techniques used in this study include (a) content analysis, (b) comparative research analysis, (c) *SWOT* analysis. Content analysis is carried out to see the suitability of the concept and the execution. Comparative research analysis aims to see the feasibility of the design being developed.

Results and Discussion

Blue Economy Implementation in KIMBis's Fisheries and Marine Enterprises

The blue economy in the developed business model explains that KIMBis Brebes can have an economic impact, a social impact on the community and an impact on the environment (See figure 6). The business model developed can collect fisheries and marine business groups, especially fishermen groups, voluntarily, especially in increasing fishery and marine products' diversification. It has a big impact on improving the welfare of fishermen who are members of KIMBis and creating a double effect for reducing unemployment and alleviating poverty for coastal fishermen in Brebes Regency.

Implementing a blue economy in production activities is manifested in the application of an integrated fish farming system in the KIMBis business. This activity combines fishery activities with agriculture and livestock as raw materials for fish processing, a provider of energy sources. Aquaculture activities require fish feed produced from agricultural activities such as corn, cassava, taro. It is also integrated with livestock activities such as cultivating earthworms, chickens or snails. Products produced from agricultural activities are raw materials for cooking spices such as lemongrass, tur-

meric, ginger, chillies, tomatoes. Meanwhile, waste from fish processing activities can serve as a raw material for biogas production, which can be used as an energy source for fish processing. Biogas production can also produce liquid and solid fertilizers, which are used for fertilizing ponds and crops. Thus, innovation in an integrated fisheries system can increase revenue streams for fisherman households who are members of KIMBis and encourage social inclusion, especially the absorption of labour.

Meanwhile, the social impact created from the implementation of the blue economy is to improve the quality of human resources by increasing knowledge and skills. For instance, fishermen's creativity and innovation in processing captured fish products into product variants such as shredded fish, crackers, frozen food, various dried fish and fish. The resulting waste, such as fish shells, shellfish, fish bones and fish manure, can be developed into other product variants.

Meanwhile, the implementation of the blue economy in KIMBis fisheries and marine business also impacts the environment; creating environmentally friendly production activities, sustainable waste management and preserved marine ecosystems.

KIMBis's Business Model Canvas (BMC) Based on Blue Economy

This product's advantages, namely (a) Promoting KIMBIS fishery products to consumers, are based on the analysis of challenges and opportunities of blue economy concept. The value added of KIMBIS fishery and marine business, namely (1) creation of new fisheries marketing channels that support the principle of efficiency and prevent middlemen's domination. (2) Diversification of zero waste fishery products. (3) Environmentally friendly fishery and marine businesses. The advantages or value added that offered by the fisheries business and the strength of KIMBIS can be in the form of new products, better quality of products and services, unique product designs, cheaper/competitive prices, easy access and others.

New advantages (value proposition) for customers on a wider scale, such as 1) Fresh and hygienic product quality, so it is possible to change KIMBIS fisheries and marine businesses' brand image. This value proportion will build consumer perceptions in interpreting the quality of KIMBis fish products by farmers' standard needs. 2) Various processed products such as shredded fish bones, various fish crackers

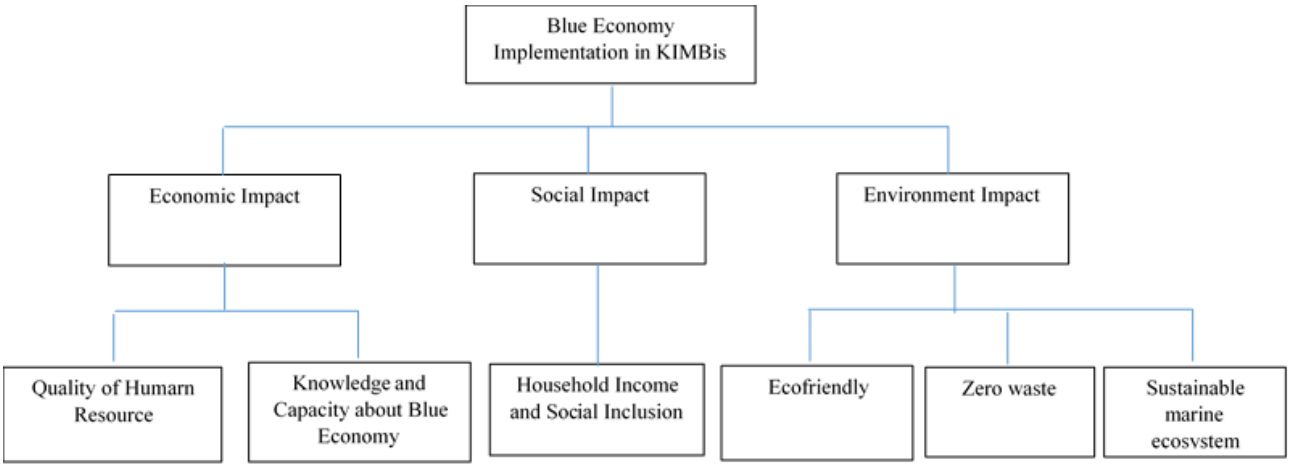

Figure 1 Blue Economy Implementation in KIMBis

Table 1 KIMBis's Business Model Canvas

<table>
<tr><th colspan="5">Business Model Canvas</th></tr>
<tr><th>Key Partners</th><th>Key Activities</th><th>Value Propositions</th><th>Customer Relationships</th><th>Customer Segments</th></tr>
<tr><td rowspan="3">Ministry of Marine Affairs & Fisheries (KKP)
District UMKM Office
Fishery College (STP) / Academic
Pasar Minggu Jakarta
Integrated fish farming consultant
Fish seller of a kind
Distributor of basic necessities</td><td>Production with an integrated system (agriculture / livestock)

Product processing & marketing

Partner alliance / collaboration</td><td rowspan="3">Fresh fish products without the smell of sludge

Diverse and ready-to-eat variants of processed fish products (shredded fish, frozen food, various fish crackers & seaweed, dried fish, iodine salt)

Prices are cheaper than traditional markets</td><td>Special personal assistance

Shopping outlets (self service)

Community</td><td>Culinary industry
Commuters and tourists
Individual buyers
Party organizer
Government and private agencies
All interested buyers from all regions in Indonesia</td></tr>
<tr><td>Key Resources
Ship

Cultivation land

Fish processing equipment / machines

HR & finance</td><td>Channels
Minimarket / mini fish market / cooperative

Fishing & therapy pool

Social media / web / online shopping outlets</td><td></td></tr>
<tr><td colspan="2">Cost Structure
1. Purchasing fish farming / livestock / agriculture equipment
2. Purchase a ship
3. Purchase fish processing and packaging equipment.
4. Salary / tax / business license</td><td colspan="2">Revenue Streams
1. Sales of fresh fish products and various processed fish
2. Sales of groceries
3. Fishing & therapy services
4. Membership fees
5. Local Government program assistance</td><td></td></tr>
</table>

and seaweed, various dried fish, fish fillets and frozen food. 3) Product prices are affordable than traditional markets. The new value in KIMBis products can increase consumer interest and taste. The blue economy principle applied in this activity minimises waste and creates more value for the innovative and adaptive KIMBis fishery business. This fish processing business has a multiplier effect in adding new income sources by increasing fishermen's opportunities for better livelihoods. Also, the principle of social inclusion that is implemented in the intensification of KIMBis Brebes aquaculture can absorb a lot of workforces so that it has the potential to reduce unemployment and poverty in the coastal areas of Brebes Regency.

Customer segment from this model, namely (b), describes the fishery and marine products' main target. The revised KIMBis canvas business model incorporates a fairly high demand for fish and marine processed products for a wider consumer segment, such as 1) the Culinary industry, which means that high-quality and affordable KIMBis fish product variants open up the potential for a new market segment for the culinary industry. The culinary industry, which is constantly growing, can increase the demand for fresh and processed fish in large

quantities. 2) Commuters means the strategic location of KIMBis opens opportunities for the fast market segment to buy processed fish products that can be used as supplies or as souvenirs. 3) Tourists as Bulukamba Brebes has a very busy natural tourism object. The number of tourists will continue to grow with the development of the land transportation network system in the Brebes Regency area. This market segment for souvenir shops that sell processed fish and seaweed products. 4) Party organiser where fish and seaweed products can be served for party dishes. Thus, it can add new customers to the KIMBIS business. 4) Individual buyers. 5) Government agencies. This market segment is targeted for fishery training products, fishing, mini fish markets and cooperatives.

Customer relationship in this business model, such as (c) describes the KIMBis mechanism in maintaining good relations with consumers. The strategy developed plays an important role for KIMBis to acquire new customers, retain customers and increase sales. Improvements in business models, new strategies are carried out through special personal assistance, with special service officers to respond to long-term online and offsite sales transactions. Special assistance services also include delivery services, especially for processed fish products. In the future, KIMBis minimarket will provide all the facilities so that customers can help themselves. The third strategy is to build a community of users to exchange knowledge and information, such as the community of fish lovers, fish therapy, and anglers.

Channels included (d) is a medium for KIMBis to reach consumers targeted so that consumer can accept the advantages or added value offered. KIMBIS and customers can connect via communication, distribution and sales channels. The KIMBis fisheries and marine business communication channel has two phases, namely: 1. They are building consumer awareness and evaluating the products and services offered by KIMBIS. Social media networks, the web, and online shopping outlets are used as distribution media for KIMBis fisheries and marine businesses. 2. Providing a place to sell products and providing services consisting of minimarkets, mini fish markets, cooperatives, therapy ponds and fishing.

Key activities listed such as (e) encourage optimising the multiplier effect principle in increasing people's income. Key activities are needed to create and deliver value propositions, reach markets, and maintain good relationships with consumers to generate additional income streams. The improvement of the canvas business model in the KIMBis fisheries and marine business is as follows; (1) applying an integrated fishery system (integrated fish farming) in the KIMBis business. This activity combines fishery activities with agriculture and livestock as raw materials for fish processing, a provider of energy sources. Aquaculture activities require fish feed produced from agricultural activities such as corn, cassava, taro. It can also be integrated with animal husbandry activities such as collecting earthworms, chickens or snails. Agricultural activities that are built can be used as pond embankments. Products produced from agricultural activities are raw materials for cooking spices such as lemongrass, turmeric, ginger, chillies, tomatoes. Meanwhile, waste from fish processing activities can serve as a raw material for biogas production, which can be used as an energy source for the fish processing process. Biogas production can also produce liquid and solid fertilisers, which are used for fertilising ponds and crops. Thus, in-

novation in an integrated fisheries system can encourage social inclusion, especially the absorption of labour.

Processing and marketing of fishery and marine products (2) in a key activity require partners and sources of information to accelerate KIMBIS products' distribution. Partner alliances and collaborations (3) expand cooperation in acquiring various competencies and facilitating resource which needed with various KIMBis key partnerships. KIMBIS collaboration with various parties can also increase the supply of similar fish products, knowledge in developing environmentally friendly capture fisheries activities, cultivation activities and processing businesses.

Key resources used, namely (f) in the improved business model, include the most important assets in supporting KIMBis fisheries and marine business operations, including 1) Ships, which are the main transportation media for KIMBIS fishermen capture fisheries activities. So far, ships have been purchased from middlemen at burdensome prices and agreements. Therefore, in the future KIMBis can collectively own vessels that KIMBIS members can use. The partnerships owned by KIMBIS can later be used in providing the required capital and physical assets. 2) Cultivation of land, fish processing equipment/machines are needed as aquaculture production activities and fish processing activities. 3) Human and financial are also important assets in developing added value from the products to be produced. Apart from that, finance is needed to construct physical and operational facilities that can be obtained from the KIMBIS income streams.

Key partnerships (g) describe the relationship between KIMBis and third parties that expects to support marketing efficiency, which is still dominated by middlemen. KIMBis needs to expand its partners to optimize the business model to generate affordable prices due to large economies of scale, risk reduction (reinsurance), and additional best resources. The partnerships that are improved in the KIMBis business model include; 1. Government agencies (KKP, Dinas UMKM), integrated fish farming consultants and academics. KIMBis can obtain easy licensing for home industry food business (P-IRT), knowledge, skills, and experience through extension workers and business actors who have previously succeeded in developing their business. 2. Other sellers are a form of cooperation between KIMBis and the fish seller community, which can increase fish stocks to increase the number of product sales. 3. Future distributor partnerships such as groceries or minimarkets.

Revenue stream (h) is a source of cash inflows generated from KIMBis fisheries and marine business activities. The source of income that KIMBIS can optimize is from the sale of fresh and processed fish products, which are integrated with the sale of necessities through cooperatives and mini fish markets, which can be carried out by KIMBIS managers themselves. The income stream will also result from business diversification through fishing and therapy services. The flow of income through membership fees which are members of KIMBIS, and assistance from local government programs can support sustainable fisheries efforts and KIMBIS strength.

The cost structure (i) describes all costs incurred for the KIMBis business model's operational activities. The cost structure is used as follows; (1) financing the purchase and maintenance of fish farming equipment, husbandry and agricultural activities. (2) Financing for the purchase of vessels for capture fisheries activi-

ties. (3) Financing to purchase fish processing and packaging equipment. (4) Financing to pay employee salaries, taxes and business licenses.

In the first phase of development or the identification stage of a business model reviewed based on the results of interviews and Focus Group Discussions (FGD) with KIMBIS managers, KIMBIS business model improvements can be developed for the future. The business model's improvement is also based on the consideration of KIMBIS's vision, namely the creation of an independent, advanced, and strong marine and fisheries sector in Brebes Regency. Improvements to the business model are also based on SWOT analysis, resulting in improved business models in Figure 1. Based on Figure 1, the latest business model development requires KIMBis parties involved to maintain the consistency of the production goods they produce. Especially from the amount of stock of goods, the market that will be reached will be wider.

KIMBis's Information System Design

Information systems cannot be separated from product formulation, which has several stages that started from the designing and planning stages based on focus group discussion findings. Based on the process of identifying problems and components needed in developing learning products. The design of fisheries and marine business information system based on the blue economy has two approaches such as (a) using the techno-sociopreneurship system, (b) based on existing Blue Economy principles.

KIMBis requires a web-based information system that can display its business profile. Therefore, KIMBis requires a web-based company profile. They will display the organizational structure, the various products produced, the profiles of fishermen and business actors in the Brebes area, and the products produced which can be made direct transactions via WhatsApp. These notes include: (1) To use case

Figure 2 SWOT Analysis of KIMBis's Business Model Canvas

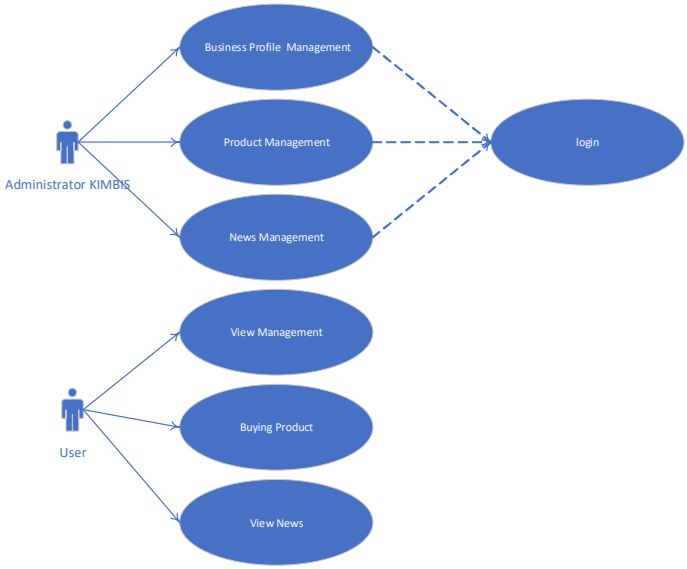

Figure 3 Use Case Diagram

diagrams to identify functionality in the program. This functionality will identify what users can do from the information system (Figure 3).

The diagram above explains that the system to be built has two types of actors, the first is management, and the second is the user. The manager of KIMBIS can manage the company profile or business profile of KIMBis. It means that managers can fill in their company profile in the future according to the business situation

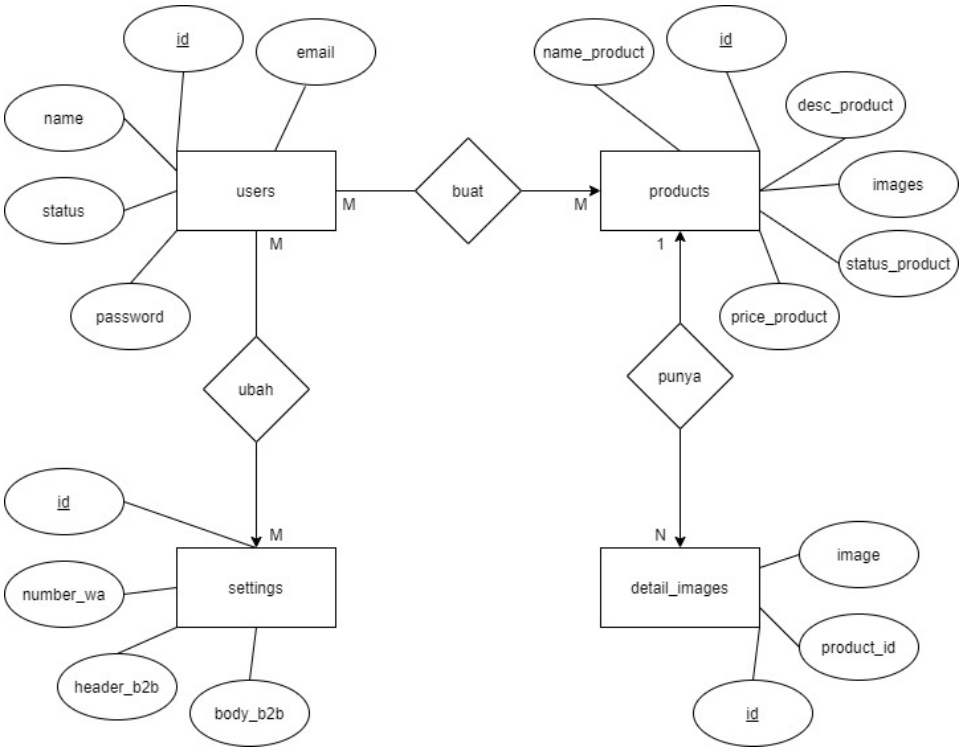

Figure 4 KIMBis's Entity Relationship Diagram System

owned by KIMBis. They can also add the products available, add their descriptions, updated news, and add their prices. It will help business actors and managers to be better known and accessible to the wider community. News will be typed and stored into the system, and later it can be read by all users of this information system. (2) Entity-relationship diagram is a diagram that will later become a database structure that will be used in this information system. the system to be created will refer to this entity relationship diagram.

The information system design use Entity Relationship Diagram (ERD), where the user's entity is created to store the website's administrator data who manages KIMBis products. The user's entity has an identification number attribute as the primary key, a status to see whether the account is active or not, name, email, and password. Products entity uses to store product data. The products entity has an identification number as the primary key, name_product, desc_product to describe the product description, status_product to see if this product is still available or not, price_product, and images. The detail_images entity functions to store detailed images owned by the products entity. The detail_images entity attribute consists of identification number as the primary key, product_id as a foreign key associated with the product entity's primary key, and image. Entity settings to store data such as WhatsApp number, title and body in Business to Business (B2B) content have an id attribute as the primary key, number_wa for storing WhatsApp numbers, header_b2b for storing titles, and body_b2b for storing content.

(3) Information System Prototype. This prototype describes the appearance on the website so that the display can be a reference for programmers to design and program an information system properly. The prototype is designed so that all information system needs can be met in the prototype.

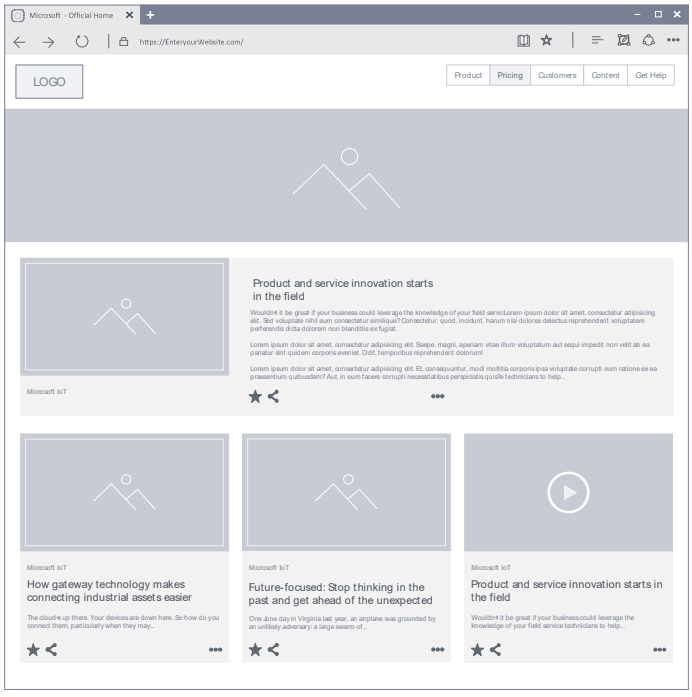

Figure 5 KIMBis's Information System

Based on the information system requirements for the KIMBIS business that have been described above, it can be concluded that KIMBIS must have a website that is interactive for users and user-friendly. The process of translating functional requirements into a website, requires a process with a coding name. This process requires technical skills or abilities regarding information technology to create a website. Website creation requires a tool or media in the form of Visual Studio code to accommodate all programming languages used to build websites. This website is designed with my SQL database, which is compiled directly and built on leased hosting in terms of database. The process of implementing coding into an information system can be seen in the image below.

The figure describes the KIMBis information system's appearance derived from the requirements of the KIMBis system. The KIMBIS information system is already hosted with the address http://kimbisbrebes.com. It means that the KIMBIS website is ready to use. At the top, there is navigation regarding the home, about, product, contact, and FAQ. It reflects a good system by representing KIMBIS as a company profile to be seen by the wider community. The Home section here contains the initial view in Figure 5. There is a WhatsApp symbol where visitors to the website can connect directly to KIMBis administrators via WhatsApp's short message on each navigation. In the About section, there is a narrative about KIMBis and its stakeholders. There is also the VISION and MISSION of KIMBis, which can be read for the general public. The community can learn and know the history of the formation of KIMBis as a means of bridging between local governments and surrounding communities who rely on their livelihoods engaged in fishing and their processed products.

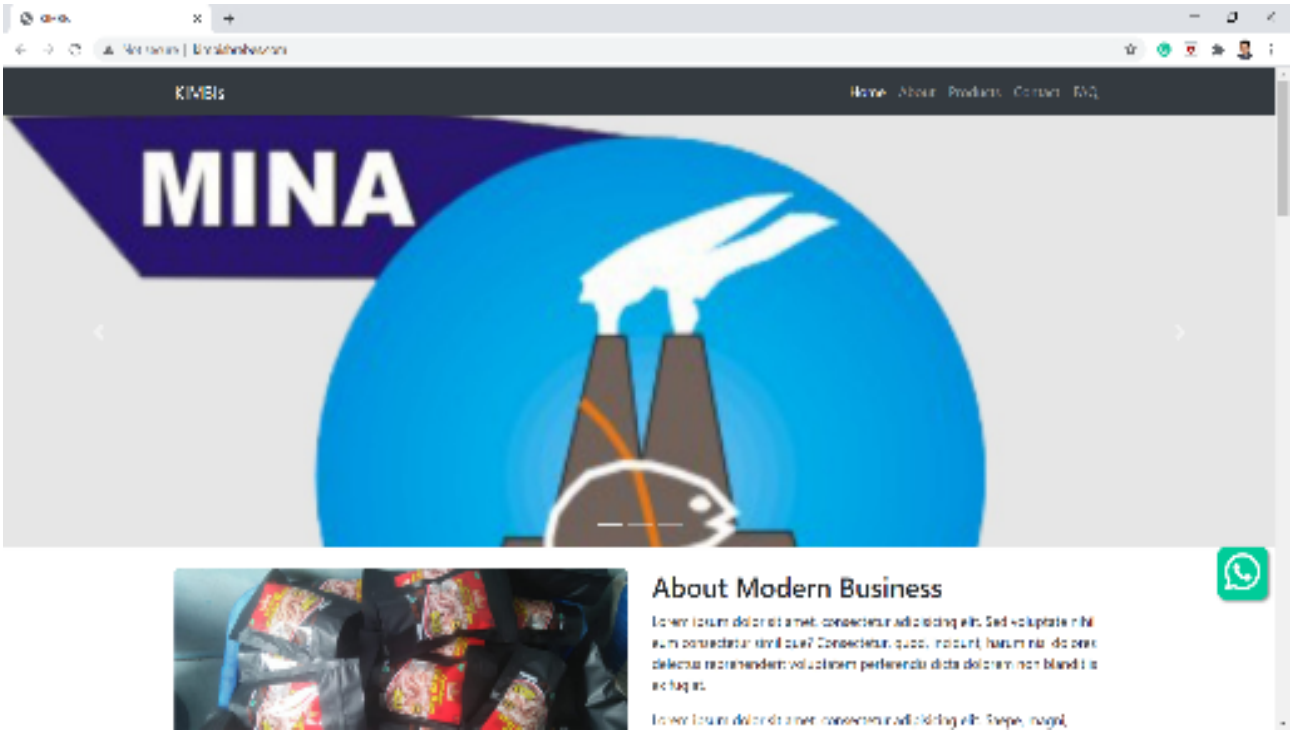

Figure 6 Display of KIMBis's Information System

The product can be in the form of raw products and processed products from the surrounding community. It will support the economy at the local level, especially after getting buyers from outside the city. With this kind of information, visitors to this website can see all the available products. Each product sold contains an image, a complete description of the product, product price, and navigation buttons to buy it directly using WhatsApp short message. One of the sophistication of this KIMBis information system in selling products is that a button directly leads to WhatsApp and automatically writes a message to buy something. The buyer will not be bothered by typing what to buy to ask about the availability of products. It helps buyers so that they can make transactions later. The use of WhatsApp's short messages also helps KIMBis managers monitor the activities of buyers originating from this information system. They don't have the hassle of following up the incoming orders by opening the website every time.

In the contact section, we can see how to contact KIMBis. There is a map that can help the navigation of buyers who will come directly to the KIMBis. The contact details consist of the complete KIMBis address, KIMBis management phone number, email, and KIMBis opening hours or operating hours. It is very helpful for buyers who will buy directly and see the existence of this business. Lastly is the FAQ menu or Frequently Asked Questions or something frequently asked by website users. This FAQ plays a big role in helping visitors using this information system. The FAQ has a role in representing the administrators in using this website and purchasing through this website and WhatsApp application. The visitors can read the rules or frequently asked questions in using this information system.

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