

Business Feasibility Study of Boatbuilding at Traditional Shipyard in Indonesia

Yugowati Praharsi¹, Muhammad Abu Jami'in² and Devina Puspita Sari³
Business Management^{1,3} and Electrical Engineering Department²
Shipbuilding Institute of Polytechnic Surabaya
(Politeknik Perkapalan Negeri Surabaya)
Surabaya, Indonesia
yugowati@ppns.ac.id

Abstract

There are lots of traditional shipyards in Indonesia. These traditional boat buildings are used by fishermen. However, there is no prior study on how these traditional shipyards run the business. In this study, we focus on business feasibility study from 5 aspects such as market, economic, technical, financial, and customer needs aspects. This study will contribute to the traditional boatbuilding business development at the shipyard and small craft technology business in the maritime developing countries.

Keywords

Feasibility study, boat building, traditional shipyard, Indonesia

1. Introduction

There are 3 types of traditional boats for fishermen in Lamongan, Indonesia, namely: pursein, ijon-ijon, boats. Based on Figure 1, it is shown the hull constructions of each type, from the left side is pursein, ijon-ijon and boats respectively. For the advantages of boat products from traditional shipyards, this is a type of boat. As for the pricing system for each type of ship, there are no precise rules. Usually, it is done with a down payment system at the beginning then further payments are made based on the progress of the boat building stages with several terms. Based on the survey results, several shipyards have implemented a strategy, namely: shipyard owners are always open and provide opportunities for their customers to convey their deficiencies and requests from the results of the boats received. Boat owners are also open to monitoring at any time what is done by boat owners during the boat building process. This is intended so that the resulting boat products are truly in accordance with the needs of consumers/boat owners. During the manufacturing process, several existing technologies have been used, such as drills, chainsaws, cranes, loaders, etc. This shipyard is economically very helpful for the economy of local residents because it can open up opportunities for work. Residents there were not disturbed by the existence of this Shipyard even though it is located behind the Village Hall. The shipyard does not produce waste because the remaining pieces of wood will be sold to furniture factories as household appliances, as well as tofu factories and sugar factories as fuel.

Business feasibility studies will indirectly have links with the interests of society and government. The government needs to use a business feasibility study, especially to see the impact of the business on people's lives and economic growth. There are five aspects in business feasibility study, such as: market, economic, technical, financial, and customer needs aspects. With the existence of innovations or new products that emerge from the community, even the smallest form of business can have a positive impact to the Gross Domestic Product (GDP). To the best of our knowledge, there is no prior business feasibility study yet at the traditional shipyard. This study will contribute to the traditional boatbuilding business development at the shipyard and macro-economic mapping in general.



Figure 1. the type of boats

1.1 Objectives

The objective of this research is to describe the business feasibility study of traditional boat building at the shipyard from 5 aspects, such as: market, economic, technical, financial, and customer needs aspects. The research contributions are in the field of business feasibility study, small craft technology and business, and the maritime developing countries.

2. Literature Review

2.1 Business Feasibility Study

A business feasibility study is an activity that studies in depth about a business or business to be run, in order to determine whether or not the business is feasible (Kasmir & Jakfar 2020). A business feasibility study is a study of a business plan that not only analyzes whether or not a business is feasible, but also when it is operated routinely in order to achieve maximum profits for an unspecified time. Business feasibility studies will indirectly have links with the interests of society and government. The government needs to use a business feasibility study, especially to see the impact of the business on people's lives and economic growth.

With the existence of innovations or new products that emerge from the community, even the smallest form of business can have a positive impact on living. According to (Kasmir & Jakfar 2003), there are at least five reasons why a feasibility study needs to be carried out before starting a business or project, namely: (1). Avoiding the risk of loss, (2). Facilitate planning, (3). Facilitate the implementation of work, (4). Facilitate supervision, (5). Easy control.

Which aspect assessment sequence should be preceded depends on the readiness of the assessor and the completeness of the existing data (Daeod & Nasution 2021). In the feasibility study, each aspect does not stand alone, but is interrelated. This means that if one aspect is not met then it is necessary to make improvements or additions as needed. There are several aspects, including: market aspects, economic aspects, technical aspects, financial aspects, and aspects of customer needs (Prasetyawan 2021). Table 1 shows the dimension and sub-dimension of these 5 aspects in the business feasibility study.

Table 1. Five aspects of business feasibility study

Dimension	Sub-dimension	Reference
Market Aspect	Products, product distribution, sales projections, strategy, market potential, and competitor analysis.	(Herlianto & Pujiastuti, 2009)
Economic Aspect	Economic Factors, National Development, and Society	
Technical Aspect	Inventory Management, Factory Location, Product Selection and Planning, Technology Selection, Production Quantity Capacity Planning, Quality Control, and Production Strategy Selection	
Financial Aspect	Financing Structure and Investment Appraisal Criteria	
Customer Need Aspect	Product Quality, Service, Sales Activities, Service After Sales, and Company Values	

2.2 Market Aspect

The market aspect is very important in a business feasibility study. Without forecasting the demand for products that have been analyzed, there may be a shortage or excess of products. Shortage or excess demand will lead to inefficient business activities. The market can be said to be healthy if the products produced get a place in the market and produce the right amount so that they are profitable. According to (Nurmalina, et al. 2014), Market and marketing aspects

study about: (1). Request, (2). Offer, (3). Price, (4). Marketing program, (5). Estimated sales that the company can achieve. Table 2 shows several sub-dimensions and related indicators of market aspect.

2.3 Economic Aspect

This macroeconomic data can be used as an economic indicator that can be processed into important information in the context of a business feasibility study, for example: GDP (Gross Domestic Product), investment, inflation, foreign currency exchange rates, bank credit, government budgets, spending on foreign trade development . and balance of payments. The macroeconomic influence of a country directly or indirectly is evident in business plans, especially businesses with a relatively large scale. Table 4 shows several sub-dimensions and related indicators of economic aspect.

2.4 Technical aspect

Technical aspects are also very important in a research. (Husnan & Muhammad 2000) stated that technical aspects are aspects related to the overall technical and operational project development after the project is completed. Assessment of the feasibility of this aspect is very important to do before the company is run. This determination of feasibility concerns matters relating to the technical/operational aspects of the company, so that if it is not properly analyzed it can have fatal consequences for the company on its way forward. There are several things that need to be considered in this aspect, including: (a) Determining Company Location, (b) Selection of Production Strategy, (c) Selection of Technology, (d) Selection and Product Planning, (e) Planning of Total Production Capacity. . Table 3 shows several sub-dimensions and related indicators of technical aspect.

2.5 Financial Aspect

To realize a business project, funds are needed for investment. These funds are classified on the basis of tangible fixed assets such as land, buildings, factories and machinery. As well as intangible fixed assets such as patents, licenses, initial costs and pre-operation costs. In addition to fixed assets, working capital is also needed. In calculating working capital, you can use a method based on the time it takes for funds to come out of cash until it returns to cash. After the amount of funds needed is known, the next thing that needs to be determined is in what form the funds are obtained, what will be chosen is the source of funds that has the lowest cost and does not cause problems for the sponsoring company. Table 5 shows several sub-dimensions and related indicators of financial aspect.

If in the same period there are several project proposals that prove feasible to be realized, meanwhile, the available funds or budget are insufficient, then a solution needs to be sought, one of which is by prioritizing the projects. How to conduct an investment appraisal and perform a priority order analysis is described in this section. In general, there are four methods that are commonly considered for use in assessing the cash flow of an investment, namely: the payback period method, net present value, internal rate of return, and profitability index, and BEP. Cost volume profit (CVP) is a managerial accounting technique used to calculate BEP by considering the composition of sales, selling prices, fixed costs and variable costs for one or many products/services. CVP is easy to use for profit planning, pricing, cost control, budget preparation. The formula is as follows (Sumaji 2019):

$$\text{Contribution margin} = \text{unit price} - \text{variable cost per unit} \quad (2.1)$$

$$\text{BEP sales unit} = \text{Total fixed cost} / \text{Contribution margin} \quad (2.2)$$

$$\text{Profit target sales unit} = \text{Total fixed cost} + \text{profit targets} / \text{contribution margin} \quad (2.3)$$

3. Methods

The questionnaires are generated from 5 aspects such as: market, technical, economic, financial, and customer needs. The indicators respected to the related dimensions and sub-dimensions are shown in Table 2 to Table 6.

3.1 Market Aspect

Table 2. Indicators of market aspect

Dimensions	Sub-dimensional	Indicators	Reference
Market Aspect	Product	What is your company's superior product?	(Herlianto & Pujiastuti, 2009), (Djamaludin et al., 2019), (Arga et al., 2021)
		What are the strengths and weaknesses of your product?	
		Who is the target of the product you produce?	
	Product Distribution	How do you get your product into the hands of consumers?	
	Sales Projection	What is the amount of market demand in the last 1 year?	
		How do you find out market demand that tends to fluctuate?	

Dimensions	Sub-dimensional	Indicators	Reference
	Strategy	How do you determine the price for each type of ship?	
	Market Potential	What type of market have you chosen and what is your strategy for dealing with that market?	
		What about the result of this strategy?	
		What is the product development method that you produce?	
		Why did you choose to use this location as a production site?	
		What are you doing so that customers are interested in your shipyard (not preferring other shipyards)?	
		How do you take human resources to work in the shipyard?	
	Competitor analysis	Do you have competitors in the same market?	
		Have you ever benchmarked? If so, with whom? If No, are you interested in doing so?	
		What opportunities do you have from the comparative study process?	

3.2 Technical Aspect

Table 3. Indicators of technical aspect

Dimensions	Sub-dimensional	Indicators	Reference
Technical Aspects	Inventory Management	Who is responsible for checking inventory?	(Herlianto & Pujiastuti, 2009), (Purwantono et al., 2021), (Djamiludin et al., 2019).
		How do you manage inventory so you don't run out of stock one day?	
	Factory Location	Where is the production location? and is there a separate reason why choose that location?	
	Product Selection and Planning	Is there a product that is a priority to produce (in other words the best-selling product) out of the many ship products that have been produced?	
		What is the process of building a wooden ship?	
	Technology Selection	What technology (in the form of machinery/tools) do you feel provides easier changes to shipbuilding?	
	Total Production Capacity Planning	Why is it necessary to regulate the amount of production (raw materials) so that the amount produced is not too much or too little?	
		What is the production capacity of wooden boats in 6 months? if it's more than... can you still make it or not? If the field is like this, how many ships can it fit in?	
Quality Control	How do you maintain the quality of the ship products produced in accordance with company standards?		
Selection of Production Strategy	What is your strategy in the ship building process to match customer demand?		

3.3 Economic Aspect

Table 4. Indicators of economic aspect

Dimensions	Sub-dimensional	Indicators	Reference
Economic Aspect	Economic Factors	What are the economic factors that affect your company? (Inflation, foreign exchange rates, bank credit, investment, etc.)	(Herlianto & Pujiastuti, 2009), (Ichsan et al., 2019), (Kasmir, 2018)
		How can this affect your company?	
		What are the obstacles and challenges for your company in terms of the economy? (Climate, low human resources and natural resources, trade value)	
	National development	Does your company have support from the local government?	
		Does your company participate in national development? (Paying taxes, generating foreign exchange, increasing state revenue)	
	Public	Does your company have an impact on society? (positive or negative)	
Does your company have high employment opportunities for the community?			

3.4 Financial Aspects

Table 5. Indicators of financial aspect

Dimensions	Sub-dimensional	Indicators	Reference
Financial Aspect	Financing Structure (source of funds obtained)	Where did the sources of funds you used to set up this business come from?	(Herlianto & Pujiastuti, 2009), (Palkina et al., 2015), (Sunaryo et al., 2020),
		Approximately how much capital was issued for the production of this ship?	
		How much does each model and size of ship cost?	
	Investment Valuation Criteria	How will the available funds be allocated?	
		How much income does the company get?	
		What is the process of building a wooden ship?	

3.5 Aspects of Customer Needs

Table 6. Indicators of customer needs aspect

Dimensions	Sub-dimensional	Indicators	Reference
Customer Needs Aspect	Product Quality	Are the tools used complete and according to standards?	(Herlianto & Pujiastuti, 2009), (Caliskan et al., 2019), (George, 2019)
		Are the materials used according to what the customer wants?	
		Whether the ship related functions function properly?	
		Does the price match the quality of the product you get?	
	Service	Whether the result is in accordance with the wishes of the customer?	
		Does marketing explain the product well and clearly?	
		Does the company explain the progress of at least 1/2 of the work?	
		Does the company provide direction regarding production to completion of work?	
	Sales activities	Whether the customer is provided with information related to the product provided by the company?	
		Are customers being helped to select the company's products that meet their needs?	
	Service after sales	Does the company provide opportunities for customers to submit complaints if there are complaints about products or services to customers?	
	Company Value	Does the company ensure that the shipbuilding process has been carried out properly without any defects in the product?	
		Does the company have a company culture that can support the continuity of the company's business processes?	

4. Data Collection

Data are collected from 4th August to 7th November, 2022. We surveyed to several traditional shipyards in Lamongan, Indonesia. We did the interview to the project leader, the shipyard owner, and the customer/the owner of boats.

5. Results and Discussion

5.1 Market Aspect

The superior product from several shipyards in Lamongan in 2021-2022 has the same type, namely the type of boat. This can happen because in recent years customers have been more interested in boat type ships. The reason why customers prefer boats with the type of boat is because the height and shape of the ship's height are sharp so that it will be easier to break the wind according to fishermen and consumers.

The advantage of traditional shipyards is that there are consultation sessions with customers regarding the desired shape, height, width of the ship and requests for sizes according to what the customer wants while still providing the best advice regarding the size and shape of the ship. At this shipyard customers do not need to pay in full but can pay a down payment in advance of the amount of wood needed for the desired ship size. In this shipyard workers have their respective responsibilities so that each worker has a different salary according to skills.

Target consumers taking into account the type of market segmentation, as follows: (1) The main target in terms of demographics are fishermen or people who do business in the sea sector, (2) The main target geographically is the

Lamongan area, but it does not rule out the possibility of receiving orders from outside the area, such as Jakarta and Surabaya, but more from the Lamongan area.

Pricing for each type of ship at this shipyard is uncertain because this shipyard is a traditional shipyard. There are 2 systems owned at this shipyard, namely: (1) If you pay 80% in full at the beginning, then the price of the ship will remain until the final payment, (2) If you pay in installments with payment terms based on the progress of ship construction, then the price of the ship can change from the provisions beginning.

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The chosen strategy is to prioritize the quality of the products produced. Conduct evaluations and interviews with fishermen or ship owners who use products from this shipyard. From the results of these interviews an evaluation will be carried out. The results of this strategy are quite convincing as evidenced by the increasing number of consumers each year. Therefore, this shipyard always implements this strategy. The main reason for using a traditional shipyard location close to the shoreline as well as the main road is to facilitate the launching of ships/sea trials and the transportation of raw materials.

What can be done to keep customers interested is to maintain quality and characteristics. For example: (1) paying attention to a good ship's buoyancy obtained from a good and correct propeller position, (2) Maintaining quality can be obtained from always evaluating the ships that have been produced, (3) using the best wood so that the ship can last a long time. The opportunity from the comparative study process is to find out that there are new ways or methods for making ships.

5.2 Economic Market

The economic factor that greatly affects the company is inflation. This inflation greatly affected the price of wood used as the main raw material. But even so, traditional shipyards have never done bank credit. The owner of the shipyard outsmarts this by means that when there is remaining capital it will be used to buy wood. This can affect it because the price of wood increases from time to time making the profit for each ship made different. So that the net profit each year is different.

This traditional shipyard uses the facilities or leases land owned by the village. The climate hampered work, because shipyards work in the open. However, according to the shipyard owner, during the rainy season fewer consumers buy ships. Fluctuating timber prices make the trade value of ships also fluctuate. The impact of the existence of a traditional shipyard economically is very helpful for the local people's economy because it can open up opportunities for work. Residents there were not disturbed by the existence of this Shipyard even though it is located behind the Village Hall. The shipyard does not produce waste because the remaining pieces of wood will be sold to tofu factories and sugar factories as fuel.

5.3 Technical Aspects

A. Selection of Business Strategy

In this business world, especially in the field of wooden shipbuilding, of course there are many competitors. In order to compete, a special strategy is needed to attract customers and provide satisfaction for them. Based on the survey results, several shipyards have implemented a strategy, namely: shipyard owners are always open and provide opportunities for their customers to convey their deficiencies and requests for the results of the ships received. From the results of this submission, the owner can always evaluate the performance and results of his work to produce wooden boats according to the wishes of consumers. With this freedom, the owner hopes that consumers can feel satisfied and gain trust.

B. Product Selection and Planning

In selecting and planning a wooden ship, of course there are many steps that need to be considered and carefully prepared, starting from the point of determining the idea, making the design, making prototypes and testing, to implementation. After a number of alternative product ideas have been filtered out, what products (several products) will be prioritized to be produced by determining the type and size of ship the customer wants. Then, just do the execution of its creation. From this process the results of its performance can be known so that it can be known what types of wooden ships are mostly ordered by customers. In the process of building wooden ships, this is different than usual, namely: cutting wood → hull construction → frame installation → Hatch installation → the wheelhouse building installation → machine installation (net & driving machines) → sea trial.

C. Selection of Technology

In the construction of fishing boats, they tend to still utilize human labor due to the location of the business location which is on the seafront so they take advantage of this opportunity. However, it is possible that some shipyards producing wooden ships do not utilize existing technology, some of the manufacturing processes already use existing technology, such as; drills, chainsaws, jackhammers, cranes, wood cutting machines etc.

D. Production Amount Planning

In the process of building wooden ships, it is necessary to plan the amount of production so that the production process can run optimally. In some shipyards, in planning the amount of production, they can arrange it by buying raw materials according to shipbuilding needs.

E. Inventory Management

The existence of this inventory is to anticipate consumer demand which increases sharply, or to supply raw material shortages. The amount of inventory should be in accordance with the needs, namely not too much or too little. To control it required an inventory management. In managing this inventory, from several shipyards that have been surveyed, they will not store too much raw material so that the inventory in the storage area is only the raw materials that will be used when there are customers. If there are no orders, the owner will not stock the inventory. This is done to reduce losses.

F. Quality Control

In the process of operating wooden ships, quality control is needed so that the wooden ships produced can be operated properly. Based on survey results at several shipyards, it was found that in controlling the quality of these wooden ships, they always try their best starting from selecting premium quality raw materials, the ship building process, to finishing to produce wooden ships according to customer wishes. In addition, it is also consistent in evaluating the deficiencies of its work.

5.4 Financial Aspect

A. Financing Structure

Based on the survey results that have been conducted, for the average capital issued by the owner of shipyard A to open his business, partly comes from his own capital and partly comes from customers' capital who will order ships. In detail, the total capital obtained by each shipyard is shown in Table 7 and 8.

Table 7. Total Shipyard Capital A on 50 GT Boat size

Type	Amount
Raw Material (wood)	Rp 500.000.000
Shipyard rent (a year) size 75x30 ha and electricity	Rp 6.000.000
Work tools (saws, drills, hammers, etc.)	Rp. 100.000.000
Labor costs	Rp. 200.000.000
Nails, bolts, paint, etc	Rp. 150.000.000
Machine tools	Rp. 300.000.000
Total	Rp1.256.000.000

Meanwhile, the price for each ship being sold varies, this can be seen in terms of the size and type of vessel requested. Based on Table 7, if what is requested is only a ship without engine and finishing with a size of 50 GT, with dimensions: length of the keel (bottom base): 10 m, height of the ship (from keel to deck): 5.6 m, length of the ship (one height to others): 16m, the width of the ship (calculated from the center line of the ship): 6.8m is sold at a price

of IDR 1,000,000,000, - for the ship up to its finishing. Meanwhile, the ready-to-use ship is sold at IDR 1,500,000,000.

Table 8. Total Shipyard Capital B on 40 GT Boat Size

Type	Amount
Raw Material (wood)	Rp350.000.000
Shipyard rent (a year) size 75x30 ha and electricity	Rp15.000.000
Work tools (saws, drills, hammers, etc.)	Rp.125.000.000
Labor costs	Rp.175.000.000
Nails, bolts, paint, etc	Rp. 135.000.000
Machine tools	Rp. 300.000.000
Total	Rp1.100.000.000

Meanwhile, for the owner of shipyard B, the price for each ship sold varies, this is seen in terms of the size and type of vessel requested. Based on Table 8, if what is requested is only a ship until finishing it is sold at Rp. 1,000,000,000. As for ready-to-use ships, they are sold at IDR 1,500,000,000. with a ship size of 40 GT with Dimensions: Length of the keel (bottom base): 17m, height of the ship (from the keel to the deck): 2.2m, the length of the ship (one height to another): 22m, the width of the ship (calculated from ship's centerline): 5.6m.

B. Investment Valuation Criteria

A case study of two traditional shipyard is used in the calculation of investment valuation. Shipyard A built the traditional boat with 50 GT, meanwhile Shipyard B built ones with 40 GT size.

Shipyard A

Contribution margin: Rp. 1,500,000,000-Rp. 1,150,000,000 = Rp. 350,000,000

Units of sales (BEP): 106,000,000 / 350,000,000 = 0.30

Sales units (profit target) = (106,000,000 + 100,000,000) / (350,000,000) = 0.59

Shipyard B

Contribution margin: Rp. 1,500,000,000-Rp. 960,000,000 = Rp. 540,000,000

Units of sales (BEP): 140,000,000 / 540,000,000 = 0.26

Sales units (profit target) = (140,000,000 + 100,000,000) / 540,000,000 = 0.44

Average contribution margin: (350,000,000 + 440,000,000) / 2 = 395,000,000

Average unit sales (BEP): (0.30 + 0.26)/2 = 0.28

Average unit sales (profit target): (0.59 + 0.44)/2 = 0.52

5.5 Customer Needs

1. Product Quality

Based on the result of a survey that has been conducted, the product quality of boat is rising in a parallel with the price of the boat.

2. Service

Based on the results of the interviews that have been conducted, we find that customers will be more satisfied when the company can provide details of the process from the boat intended at the time of manufacture to the awarding of the boat's title certificate which means that the ship has been completed and is ready to be sailed. Services can also be made easier when the buyer knows the seller of the boat as obtained from our second source which makes transactions easier because they already have trust outside of this trade.

3. Sales Activities

Based on the result of the interview, customer tend to be more flexible when they know beforehand about the company and the boat that they sell. There's also a supporting factor where if the customer can see the process of the boat building, they can monitor and ask for customization.

4. Service After Sales

Based on the results of the interviews that have been conducted, we found that in the boatbuilding process, if the customer has no problems on the process of the boat building. The company will not accept complaints from customers regarding boats that have been completed and fall into ownership of the customer. On the other hand, when a customer has a complaint in the process of boat building, the constructor will adjust and solve the problem regarding the complaint from the customer

5. Company Values

Based on the results of interviews that have been conducted, we found that the company ensures that the boatbuilding process has been carried out properly without any defects in the product which has been monitored directly by the customer with clear manufacturing transparency. Here we also obtain information that customers have been able to see a company culture that can support the sustainability of the company in the long term.

6. Conclusion

We have discussed the business feasibility study of boat building process at traditional shipyard from 5 aspects, such as: market, economic, technical, financial, and customer needs aspects. From market aspect, the payment is very flexible based on progress term payment or down payment. From the economic aspect, the shipyard can manage the payment by purchasing the wood to be stored to anticipate the price increasing. From the technical aspect, they tend to still utilize human labor due to the location of the business location which is on the seafront so they take advantage of this opportunity. From financial aspect, the BEP value and the profit target is less than 1. It means that the business is well prospect and running. From customer needs, customer tend to be more flexible when they know beforehand about the company and the boat that they sell. There's also a supporting factor where if the customer can see the process of the boat building, they can monitor and ask for customization.

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Biography

Yugowati Praharsi is an Assistant Professor in Business Management Department at Shipbuilding Institute of Polytechnic Surabaya, East Java, Indonesia. She earned B.Sc. in Mathematics from Satya Wacana Christian

University, Indonesia; M.Sc in Electronic Engineering and Computer Science and Ph.D in Industrial and System Engineering from Chung Yuan Christian University, Taiwan. She has published national and international journals and conference papers. Her research interests are in the field of operation research, production system, quality management, and supply chain management.

Mohammad Abu Jami'in received the B.E. degree in Marine Engineering and M.E. degree in Control Engineering from Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia in 2000 and 2008, and the Doctor of Engineering in Neurocomputing from Waseda University, Japan in 2016. He is currently a lecturer with the Politeknik Perkapalan Negeri Surabaya (Shipbuilding Institute of Polytechnic Surabaya), Indonesia. His research interests include artificial intelligence and its applications such as system modeling and control, ship propulsion, renewable energy, and image processing.

Devina Puspita Sari is a Lecturer at PPNS. Mrs. Devina holds a Bachelor of Engineering degree in ship control from the Sepuluh Nopember Institute of Technology and Master of Engineering in ship control from the Sepuluh Nopember Institute of Technology.

Acknowledgements

This research was supported by Directorate General of Research and Development, Ministry of Research, Technology, and Higher Education, Indonesia under grant Applied Product Research in 2022, No. 1677/PL19/TI.00.01/2022.