STRATEGIC DEVELOPMENT OF NILE TILAPIA AQUACULTURE AT FIRDAUS FARM, TASIKMALAYA CITY

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Abstract. Tilapia (Oreochromis niloticus) farming is a vital aquaculture sector that contributes significantly to food security, rural income, and employment creation in developing regions. Despite its vast potential, the industry faces persistent challenges, including limited capital, insufficient technology adoption, and external risks such as environmental change and feed price volatility. This study, conducted at Firdaus Farm in Tasikmalaya City, aims to formulate development strategies using SWOT analysis and the Quantitative Strategic Planning Matrix (QSPM). The results position Firdaus Farm in the growth strategy quadrant (IFE = 2.70; EFE = 2.90). The top recommended strategy is enhancing human capital and applying appropriate aquaculture technology (TAS = 3.35), followed by forming strategic partnerships and improving financing access (TAS = 3.30), and diversifying value-added tilapia products to access broader markets (TAS = 3.20). Strategies are formulated progressively across short-term (training and digitalization), mid-term (cooperation and funding), and long-term (product innovation). This strategic roadmap is expected to guide sustainable and competitive development in tilapia farming.

Keywords: Tilapia farming, Development strategy, SWOT, QSPM, Aquaculture Technology, Firdaus Farm, Competitiveness

1 Introduction

Tilapia farming (Oreochromis niloticus) plays a vital role in strengthening food security, enhancing community economy, and improving the welfare of fish farmers in Indonesia [1][2]. Tilapia is recognized for its rapid growth, high environmental tolerance, and increasing market demand [3]. Therefore, developing this sector is essential to ensure the sustainability of fisheries [4]. However, the industry still faces various obstacles, such as limited resources, fluctuating feed prices, and environmental changes [5]. To optimize development, measurable strategies based on comprehensive analysis are required [6].

One widely used method is SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) [7], which helps evaluate internal and external factors influencing tilapia farming success [8]. Internal factors include strengths like growing aquaculture technology and weaknesses such as limited capital and suboptimal human resources [9]. External factors comprise opportunities such as increasing market demand, and threats such as disease risks and competition [10].

Following SWOT analysis, QSPM (Quantitative Strategic Planning Matrix) is employed to prioritize strategies based on the weight and attractiveness of each factor [11]. This method identifies the most relevant and effective strategies based on Relative Attractiveness Scores [12]. The integration of SWOT and QSPM facilitates data-driven strategy formulation to enhance productivity, operational efficiency, and competitiveness [13].

This research aims to analyze the internal and external factors affecting tilapia farming development and to formulate appropriate strategies to improve competitiveness and farmer welfare in Indonesia [14].

2 Research method

This study applied a descriptive method with both qualitative and quantitative approaches. The research focused on identifying strategic internal and external factors and formulating priority development strategies using SWOT and QSPM frameworks.

2.1 SWOT Analysis

This research employed a descriptive approach using both qualitative and quantitative data to formulate development strategies for tilapia farming. The analysis techniques used were SWOT (Strengths, Weaknesses, Opportunities, Threats) and QSPM (Quantitative Strategic Planning Matrix). This combined method was selected due to its effectiveness in mapping strategic positions and determining priority actions based on internal and external environmental factors [15].

SWOT analysis was conducted to examine the internal and external conditions of the tilapia farming unit. Internal factors consist of strengths and weaknesses that reflect the availability of resources, managerial capabilities, and production capacity. External factors include opportunities and threats originating from environmental dynamics such as market trends, government policies, climate variability, and competition. Data collection for this stage was carried out through structured interviews with business actors, direct field observations, and review of supporting literature.

The results of the SWOT analysis were then combined to formulate four types of strategic alternatives. The SO (Strength-Opportunity) strategy represents an offensive approach that utilizes internal strengths to capitalize on external opportunities. The WO (Weakness-Opportunity) strategy is adaptive, aiming to overcome internal weaknesses by leveraging external opportunities. The ST (Strength-Threat) strategy focuses on using internal

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strengths to mitigate or neutralize external threats. Lastly, the WT (Weakness-Threat) strategy is defensive, aiming to minimize both internal weaknesses and external threats to reduce potential risks.

2.2 QSPM Analysis

To determine the most relevant development strategy, the study applied the Quantitative Strategic Planning Matrix (QSPM) as a follow-up to SWOT analysis. QSPM is a quantitative approach that allows objective evaluation of each strategic alternative based on the importance weight and attractiveness score of identified factors. The procedure involved assigning weights to each factor, scoring the attractiveness of strategic alternatives on a scale of 1 to 4, and calculating the Total Attractiveness Score (TAS) as the product of weight and attractiveness. The strategy with the highest TAS was selected as the main recommendation. This method provided a systematic, data-driven process to prioritize strategies that are both relevant and feasible for implementation in the development of tilapia farming.

The combination of SWOT and QSPM was considered appropriate to address the research objectives, which required the integration of qualitative insights and quantitative decision-making tools to ensure comprehensive strategy formulation. Similar approaches have been validated in aquaculture and agribusiness research for planning adaptive and competitive development programs [16][17].

3 Results and discussion

3.1 SWOT Analysis Results

Based on data obtained through structured interviews, field observations, and literature reviews, SWOT analysis was used to classify strategic factors as follows:

- Strengths (S): Availability of local resources, skilled labor, and low production costs.
- Weaknesses (W): Limited access to capital, narrow distribution networks, and weak business management.
- Opportunities (O): Increasing market demand and support from government programs.
- Threats (T): Dependence on industrial feed, intense competition, and risk of disease and water quality.

The Internal Factor Evaluation (IFE) analysis was used to assess internal strategic elements. It helps identify key strengths and weaknesses within the business environment. The final IFE score reflects the extent to which the company can optimize its internal advantages and manage internal challenges effectively to achieve its strategic objectives [21].

Table 1. Internal Factor Evaluation (IFE) Matrix.

No	Internal Factors	Weight	Rating 1-4	Score (Weight x Rating)
1	Availability of land	0.15	4	0.60
2	Farmers' experience and skills	0.10	4	0.40
3	Suboptimal production technology	0.20	2	0.40
4	Limited business capital	0.20	2	0.40
5	Conventional marketing system	0.15	2	0.30
6	Availability of local labor	0.20	3	0.60
Total		1.00		2.70

A score of 2.70 indicates a relatively favorable internal condition. However, there are still significant internal challenges such as capital access and modern technology adoption that need to be addressed.

The External Factor Evaluation (EFE) analysis identifies and evaluates strategic elements from the external environment. The total EFE score reflects how well the enterprise can seize external opportunities and manage potential risks [22].

Table 2. External Factor Evaluation (EFE) Matrix.

No	External Factors	Weight	Rating 1-4	Score (Weight x Rating)
1	High market demand	0.25	4	1.00
2	Government programs and support	0.20	3	0.60
3	Competition among farmers	0.15	2	0.30

4	Climate change and water quality issues	0.20	2	0.40
5	Advancements in aquaculture technology	0.20	3	0.60
Total		1.00		2.90

With an EFE score of 2.90, the enterprise is positioned in an environment rich in opportunity, although several risks remain. Combining the IFE and EFE results enables mapping the business position in the Internal–External (IE) Matrix.

The IE Matrix integrates internal and external scores into a nine-cell matrix to determine the strategic posture. Using coordinates:

- IFE Score (X-axis): 2.70 (Moderate)
- EFE Score (Y-axis): 2.90 (Moderate–High)

These values place Firdaus Farm in Quadrant II or III, suggesting the enterprise should focus on either (a) expanding its current business capacity through proactive utilization of strengths and opportunities (Quadrant II), or (b) defending and stabilizing its position while improving internal capabilities (Quadrant III) [23]. This strategic positioning aligns with findings by Wardhani (2020), where IE Matrix is used to determine direction based on company strength-opportunity balance.

This matrix provides a clear and data-driven visual framework for identifying appropriate strategic options for the business.

Combination of SWOT Strategies:

- SO Strategy: Utilize land availability and skilled labor to implement modern aquaculture technology in response to increasing market demand.
- WO Strategy: Overcome limited capital and market reach by developing partnerships with cooperatives and financial institutions.
- ST Strategy: Strengthen internal competencies to mitigate risks from disease and environmental fluctuations.
- WT Strategy: Improve business management and reduce vulnerability through internal process enhancement.

A mix of these strategies ensures that the enterprise does not solely focus on one aspect such as expansion or defense, but rather maintains an integrated strategic balance across internal and external domains.

3.2 QSPM Analysis Results

The strategic alternatives from the SWOT matrix were further analyzed using the Quantitative Strategic Planning Matrix (QSPM) to determine their relative priority. QSPM allows for ranking strategies based on Total Attractiveness Scores (TAS), calculated from weighted internal and external factors and attractiveness scores (AS) assigned on a scale of 1 to 4.

Table 3. QSPM Matrix.

No	Strategic Factors	Weight	Strategy A : Produk Diversification		Strategy B : HR & Technology		Strategy C : Partnership & Capital	
			AS	TAS	AS	TAS	AS	TAS
1	Availability of land	0.15	4	0.60	3	0.45	3	0.45
2	Farmers' experience	0.10	3	0.30	4	0.40	3	0.30
3	Limited capital	0.20	2	0.40	3	0.60	4	0.80
4	Suboptimal technology	0.15	3	0.45	4	0.60	3	0.45
5	High market demand	0.25	4	1.00	3	0.75	3	0.75
6	Government program support	0.10	3	0.30	4	0.40	4	0.40
7	Environmental risks	0.05	3	0.15	3	0.15	3	0.15
Total		1.00	3.20		3.35		3.30	

Interpretation: The results show that Strategy B (Enhancing human resources and applying appropriate aquaculture technology) has the highest TAS of 3.35, making it the top recommendation. This is consistent with findings by Puspitasari and Tjahjono [24], and Swastawati et al. [25], who emphasized that building human capacity and introducing technology are pivotal in enhancing production efficiency and competitiveness.

Moreover, Asharurozi et al. [26] demonstrated that technology adoption in floating net cages helped strengthen the sustainability of fish farming.
This finding also supports global best practices that emphasize integrated aquaculture strategy development, combining technology adoption, market expansion, and human capital investment [27].
Strategy C (Partnerships and capital access) is ranked second with TAS = 3.30. It supports financial resilience by engaging stakeholders and expanding access to funding.
Strategy A (Product diversification) ranks third (TAS = 3.20), suitable for long-term growth through value-added products like fillets, fish balls, or frozen goods—particularly after internal capacity has improved. Diversification can also support export potential when integrated with strong branding and digital marketing strategies [27].
Phased Implementation Plan:

- Short term: Conduct training and provide water quality monitoring tools and e-marketing support.
- Mid term: Form strategic partnerships and secure financing.
- Long term: Develop processed tilapia products, branding, and explore export markets.

These strategies are not mutually exclusive. Instead, they form a synergistic roadmap that can enhance resilience, growth, and competitiveness of tilapia farming in both domestic and global markets. According to Amalia et al. [28], integrated approaches that combine skill development, financing, and innovation are key to long-term aquaculture sustainability.

4 Conclusion and recommendation

This study has demonstrated that the development of tilapia farming at Firdaus Farm, Tasikmalaya City, holds substantial potential for sustainable growth. Through SWOT and QSPM analyses, the enterprise was found to be in a favorable strategic position, supported by internal strengths such as land availability and skilled labor, as well as external opportunities like high market demand and government support.
The results of the IE Matrix positioned the business in Quadrant II/III, indicating a combined strategy of proactive development and defensive consolidation. The QSPM analysis confirmed that the most attractive strategy is enhancing human capital and applying appropriate aquaculture technology (TAS = 3.35), followed by establishing strategic partnerships and improving access to capital (TAS = 3.30), and product diversification for market expansion (TAS = 3.20).
Therefore, it is recommended that the development strategy be implemented progressively. In the short term, emphasis should be placed on building capacity through training, technology adoption, and digital marketing initiatives. In the mid term, efforts should focus on engaging key stakeholders, forming cooperative partnerships, and improving financial accessibility. In the long term, the enterprise should pursue product diversification through value-added innovations, branding strategies, and exploration of export markets to enhance competitiveness and market resilience.
Integrating these strategies holistically is essential for empowering local fish farmers, increasing productivity, and achieving sustainable aquaculture development. This approach aligns with international best practices and contributes to the broader goal of food security and rural economic growth.

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