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Feasibility and strategy of developing the agribusiness of marine ornamental fish for export

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Abstract. Rearing marine ornamental fish is a very promising business, considering the diversity and abundance of fish. The purpose of this research was to analyze the business feasibility and formulate marine ornamental fish business development strategies for export purposes. The analytical methods used included the financial analysis and SWOT analysis. The results of the study demonstrated that marine ornamental fish business is quite profitable. As shown by the payback period (PBP) value of 3.38 year, by the internal rate of return (IRR) value of 40.75%, the profitability index (PI) value of 3.38, the net present value (NPV) of USD 158.768.76 and the break event point (BEP) value of USD 1,063,644.50, while for the business development an aggressive strategy needs to be carried out by implementing the strength-opportunity (SO), namely: 1) by improving the quality, availability/stock and type of fish, 2) by expanding the market and simplifying the distribution channels, 3) by setting the focus on the development of facilities for maintaining the availability/stock and 4) by promoting the survival and growth of the cultures fish by leveraging technological advances.
Key Words: financial, analysis, coral reef, SWOT.

Introduction. Indonesia is the largest island nation in the world. Stretching from Sabang to Merauke, Indonesia has 17,499 islands with a total area of about 7.81 million km^2 (Bappenas 2016). Of the total area, 3.25 million km^2 is ocean and 2.55 million km^2 is the Exclusive Economic Zone (ZEE), and only about 2.01 million km^2 in the form of land (mainland). The physical potential of the existing marine area provides Indonesia with biological resources waters, such as; fish consumption and ornamental fish and other marine organisms (Akmal 2020). In addition, Indonesia is also located in the world's coral triangle area which is the center of the highest marine biota diversity, especially coral species and ornamental fish (Kasmi 2020). The coral triangle covers 6.5 million km², with more than 600 species of coral reefs, representing 75% of all the world's coral reef species. The potential of fish is more than 3,000 species, including the largest fish, the whale shark and fossil living coelacanths. Another significant potential consists of ornamental fish. The economic potential of ornamental fish in Indonesia has not been utilized to the maximum, until now. The potential of ornamental fish is believed to be able to improve the welfare of the people of Indonesia. This is based on the potential of ornamental fish that reaches 4,720 types of fresh water fish and 650 types of sea water fish (BPSPL 2021). Nevertheless, the optimization strategies of the existing potential must preserve the sustainability of fish resources. As stated by Hermawan et al (2021a), the main objective of the general resource management, in particular of the fisheries resources, is the sustainability, where economic benefits can be obtained on the one hand, while maintaining the availability of fish resources and the social harmony on the other hand. El Fajri et al (2020) stated that there are several attributes that can

improve the sustainability of fisheries resource management, including: a) carrying capacity, b) high economic dependence on swamp ecosystem, c) economic benefits of the swamp, d) local wisdom, e) community's perception towards environment, f) swamp area management, g) monitoring, h) regulation for resource use and i) institution for resource management. Further, according to El Fajri et al (2021), the poor condition of fish resources was caused by several factors, including pollution and the use of destructive fishing. Management strategies that can be implemented are i) prohibiting the use of destructive fishing gear, ii) increasing the capability of the fleet (>10 GT), iii) building a Wastewater Treatment Plant (WWTP) for every industry and factory and iv) creating a fishery protected area (fish sanctuary). According to Daris et al (2021), various strategies are needed to maintain the sustainability of the coastal management.

Ornamental fish is one of the leading commodities of the Indonesian fisheries sector since long ago and became one of the mainstays of exports from Indonesia in recent years. Nevertheless, the economic potential of ornamental fish until nowstill did not reach the maximum. Among the thousands of types of ornamental fish in Indonesia, only a few types have been utilized and developed as export commodities, such as; botia, arowana, discus, betta, tiger fish, guppy, ornamental shrimp, angel fish, starfish and invertebrate species. Besides, export destination countries are generally still dominated by Japan, Singapore, the United States, China, The United Kingdom, South Korea, Malaysia, Germany, France and Taiwan. In 2018, Indonesia's ornamental fish export volume reached 257.862.207 tails, with an export value reaching USD 27,61 million (Bappenas 2016). The potential of these fisheries can be further developed as business opportunities able to improve the welfare of fishing communities, regional income and foreign exchange of the country (Kasmi et al 2020).

The business of marine ornamental fish is very promising, considering the diversity and abundance of fish, giving entrepreneurs the choice of ornamental species to be cultivated or exported. Besides, the price of marine ornamental fish is also varied, ranging from relatively cheap to relatively expensive prices. In addition, the sharpness of the pattern and color of marine ornamental fish is a special attraction for ornamental fish lovers. The waters of South Sulawesi, especially in Spermonde waters are known for their various species of marine ornamental fish. The injel is one of the species of marine ornamental fish that is widely caught and traded in South Sulawesi, especially in Makassar city, but also from Java and Bali. Moreover, this type of injel is also found in marine aquariums in hotels and in offices of government agencies. Moreover, the injel is also widely found in several ornamental fish markets in Makassar city.

Nevertheless, total production of marine ornamental fish, especially certain types of fish for each year continues to decrease, especially during the Covid-19 pandemic. Beside, various obstacles are also faced by sea water fish entrepreneurs, such as: aspects of capital, low production quality, institutional (organization), agribusiness management, technology, agribusiness network and market information. For that, it is very important to conduct this research in order to obtain the level of feasibility of marine ornamental fish business and to develop an agribusiness strategy, especially for export purposes.

Material and Method

Description of the study sites. This research was conducted in two companies exporting marine ornamental fish, namely: CV. Rezky Bahari, located at Jalan Cakalang V No. 7 Makassar, South Sulawesi and CV. Cahaya Baru, located in Jakarta. The study was conducted from March to August 2021. Both companies were chosen considering that both are marine ornamental fish exporters that still exist to this day, even during the covid-19 pandemic.

Types and sources of data. This research is descriptive, using a qualitative approach. The data used in this study consists of: 1) primary data is obtained directly in the field by observation and interview of respondents, such as agribusiness units and ornamental fishing, and 2) secondary data is obtained from the office or association of Corals,

Shellfish, and Ornamental Fish Indonesia (AKKII) and a Combination of Coral Entrepreneurs and Indonesian Ornamental Fish (GAPEKHI). According to Yusuf & Daris (2018), primary data is original and is obtained directly from the source. Secondary data is obtained either by individuals or institutions for a specific purpose.

The data collection techniques used in this study, include: 1) observation techniques, 2) interview technique, and 3) library study techniques, as in Table 1.

Table 1

Types, sources and methods of data collection

No	*Data type*	*Data source*	*Data collection methods*
1	Investment costs, fixed costs and variable costs of marine ornamental fish business Income from marine ornamental fish Bank interest (assuming investment capital loan from bank)	Marine ornamental fish exporter company (CV. Rezky Bahari and CV. Cahaya Baru)	Observations and interviews
2	Identification of internal strategic factors (strengths and weaknesses) and external strategic factors (opportunities and opportunities)	Company management (CV. Rezky Bahari and CV. Cahaya Baru Documents and results of previous research related	Library study Interview

Data analysis methods. The data analysis methods used in this study are strongly related to the purpose of the research: the feasibility level of a marine ornamental fish business is analyzed with financial analysis methods, while the strategy for the development of business with marine ornamental fish for export is done with SWOT analysis.

The financial analysis. It focuses on an individual which is directly involved in a project (Gray 1997; Kasmi et al 2018). The financial analysis in this study was intended to analyze the level of business feasibility of marine ornamental fish for export, using the following methods: 1) the Payback Period (PBP), 2) the Net Present Value (NPV), 3) the Internal Rate of Return (IRR), 4) the Profitability Index (PI), and 5) the Break Even Point (BEP).

The payback period (period of return) is the period of time required for the return of the investment value, through the net revenues generated by the investment project. According to Vajpayee & Sarder (2019), the PBP represents the number of years required to return the value of an investment that has been spent in an undertaking project, while, according to Kagan (2019), the PBP can also be referred to as the period of return on the capital. The eligibility criteria for a viable and acceptable investment is a payback period shorter than the maximum payback period, according to the equation (Kagan 2019):

$$\mathrm{PP} = n + \frac{b - c}{d - c}$$

Where:
n - last year in which the amount of cash flow>original investment (initial);
b - investment value (USD);
c - cumulative of cash flow in the year^{-n};
d - net cash in USD in the year^{-n}.

The net present value, intended to assess investments that take into account the time value of money (capital). Therefore, discounted cash flow is used, on the basis of

the company's cost of capital/interest rate/required rate of return. The feasibility criterium is NPV>0, else the effort is not worth. NPV is calculated with the following formula (Kotler 2003):

$$NPV = \sum_{t=0}^{n} \left(\frac{At}{(1+k)} t \right)$$

Where:
At - cash inflows during the period t;
k - discount factor;
n - last period of expected cash flow.

The internal rate of return is intended to seek an interest rate that equalizes the present value of future expected cash flows (or cash receipts) with the initial investment expenses. The IRR can also be defined as an interest rate that produces an NPV equal to zero. The feasibility criterium is IRR>rate of return, therefore the business is, else the business is not feasible. The IRR is calculated with the following formula (Gallo 2016):

$$\text{IRR} = i_1 + \frac{\text{NPV}_1}{\text{NPV}_1 - \text{NPV}_2} x\,(i_2 - i_1)$$

Where:
IRR - internal rate of return;
i_1 - discount rate NPV positive;
i_2 - discount rate NPV negative;
NPV_1 - net present value positive;
NPV_2 - net present value negative.

The profitability index is a comparison between the present value of the cash flow and the initial investment. The feasibility criterium is: PI value >0, else the business is not profitable, therefore not feasible. The PI calculation is based on the formula of Kasmir & Jakfar (2007), as follows:

$$\text{PI} = \frac{Present\ Value\ Cash\ Inflow}{Present\ Value\ of\ Investment}$$

The break even point is the condition of return of capital/principal is a state where the receipt of company income (total revenue) equal to the costs incurred (total cost). A company will only benefit when its production or sales have exceeded or exceeded break-even. The BEP or the principal turning point can be calculated using the following equation (Kasmir & Jakfar 2007):

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{Price} - \frac{\text{Variable Cost}}{\text{Production}}}$$

SWOT analysis. It is the systematic identification of various factors supporting the formulation of the company's future policies. The analysis is based on the logic to maximize strength and opportunity, and simultaneously minimize weakness and threats. According to Rangkuti (2015), the SWOT analysis is the systematic identification of various factors to formulate a company strategy, based on the relationship or interaction between internal elements, namely strength and weakness factors, to external elements, such as opportunities and threat factors. Meanwhile, according to Pearce & Robinson (2014), the SWOT analysis is a systematic way of identifying the factors and strategies that describe the best match between them. This analysis is based on the assumption that an effective strategy will maximize the strengths and opportunities and will minimize the weaknesses and threats (David 2014). The SWOT analysis is carried out through

three stages, namely: 1) calculate the score, weight and total number of multiplication scores by weights on each factor, 2) search for point values x and y with SWOT matrix analysis, and 3) determine the position of the business in the SWOT quadrant based on the point (x, y) (Juansah et al 2020).

Results and Discussion

Business feasibility. The business of marine ornamental fish requires initial capital/investment and relatively large operational costs. The investment is in the form of fixed assets as a long-term investment for the next few years. Investment decisions in a business are based on various considerations, such as open business prospects, available market share and the potential for business feasibility analysis. An analysis of the business feasibility estimates the value of the initial investment and the operational costs against the amount of profit obtained. Here are the results of the analysis of the feasibility of marine ornamental fish business.

Table 2

Results of financial analysis of marine ornamental fish

Financial indicators	*Value*	*Criterion*	*Decision*
Payback Period (PBP)	USD 37,273.93	>0	Feasible
Net Present Value (NPV)	USD 158,768.76	>0	Feasible
Internal Rate of Return (IRR)	USD 2.52	>1.0	Feasible
Profitability Index (PI)	USD 3.38	>1.0	Feasible
Break Even Point (BEP)	USD 1,063,644.50	>74.3759	Feasible

The value of the PBP in the first year was USD 37,273.93. The value is positive, which means that the marine ornamental fish business is worth trying. In contrast, the business has been positive or has experienced a surplus of cash flow, which means the business has provided profits in the first year. The investment is USD 69.682,53. It can be covered or returned in the first year of business. Thus, it can be concluded that the marine ornamental fish business is worth doing from the rate of return on business capital. This is in accordance with the statement Vajpayee & Sarder (2019), that a quick time to regain the initial capital of the business makes the business more attractive. The same conclusion can be inferred from the study of Hermawan et al (2021b) on the business feasibility of cakalang (*Katsuwonus pelamis*) in Buhung Pitoe Island indonesia, where the NPV value is 1.23, the net B/C value is 3.79, the IRR value is 38.81%, and the PBP value is projected within the first 3 years of business. Similarly, Choeronawati et al (2019) concluded that business feasibility in fishery resources is good, including the pond fishery business on the coast of Purworejo Regency. The research results of Gandhy (2018) show the feasibility of fish farming business in floating nets (KJA) in Cirata Reservoir.

The NPV around USD 166.529,85 indicates a viable business. Kotler (2003) stated that the positive or more than zero (>0) NPV is an indication that the business is feasible. NPV>0 shows that the revenues are greater than the investment value (gain), while NPV<0 indicates smaller revenues, compared to the expenditure (loss). The internal rate of return is one of the reference business feasibility indicators for calculating the efficiency of a business investment or project (Harding & Long 2018). The IRR is used to find the discount rates that can equate the present value of the cash flow with the present value of investment. Moreover, the IRR is a discount rate that can equalize the present value of the cash flow with the present value of the investment (Gallo 2016). By using discount rates of 40%, an IRR on the investment in a marine ornamental fish business as large as USD 69.925,53, with an economic life of 10 years of effort, produced a net cash flow of USD 72.206,19. Based on these results, the value is obtained for the Present Value of the cash flow is positive (greater than the value of the investment of USD 2.272,10). By using a discount rate of 42%, an IRR on the investment of marine ornamental fish business of USD 69.934,09, with an economic life of 10 years of effort, produced a net cash flow of USD 66.132,25. Based on these results, the cash flow

negative value was USD 3.801,804. Based on these estimates, the value of IRR is 40.75%, and the value of required rate of return is 17.5%. Thus, it can be concluded that IRR>required rate of return (40.75>17.5%). It indicates that the marine ornamental fish business investment was USD 69.908,73. Yoesdiarti et al (2017) stated that the ornamental fish business in Ciomas Bogor provides benefits and feasible IRR around >1.0. The PI of marine ornamental fish business run by CV. Resky Bahari was 3.38. It indicates that the marine ornamental fish business was relatively well and can be developed. The PI is at USD 1.0 and producing USD 3.38. If the PI is no less than 1.0, then the profitability of the proposed ornamental fish business can be accepted. According to Kasmir & Jakfar (2016), the PI is the ratio of activity from the amount of net current value of receipts to the present value of investment expenditures during the life of the investment.

The Break-Even Point (BEP) of marine ornamental fish was USD 1.115.542,51 or 550.161 pcs. The value indicates the sales of CV. Resky Bahari has not earned a profit yet, but it did not suffer any losses. Thus, the company is required to make sales above that amount. According to Kasmir & Jakfar (2016), BEP is a turnback to compare the revenue or the number of units that must be sold to cover the costs of generating a sale. In other words, the break-even point is when a business does not experience losses and does not get a profit.

Marine ornamental fish business development strategy. SWOT analysis was used to identify several internal and external strategic factors from interviews and respondents' questionnaires. The questionnaires were used to calculate weights and rates to obtain a score of each of these factors (Baroto & Purbohadiningrat 2014). Interviews were done with the experts. It is in line with Yusuf et al (2021), that policy analysis tools, including SWOT analysis, are based on experts. Evaluation of internal factors of seawater ornamental fish business is presented in Table 3.

Table 3

Matrix of internal factor evaluation (IFE) of marine ornamental fish

No.	*Internal factors*	*Weight*	*Rating*	*Score*
	Strength			
1	There is a Marine Ornamental Fish Association	0.15	4.0	0.62
2	Communication between association members is intense	0.10	4.5	0.46
3	High innovation technology transfer	0.05	3.5	0.18
4	High diversity of fish species	0.10	5.0	0.51
5	Coral reef potential is high	0.15	4.0	0.62
	Weakness			
1	Operating costs is high	0.10	2.5	0.26
2	Products are seasonal	0.10	2.0	0.21
3	Low quality	0.05	2.0	0.10
4	Low skill	0.10	2.0	0.21
5	Fishing gear is not environmentally friendly	0.08	2.5	0.19
	IFE Total			3.36

The matrix of internal factor evaluation (IFE) of marine ornamental fish business obtained 3.36. The cumulative value of the strength factor was 2.39, and the weakness factor was 0.97. The cumulative value of internal factors was 3.36 and categorized in a strong category. According to Wheelen et al (2018), if the IFE score is more than 2.5 then it is categorized as strong, and if the score is less than 2.5 then it is categorized as weak. Thus, it can be concluded that the internal factors are related to the relatively strong strategy of developing marine ornamental fish. The evaluation of external factors of seawater ornamental fish business is presented in Table 4.

Table 4

Matrix of external factors evaluation (EFE) of marine ornamental fish

No.	*External factors*	*Weight*	*Rating*	*Score*
	Opportunity			
1	Market demand is high	0.14	4.5	0.56
2	Public attention to environmental damage is increasing	0.09	4.0	0.42
3	Technological advantages of marine ornamental fish	0.09	3.5	0.33
4	Potential coral sea waters	0.14	5.0	0.70
5	There are NGOs or institutions in the field of fisheries (marine ornamental fish)	0.05	4.0	0.19
	Threats			
1	Free trade of AFTA and WTO	0.14	2.0	0.28
2	Certification (International quality standards)	0.09	1.0	0.09
3	Destructive fishing	0.09	1.5	0.14
4	Biotech technology	0.09	1.5	0.14
5	Eco-labeling	0.07	1.0	0.07
	Total IFE			2.92

The results of the EFE matrix analysis of marine ornamental fish business was USD 2.92. The cumulative value of the opportunity factor was 2.20, and the threat factor was 0.72. The cumulative value of external factors was 2.92, classified as a strong category. According to Wheelen et al (2018), if the EFE is more than 2.5, then the factor is categorized as a strong category. If the factor is less than 2.5, it is categorized as weak. Thus, it can be concluded that the condition of external factors related to the strategy of developing marine ornamental fish is relatively strong.

AFTA and WTO free trade is a major threat because of the competition of marine ornamental fish products for export with other countries with scores (0.28). According to Amang & Sawit (1997), free trade will provide space or extensive access to all countries, including marine ornamental fish businesses. Free trade aims to expand the market to other countries. Further, Hadi (2003) stated that free trade will affect prices and business competition. Besides, according to Anugerah (2003) and to Sawit (2003), the central government and local governments need to prepare themselves, such as various policies related to free trade.

Space matrix analysis. The space matrix is an overview of the most appropriate strategic conditions to be carried out based on the results of the evaluation of internal factors and external factors. According to David (2014), the quadrant of space diagram includes four quadrants, namely: quadrant-I (aggressive strategy), quadrant-II (competitive strategy), quadrant-III (defensive strategy), and quadrant IV (conservative strategy). Further, according to Rangkuti (2015), space matrix analysis is used to sharpen the strategy of IE matrix analysis results. Space matrix analysis is also intended to look at the current goal development position. According to Kamiske (2015), the parameters used in the space matrix are the difference in the score of internal strategy factors (strength minus weakness) and the difference in external factor scores (chance minus threat). The estimated space matrix values are detailed in Table 5.

Table 5

Estimated value of space matrix

Factors	*Value*	*Difference*
Strengths-Weaknesses	2.39-0.97	1.42
Opportunity-Threat	2.20-0.72	1.48

Based on the difference value in the table above, the plotting was then carried out in a space diagram to obtain the position of the development strategy. The difference value of

internal factors is 1.42 to the X-axis, and of external factors is 1.48 to the Y-axis (Figure 1).

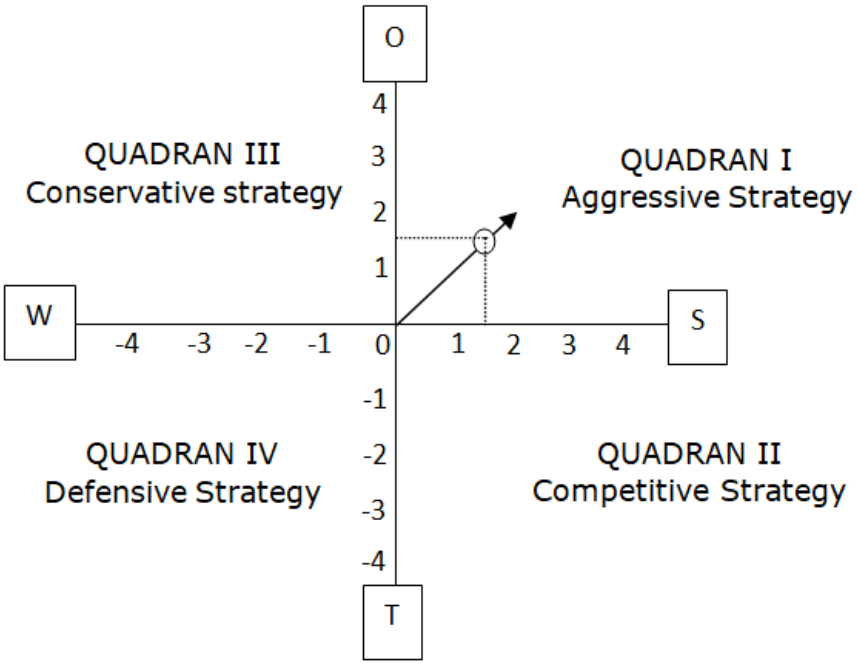

Figure 1. SWOT quadrant.

The results of estimates of the internal factors (weaknesses) and of the external factors (risk-threats) indicate that the strategy to be taken is aggressive in quadrant-I. The aggressive strategy is growth-oriented. It is in line with the current conditions where it grows and is stable.

Yuwani et al (2016) stated that the development of the freshwater fish farming business in Sleman Regency is in quadrant-I (aggressive strategy). According to Marimin (2004), the strategy that must be carried out by companies that are in quadrant-I is an aggressive strategy by optimizing their strengths.

SWOT analysis. Based on the formulation of the strategy of marine ornamental fish development, the description of the strategic alternatives of the SWOT matrix, the agribusiness development strategy of the marine ornamental fish industry is outlined as follows in Table 7.

The SWOT matrix analysis determines the performance of the marine ornamental fish industry to recognize strengths, weaknesses, opportunities, and threats. The development strategy of several internal and external factors can be interpreted in several methods, namely Strengths-Opportunities (SO), Strengths-Threats (ST), Weaknesses-Opportunities (WO), and Weaknesses-Threats (WT).

The Internal Factor Analysis Strategic (IFAS) and External Factor Analysis Strategic (EFAS) matrix analysis results show that the Internal-External (IE) comes from the total of IFE and EFE. The IFE matrix is 3.36 and EFE 2.92. It indicates the company's position in quadrant-I, which has opportunities and strengths against its weaknesses and threats. Based on this and on the results factors in the SWOT matrix, it is shown that the SO strategy is the primary strategy for the development of marine ornamental fish business, including: 1) the quality improvement, availability/stock and fish species, 2) Expanding the market and simplifying distribution, 3) Focusing facility development for the sustainability of availability/stock, and 4) Increasing promotion by using technological advances.

Table 7

SWOT matrix

External factors \ Internal factors	Strengths (S)	Weaknesses (W)
	1. There is a Marine Ornamental Fish Association 2. Communication between association members is intense 3. High innovation technology transfer 4. High diversity of fish species 5. Coral reef potential is high	1. Operating costs is high 2. Products are seasonal 3. Low quality 4. Low skill 5. Fishing gear is not environmentally friendly
Opportunities (O)	Strategy-SO	Strategy-WO
1. Market demand is high 2. Public attention to environmental damage is increasing 3. Technological advantages of marine ornamental fish 4. Potential coral sea waters 5. There are NGOs or institutions in the field of fisheries (marine ornamental fish)	1. Improve the quality, availability/stock and fish species 2. Expanding the market and simplifying distribution 3. Focusing on facility development for the sustainability of availability/stock 4. Increase promotion by using technological advances	1. Stabilizing the company's finances 2. Strengthening the quality of human resources and personnel management 3. Maintaining the quality and quantity of products 4. Evaluate and meet the company's marketing system
Threats (T)	Strategy-ST	Strategy-WT
1. Free trade of AFTA and WTO 2. Certification (International quality standards) 3. Destructive fishing 4. Biotech technology 5. Eco-labelling	1. Adapting to government policy 2. Control of raw materials with modern system facilities 3. Stabilizing product sales with digital technology	1. Conduct research and planning of company management in an integrated manner 2. Improving the company's system

Conclusions. The study results show that marine ornamental fish's effort is profitable and feasible. It can be seen that the PBP was 3.38 years, IRR was 40.75%, PI was 3.38, NPV was USD 166.512,49, and BEP was USD 1.115.522,28. For business development, an aggressive strategy needs to be done by implementing the SO strategy, such as optimizing the power by utilizing opportunities. Some strategies need to be implemented, such as: 1) improving the quality, availability of stock, and fish species; 2) expanding the market and simplifying distribution, 3) focusing facility development for the sustainability of the stock availability, and 4) increasing promotion by using technological advances.

Conflict of interest. The authors declare no conflict of interest.

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