



Sustainable Chili Pepper Agribusiness Development Model in North Maluku Province: SWOT and Quantitative Strategic Planning Matrix (QSPM) Approaches

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Abstract: The cayenne pepper agribusiness plays a vital role in supporting food security and the regional economy, but its development still faces various obstacles, such as price fluctuations, climate change, technological limitations, and weak farmer institutions. This study aims to analyze internal and external factors, determine priority strategies, and develop a sustainable cayenne pepper agribusiness development model in Oba and North Oba Districts, North Maluku Province. The study used a quantitative descriptive approach with Strengths, Weaknesses, Opportunities, Threats (SWOT) and Quantitative Strategic Planning Matrix (QSPM) analyses. Data were obtained through observation, interviews, questionnaires, and documentation of 22 farmers and key informants selected purposively. The results showed that the IFAS analysis produced a total score of 2.64, while the EFAS obtained a total score of 2.58, placing the cayenne pepper agribusiness in Quadrant I (Growth Strategy) with coordinates (0.49; 0.41). The QSPM analysis established priority strategies in the form of strengthening farmer group institutions, increasing production, implementing sustainable cultivation technologies, strengthening marketing networks, and developing partnerships and market access. This research resulted in a Sustainable Chili Pepper Agribusiness Development Model that integrates IFAS, EFAS, SWOT, and QSPM analyses as a conceptual framework in formulating a productive, competitive, and sustainable agribusiness development strategy.

Keywords: Chili pepper; Development strategy and conceptual model; QSPM; Sustainable agribusiness; SWOT

Introduction

Chili peppers are a strategic horticultural commodity with high economic value and a significant contribution to food security, trade, and agricultural economic development in various countries (Sapriyadi et al., 2025). Demand for chili peppers continues to increase in line with population growth, the development of the food industry, urbanization, and changes in consumer consumption patterns, particularly in Asia, the world's leading center for chili production and consumption. Nevertheless, the chili agribusiness system still faces various challenges, including climate

change, land resource degradation, attacks by plant pests, post-harvest yield losses, and high price fluctuations that impact the stability of farmers' incomes. Recent research shows that increasing the competitiveness of horticultural commodities is no longer solely determined by increased productivity, but also by the ability to integrate technological innovation, strengthen farmer institutions, enhance supply chain efficiency, and implement sustainable agribusiness principles that ensure economic, social, and environmental sustainability (Herawati, 2025).

Indonesia is one of the largest chili producers in Asia, with chili being a vital component of national

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horticultural development (Apriyani et al., 2025). On the other hand, chili is also a commodity that frequently triggers food inflation due to high price volatility and an imbalance between production and distribution (Hutapea et al., 2026). This situation is influenced by low adoption of technological innovation, weak agribusiness institutions, limited access to financing, and the increasing risk of climate change, which impacts productivity and supply continuity. Therefore, chili agribusiness development requires an approach that is not only oriented towards increasing production but also strengthening value chain efficiency, competitiveness, and the sustainability of the agribusiness system as a whole (Lisanty et al., 2025).

North Maluku Province has significant potential for developing cayenne pepper agribusiness, supported by tropical agro-ecological conditions, land availability, and farmers' experience in developing horticultural commodities. Publication of regional horticultural statistics shows that chili is a vegetable commodity cultivated in almost all districts and cities, including Oba District and North Oba District in Tidore Islands City, which is one of the centers of cayenne pepper production in the province. However, the characteristics of the archipelagic region result in relatively high logistics and distribution costs, limited access to technology, price information, and markets, and suboptimal utilization of cultivation and post-harvest technology (Ikhsan et al., 2026). These conditions result in the productivity, marketing efficiency, and competitiveness of cayenne pepper agribusiness not developing optimally compared to the potential of its resources (Tsurayya et al., 2015). These characteristics indicate that agribusiness development strategies implemented in other regions may not be appropriate for North Maluku. Therefore, a development model based on local characteristics is needed to formulate more adaptive, competitive, and sustainable agribusiness development policies.

In line with the modern agricultural development paradigm, cayenne pepper agribusiness development needs to be guided by the concept of sustainable agribusiness, which places economic, social, and environmental sustainability as an integral part of the agribusiness system (Ansya et al., 2023). This approach is not only oriented towards increasing productivity but also emphasizes efficient resource use, strengthening farmer institutions, technological innovation, supply chain management, adaptation to climate change, and continuously increasing product added value. From the perspective of sustainable agribusiness theory, the success of horticultural commodity development is determined by the ability to integrate internal farming factors with external opportunities through adaptive and evidence-based strategies (Rasyid et al., 2024).

Recent research shows that the adoption of environmentally friendly technologies, efficient use of resources, and strengthening farmer institutions can increase productivity while strengthening the resilience of agribusiness systems to climate and market risks (Febrianti et al., 2024).

Research on chili agribusiness development shows increasingly comprehensive developments. Recent studies no longer focus solely on increasing production but have shifted to integrating institutional aspects, technological innovation, supply chain efficiency, environmental sustainability, and determining development strategies based on multi-criteria analysis. Research by Makkulawu et al. (2023) demonstrated that SWOT analysis is effective in identifying internal and external strategic factors. Mufid et al. (2025) found that the QSPM method is capable of objectively determining strategic priorities. Other research confirms that sustainable chili agribusiness development requires integration of development strategies, strengthening farmer organizations, technological innovation, efficient resource use, and adaptation to climate change to increase the competitiveness and resilience of the agribusiness system (Novita et al., 2024). However, most research still discusses these components separately and has not integrated them into a conceptual model that can be used as a basis for formulating agribusiness development policies, particularly in island regions with different social, economic, and logistical characteristics than continental regions. A synthesis of various previous studies indicates several research gaps that require attention. First, most research on chili agribusiness development focuses on identifying strategic factors, analyzing farm efficiency, strengthening the value chain, or determining strategic priorities using SWOT or QSPM separately. Second, research integrating internal and external factors, priority strategies, and sustainable agribusiness principles into a systematic development model is still very limited, particularly for cayenne pepper. Third, most research has been conducted in agrarian regions on the islands of Java or Sumatra, while relatively few studies have considered the characteristics of island regions, such as North Maluku Province, with its inter-island distribution challenges, limited infrastructure, high logistics costs, and price volatility. Consequently, the resulting strategic recommendations have not fully addressed the needs of cayenne pepper agribusiness development in island regions with their distinct resource, market, and institutional characteristics. This situation demonstrates the need for an approach that not only generates strategic priorities but also integrates all strategic factors into a development model that can be implemented as a basis for developing sustainable agribusiness policies. Based on this gap, this study offers

a novel approach in the form of a Sustainable Chili Pepper Agribusiness Development Model, built through the integration of Internal Factor Analysis Summary (IFAS), External Factor Analysis Summary (EFAS), Strengths, Weaknesses, Opportunities, Threats (SWOT), and Quantitative Strategic Planning Matrix (QSPM) analyses into a single, systematic conceptual framework. Unlike previous research, which generally focused on identifying strategic factors or establishing strategic priorities, the model developed in this study explains the relationship between internal factors, external factors, strategic priorities, program implementation, and sustainable agribusiness development outcomes, encompassing economic, social, and environmental dimensions. The model is designed based on the characteristics of the archipelagic region, making it more relevant as a basis for developing horticultural development policies in North Maluku Province and other archipelagic regions in Indonesia. Therefore, this study aims to: identify internal and external factors that influence the development of cayenne pepper agribusiness in North Maluku Province, determine development strategy priorities using SWOT and QSPM analysis and develop a Sustainable Cayenne Pepper Agribusiness Development Model as a conceptual framework that supports policy making and the achievement of Sustainable Development Goals (SDGs) through strengthening competitiveness, improving farmer welfare, and sustainability of the agribusiness system.

Method

This research uses a quantitative descriptive approach with a case study method to analyze sustainable cayenne pepper agribusiness development

strategies in North Maluku Province (Isnaini et al., 2025). This approach was chosen because it can identify the actual conditions of the cayenne pepper agribusiness through an analysis of internal and external factors, determine development strategy priorities, and develop an agribusiness development model based on empirical conditions at the research site. The strategy analysis was conducted using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis combined with the Quantitative Strategic Planning Matrix (QSPM) as the basis for determining strategic priorities (Falih et al., 2026).

The data used consisted of primary and secondary data. Primary data were obtained through field observations, structured interviews using questionnaires, and discussions with farmers and key informants: the Head of the Tidore Islands City Agriculture Office, the Head of the Agricultural Technology Assessment Center, and the Head of the Oba and North Oba District Agricultural Extension Centers. Secondary data was obtained from the Central Statistics Agency (BPS), the Ministry of Agriculture, the Tidore Islands City Agriculture Office, the Agricultural Extension Center, the Agricultural Technology Assessment Center, and various scientific articles and supporting documents. Data validity was ensured through source triangulation and expert judgment to validate the strategic factors used in the analysis. The study population consisted of cayenne pepper farmers in the two sub-districts, while respondents were selected using purposive sampling based on the following criteria: (1) actively cultivating cayenne pepper for at least two planting seasons; (2) having at least three years of farming experience; and (3) being willing to participate. Based on these criteria, 22 respondents were selected: 12 farmers in Oba Sub-district and 10 farmers in North Oba Sub-district.

Table 1. SWOT Matrix (Wardahiljannah et al., 2025)

Internal Factors		Strengths (S)	Weaknesses (W)
External Factors			
Opportunities (O)	SO Strategies Develop strategies that leverage strengths to capitalize on opportunities.		WO Strategies Develop strategies that minimize weaknesses by taking advantage of opportunities.
Threats (T)	ST Strategies Develop strategies that leverage strengths to mitigate or overcome threats.		WT Strategies Develop strategies that minimize weaknesses and avoid or reduce the impact of threats.

Data analysis was conducted in stages using the Strengths, Weaknesses, Opportunities, Threats (SWOT) and Quantitative Strategic Planning Matrix (QSPM). The first stage identifies internal and external factors arranged into the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices by assigning weights and ratings based on the results of observations, interviews, and key informant assessments. Next, these factors are analyzed using a

SWOT matrix to generate alternative SO, WO, ST, and WT strategies (Fastaf et al., 2025). The final stage is carried out using a QSPM matrix to determine strategic priorities based on the Attractiveness Score (AS) and Total Attractiveness Score (TAS) values, so that a sustainable cayenne pepper agribusiness development strategy is obtained that best suits the internal and external conditions of the research area (Roga et al., 2025). Next, a SWOT Matrix is compiled to generate

alternative SO, WO, ST, and WT strategies based on a combination of internal and external factors (Wardahiljannah et al., 2025).

The second stage was carried out using the Quantitative Strategic Planning Matrix (QSPM) to determine the most feasible priority strategies. The QSPM analysis was conducted by incorporating all strategic factors resulting from the SWOT analysis.

Then, each alternative strategy was assigned an Attractiveness Score (AS) on a scale of 1–4 based on the relative attractiveness of each strategic factor. The Total Attractiveness Score (TAS) was obtained by multiplying the weight and the AS. The strategy with the highest TAS value was prioritized as the main strategy for developing the cayenne pepper agribusiness (Jurišić et al., 2019).

Table 2. Quantitative Strategic Planning Matrix (QSPM)

Factors	Weight		Alternative Strategy					
	(B)	SO	WO		ST	WT		
		AS (R)	TAS (BxR)	AS (R)	TAS (BxR)	AS (R)	TAS (BxR)	AS (R)
Internal Factors								
Total Weight								
External Factors								
Total Weight								
Total								

Description: AS = Attractiveness Score; TAS = Total Attractiveness Score (Weight × AS). Source: Modified from David et al. and Oei et al. (2014).

Result and Discussion

Result

Internal Factor Analysis Summary (IFAS)

Internal factor analysis aims to identify various conditions originating from within the cayenne pepper agribusiness system that act as strengths and weaknesses in supporting sustainable agribusiness development in Oba and North Oba Districts, Tidore Islands City (Umasugi et al., 2025). Identification was carried out through field observations, structured interviews using questionnaires with farmers, and discussions with key informants consisting of the Head of the Agricultural Service, field agricultural extension workers, and farmer group administrators. This approach allows researchers to obtain factual information regarding cultivation conditions, farmer institutions, access to technology, and various obstacles faced by farmers in running cayenne pepper farming businesses. The identification results were then validated through expert judgment so that the strategic factors obtained truly represent the actual conditions at the research location.



Figure 1. Field observation on chili cultivation land in Oba and North Oba districts

The research documentation in Figure 1 shows the direct observation process of cayenne pepper cultivation land at the research site. Observations were conducted to identify agro-ecological conditions, land characteristics, cultivation techniques, production inputs, and plant conditions as a basis for determining internal factors influencing cayenne pepper agribusiness development.

In addition to observations, the internal factor identification process was also strengthened through in-depth interviews with cayenne pepper farmers, the primary respondents in the study. Interviews were conducted to gather information on farming experience, land management, capitalization, cultivation technology implementation, post-harvest management, and access to market information. These interviews served as the basis for assigning weights and ratings to each internal factor, ensuring that the IFAS analysis results are based not only on field observations but also on the farmers' empirical experiences.



Figure 2. Researcher interview with chili farmers

Based on observations, interviews, and validation by key informants, ten internal factors were identified,

consisting of five strengths and five weaknesses. Each factor was weighted according to its level of importance (total weight = 1.00) and rated based on actual

conditions in the field. The weighting results are presented in Table 3.

Table 3. IFAS Matrix for Sustainable Chili Agribusiness Development in North Maluku Province

No.	Internal Factors	Weight	Rating	Score
A. Strengths				
1	Availability of fertile agricultural land	0.13	4	0.52
2	Farmers' experience in chili pepper cultivation	0.12	4	0.48
3	Existence of active farmer groups	0.10	3	0.30
4	Availability of family labor	0.08	3	0.24
5	Government support for horticultural development	0.09	3	0.27
Strengths Subtotal		0.52		1.81
B. Weaknesses				
1	Limited working capital of farmers	0.13	1	0.13
2	Limited access to modern cultivation technology	0.10	2	0.20
3	Production is highly dependent on seasonal conditions	0.08	2	0.16
4	Post-harvest management is not yet optimal	0.10	2	0.20
5	Limited access to market price information	0.07	2	0.14
Weaknesses Subtotal		0.48		0.83
Total IFAS Score		1.00		2.64

Source: Processed primary data (2025).

The analysis results show that the total IFAS score reached 2.64, consisting of a strength score of 1.81 and a weakness score of 0.83. This value indicates that the internal conditions of the cayenne pepper agribusiness in Oba and North Oba Districts are in the fairly strong category because the strengths are greater than the weaknesses. The dominance of strength factors indicates that the study area has internal resources capable of becoming the basic capital in developing a sustainable cayenne pepper agribusiness. The availability of fertile land obtained the highest score (0.52), followed by farmer experience in cultivating cayenne pepper (0.48). These two factors indicate that the success of agribusiness development is not only influenced by the potential of natural resources, but also by the capacity of human resources in managing farming businesses.

Nevertheless, several weaknesses still require serious attention, particularly limited business capital, low adoption of modern cultivation technologies, suboptimal post-harvest management, and limited access to market price information. These weaknesses have the potential to reduce production efficiency, reduce product added value, and weaken farmers' bargaining position in the marketing chain. Therefore, future development strategies need to be directed at increasing farmer capacity through access to financing, strengthening farmer group institutions, increasing the adoption of technological innovation, and developing more effective market information systems.

This research aligns with the theory of sustainable agribusiness, which states that agribusiness sustainability is determined by the ability to optimize internal resources through the integration of natural

capital, human capital, social capital, and institutional support (Dammak et al., 2025). From this perspective, internal strengths such as land quality, farmer experience, and farmer group institutions are the main foundations for increasing productivity and competitiveness in agribusiness sustainably. These results are also consistent with research by Akrib et al. (2026), which showed that the success of horticultural development is influenced by the capacity of farmers and local institutions. Rushchitskaya et al. (2024), who emphasized the importance of technology and institutional integration in sustainable agribusiness development. Ridwan et al. (2025), who found that strengthening internal factors is a key prerequisite for developing a SWOT-based strategy. Saptana et al. (2022), who reported that access to technology, financing, and market information are determining factors in increasing the competitiveness of chili agribusiness. Thus, the IFAS analysis results provide a strong empirical basis for identifying external opportunities and threats in the next analysis stage using the EFAS matrix.

Based on these results, it can be synthesized that the internal factor that most determines the development of a sustainable chili agribusiness in North Maluku Province is not only determined by the availability of natural resources, but also by the ability of farmers to manage these resources through institutional strengthening, increased technological capacity, and government policy support. This demonstrates that strengths in the form of productive land, farmer experience, and the existence of farmer groups serve as fundamental assets capable of mitigating the impact of

various weaknesses, particularly limited capital, low technology adoption, and weak marketing systems. These findings expand the concept of sustainable agribusiness, which places the integration of natural capital, human capital, social capital, and institutional capital as the primary foundation for building a resilient and sustainable agribusiness system.

External Factor Analysis Summary (EFAS)

External factor analysis was conducted to identify various opportunities and threats originating from the external environment and influencing the development of sustainable cayenne pepper agribusiness in Oba and North Oba Districts, Tidore Islands City (Fauzyah et al., 2025). External factor identification was conducted through field observations, structured interviews with farmers, and discussions with key informants consisting of the Head of the Agriculture Service, agricultural extension workers, and farmer group administrators. This approach was used to obtain information on market conditions, government policy support, developments in cultivation technology, distribution infrastructure, price dynamics, and various external risks that affect the sustainability of the cayenne pepper agribusiness. All factors obtained were then validated through expert judgment before being weighted and rated to objectively describe external conditions (Wahyuni et al., 2025).



Figure 3. Observation of the distribution of chili peppers at the research location

The research documentation in Figure 3 shows the market conditions and distribution activities of cayenne pepper, one of the objects of observation in the study. Observations were conducted to identify marketing patterns, harvest distribution mechanisms, farmer access to markets, and the dynamics of cayenne pepper demand in the study area. This information served as the basis for determining opportunity factors related to market demand and inter-regional marketing potential.

In addition to conducting observations, researchers also participated in extension activities and discussions with farmers and agricultural extension workers to obtain information on the implementation of government programs, the use of innovative cultivation technologies, and various external constraints faced by farmers. Documentation of these activities is presented

in Figure 4. The results of the discussions indicate that the success of cayenne pepper agribusiness development is influenced not only by farmers' ability to manage their farming operations, but also by institutional support, government policies, and dynamic market conditions.



Figure 4. Extension activities and discussions with chili pepper farmers

Based on observations, interviews, and validation with key informants, ten external factors were identified, consisting of five opportunity factors and five threat factors. Each factor was weighted based on its level of importance (sum of weights = 1.00), while ratings were assigned based on the level of response or influence of each factor on the development of the cayenne pepper agribusiness. The weighting results are presented in Table 4.

The analysis results show a total EFAS score of 2.58, consisting of an opportunity score of 1.70 and a threat score of 0.88. This score indicates that the external environment for cayenne pepper agribusiness development is categorized as moderately supportive because the available opportunities still outweigh the threats faced. This condition indicates that cayenne pepper agribusiness development still has good prospects if it can capitalize on various available opportunities while appropriately anticipating external risks.

The opportunity with the highest score is the increasing demand for cayenne pepper in the local market (0.56), followed by government program support for horticultural development (0.33) and the potential for interregional marketing (0.30). These three factors indicate that the external environment provides significant room for increased production and market expansion of cayenne pepper. Meanwhile, the main threats come from fluctuations in chili prices (0.26), pest and plant disease attacks (0.24), and climate change affecting productivity (0.18). These threats have the potential to reduce the stability of farmers' incomes if not balanced with appropriate adaptation strategies, such as institutional strengthening, marketing diversification, the implementation of environmentally friendly cultivation technologies, and a more effective pricing information system.

Table 4. EFAS Matrix for Sustainable Chili Agribusiness Development in North Maluku Province

No.	External Factors	Weight	Rating	Score
A. Opportunities				
1	Increasing demand for chili peppers in the local market	0.14	4	0.56
2	Government support programs for horticultural development	0.11	3	0.33
3	Potential for interregional marketing	0.10	3	0.30
4	Development of environmentally friendly cultivation technologies	0.08	3	0.24
5	Availability of land and sea transportation infrastructure	0.09	3	0.27
Opportunities Subtotal		0.52		1.70
B. Threats				
1	Fluctuating chili pepper prices	0.13	2	0.26
2	Pest and plant disease outbreaks	0.12	2	0.24
3	Competition from production centers in other regions	0.08	1	0.08
4	Climate change affecting agricultural production	0.09	2	0.18
5	Limited availability of subsidized fertilizers	0.06	2	0.12
Threats Subtotal		0.48		0.88
Total EFAS Score		1.00		2.58

The results of this study support the theory of sustainable agribusiness, which emphasizes that the sustainability of agribusiness systems is determined not only by the internal capacity of business actors but also by their ability to adapt to external environmental dynamics (Ali et al., 2026). According to this concept, market opportunities, policy support, technological innovation developments, and infrastructure availability are factors that can increase agribusiness competitiveness if optimally utilized. Conversely, climate change, price volatility, pest infestations, and limited production facilities represent external risks that must be managed through adaptive and collaborative strategies to ensure agribusiness systems remain sustainable (Alotaibi et al., 2023).

The findings of this study align with those of Rahmatullah, Ghausan, & Lestari, (2025), which showed that increasing market demand and government policy support are key factors in strengthening the competitiveness of horticultural agribusiness. Research by Khan et al. (2021) also explains that utilizing innovative cultivation technologies and strengthening marketing networks can increase the resilience of agribusiness systems to external environmental changes. Meanwhile, Fanourakis et al. (2025) found that price volatility and climate change are major threats to the sustainability of horticultural farming businesses, necessitating an adaptation strategy based on farmer institutions. Similar findings were reported by Idsan et al. (2026), who stated that the success of chili agribusiness development is greatly influenced by farmers' ability to capitalize on market opportunities while managing production and marketing risks through government support and collaboration between stakeholders.

Based on these overall results, it can be concluded that the external environment of the cayenne pepper agribusiness in North Maluku Province still offers

greater opportunities than threats, thus offering quite promising prospects for agribusiness development. Opportunities in the form of increasing market demand, support from government programs, developments in cultivation technology, and the availability of transportation networks are strategic factors that can be optimized to increase the productivity and competitiveness of the cayenne pepper agribusiness (Sukmawati et al., 2025). However, threats such as price fluctuations, climate change, pest attacks, and limited production facilities still require a planned adaptation strategy. The synthesis of the IFAS and EFAS results shows that cayenne pepper agribusiness development requires a strategy that can integrate internal strengths with external opportunities while minimizing the impact of weaknesses and threats. Therefore, in the next stage, a strategic position analysis was conducted using the SWOT Matrix to determine the direction of the sustainable cayenne pepper agribusiness development strategy that best suits the conditions of the research area.

Strategic Position for Cayenne Pepper Agribusiness Development

After successfully identifying internal and external factors through the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices, the next step is to determine the strategic position for cayenne pepper agribusiness development using a SWOT quadrant analysis. This analysis aims to determine the position of an organization or agribusiness system based on the balance between internal and external factors, thereby determining the most appropriate strategic development direction. The strategic position is obtained by calculating the internal (X) and external (Y) coordinates. The X axis represents the difference between the total scores for strengths and weaknesses, and the Y axis represents the difference

between the total scores for opportunities and threats (Noorcahyo et al., 2025).

Based on the IFAS analysis, the total strengths (S) score was 1.81 and weaknesses (W) score was 0.83. The EFAS analysis yielded a total opportunities (O) score of 1.70 and threats (T) score of 0.88. The SWOT coordinates were then calculated using the following equation:

$$X = \frac{S-W}{2} \quad (1)$$

$$Y = \frac{O-T}{2} \quad (2)$$

With: S = Total strengths score (1.81); W = Total weaknesses score (0.83); O = Total opportunities score (1.70); T = Total threats score (0.88). So we get:

$$X = \frac{1.81 - 0.83}{2} = \frac{0.98}{2} = 0.49$$

$$Y = \frac{1.70 - 0.88}{2} = \frac{0.82}{2} = 0.41$$

The calculation results show that the SWOT coordinates for cayenne pepper agribusiness development are at (0.49; 0.41). Positive coordinate values on both axes indicate that internal conditions are dominated by strengths, while the external environment offers greater opportunities than threats. A summary of the calculation results is presented in Table 5.

Table 5. SWOT Coordinate Calculation

Component	Value
Total Strengths (S)	1.81
Total Weaknesses (W)	0.83
S - W	0.98
X Coordinate = (S - W) / 2	0.49
Total Opportunities (O)	1.70
Total Threats (T)	0.88
O - T	0.82
Y Coordinate = (O - T) / 2	0.41

The coordinate values are then mapped into a SWOT Quadrant Diagram to determine the strategic position for developing the cayenne pepper agribusiness.

Based on Figure 5, the development of the cayenne pepper agribusiness is positioned in Quadrant I (Growth Strategy) with coordinates (0.49; 0.41). This position indicates that the research area has relatively strong internal conditions while facing an external environment that offers significant development opportunities. The availability of productive land, farmer experience, the existence of farmer groups, and government support are key assets supporting agribusiness development. Furthermore, increasing market demand, support from horticultural programs,

developments in cultivation technology, and inter-regional marketing opportunities provide ample scope for increasing cayenne pepper productivity and competitiveness.

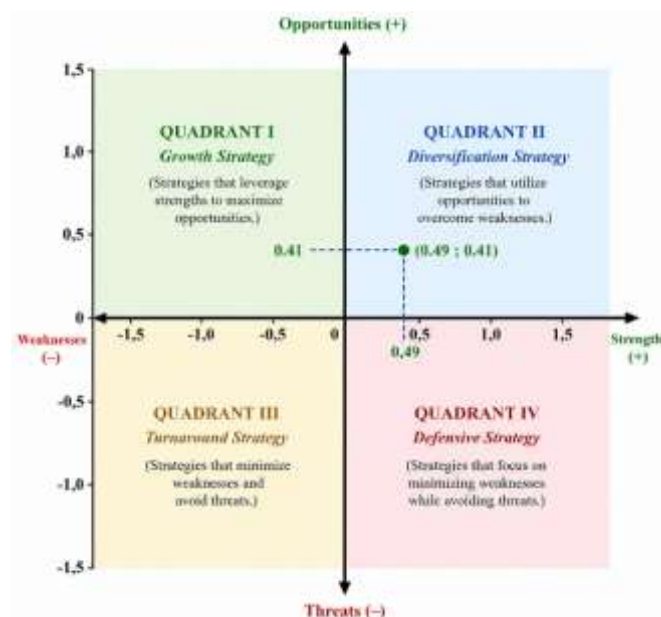


Figure 5. SWOT quadrant diagram of chili pepper agribusiness development

From a SWOT theory perspective, a position in Quadrant I indicates that the agribusiness organization or system is in the most advantageous position because it possesses internal strengths that can be leveraged to seize external opportunities. According to Anita et al. (2025), this condition directs organizations to implement a growth-oriented strategy by optimizing all available resources. This concept also aligns with the theory of sustainable agribusiness, which emphasizes that agribusiness sustainability is achieved through optimal utilization of internal strengths while still being able to respond adaptively to changes in the external environment. Therefore, the strategies developed are not only oriented toward increasing production but also directed at strengthening institutions, technological innovation, supply chain efficiency, and expanding market access.

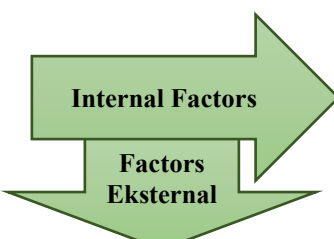
The results of this study are consistent with the findings of Sahidna (2026), who stated that Quadrant I position indicates a region's readiness to implement growth strategies through optimizing internal strengths. Research by Akbar et al. (2023), also showed that the combination of farmer capacity, institutional support, and market opportunities are key factors in increasing the competitiveness of horticultural agribusiness. Similar findings were reported by Estácio et al. (2025), who emphasized that the success of sustainable agribusiness development is determined by the ability to

integrate local resources with technological innovation and government policy support. Furthermore, research by Bara et al. (2026) demonstrated that regions in Quadrant I have a greater opportunity to develop market expansion strategies and increase added value compared to regions in other quadrants. Based on these overall results, it can be concluded that the development of cayenne pepper agribusiness in North Maluku Province has strong internal capacity and is supported by a relatively conducive external environment, thus placing it in a Growth Strategy position. This position indicates that the direction of development is no longer focused on a defensive strategy, but rather on a growth strategy through utilizing internal strengths to capture market opportunities, strengthen farmer institutions, adopt sustainable cultivation technologies, expand marketing networks, and enhance partnerships with various stakeholders. Therefore, the results of this strategic position analysis serve as the basis for formulating alternative development strategies through the SWOT Matrix.

Development Strategy Formulation Based on SWOT Matrix

After the strategic position of cayenne pepper agribusiness development is known to be in Quadrant I (Growth Strategy), the next stage is to formulate alternative development strategies through the SWOT Matrix (Suwarningsih et al., 2024). Strategy development is carried out by combining internal factors consisting of strengths and weaknesses with external factors in the form of opportunities and threats. This combination produces four groups of strategies, namely SO, WO, ST, and WT, which serve as the basis for developing alternative policies for sustainable cayenne pepper agribusiness development in Oba and North Oba Districts. The strategy formulation process is carried out based on the results of IFAS and EFAS identification that have been validated through field observations, farmer interviews, and discussions with key informants so that each strategy reflects the empirical conditions of the research area (Alam et al., 2024).

Table 6. Formulation of Chili Pepper Agribusiness Development Strategy Based on SWOT Matrix

		Strengths	Weaknesses
 Internal Factors Factors Eksternal		S1. Availability of fertile agricultural land	W1. Limited farming capital
		S2. Farmers' experience in chili pepper cultivation	W2. Limited access to modern cultivation technology
		S3. Active farmer groups	W3. Dependence on seasonal conditions
		S4. Availability of family labor	W4. Suboptimal post-harvest management
		S5. Government support for agricultural development	W5. Limited access to market price information
		SO Strategies	WO Strategies
Opportunities O1. Increasing market demand O2. Government support programs O3. Potential for interregional marketing O4. Environmentally friendly cultivation technologies O5. Adequate transportation infrastructure		SO1. Optimize the use of fertile land and farmers' experience to increase production and meet growing market demand.	WO1. Utilize government financing programs to improve farmers' access to business capital..
		SO2. Strengthen farmer organizations through government support to expand marketing networks	WO2. Enhance farmers' capacity through training in modern cultivation technologies and farm management
		SO3. dopt environmentally friendly cultivation technologies to improve productivity and product quality.	WO3. Utilize transportation infrastructure and digital market information systems to expand market access.
		Strategy ST	Strategy WT
Threats) T1. Price fluctuations T2. Pest and disease outbreaks T3. Competition from other production regions T4. Climate change T5. Limited availability of subsidized fertilizers		ST1. implement integrated pest management and climate-adaptive cultivation practices.	WT1. market price information system to reduce the risks associated with price fluctuations.
		ST2. Strengthen coordination among farmer groups to maintain product quality and ensure a stable supply.	WT2. Optimize the use of organic fertilizers and alternative agricultural inputs to reduce dependence on subsidized fertilizers.
		ST3. Develop value-added chili pepper products to enhance competitiveness and increase market value	WT3. Foster cooperation among farmers in procuring production inputs and implementing collective marketing strategies.

Based on the SWOT Matrix in Table 4, 12 alternative strategies were identified: three SO strategies, three WO strategies, three ST strategies, and three WT strategies. These four strategy groups are the result of a combination of internal and external factors previously identified through IFAS and EFAS analyses. SO strategies are formulated by leveraging internal strengths to seize external opportunities, WO strategies are aimed at minimizing weaknesses by exploiting opportunities, ST strategies aim to use strengths to mitigate the impact of threats, and WT strategies focus on defensive efforts by reducing weaknesses while avoiding threats.

The formulation results indicate that the SO strategy group has the highest level of relevance to the conditions of the study area. This aligns with the results of the SWOT quadrant analysis, which places cayenne pepper agribusiness development in Quadrant I (Growth Strategy). This condition indicates that the study area possesses strong internal capital in the form of available productive land, experienced farmers, active farmer groups, and government support, which can be utilized to meet increasing market demand, expand marketing networks, and adopt more efficient and environmentally friendly cultivation technologies. Nevertheless, the WO, ST, and WT strategies still play a crucial role as supporting strategies in maintaining the sustainability of the agribusiness system. The WO strategy is aimed at increasing farmer capacity through access to financing, technology adoption, and strengthening market information. The ST strategy focuses on increasing adaptability to price fluctuations, climate change, and attacks by plant pests. Meanwhile, the WT strategy is aimed at strengthening institutional systems, efficient use of production inputs, and developing collaboration among farmers to mitigate various business risks.

It should be emphasized that these twelve strategies are not all prioritized for implementation. All alternative strategies still have the potential to be implemented, but their priority levels vary. Therefore, in the next stage, a selection process was conducted using the Quantitative Strategic Planning Matrix (QSPM). Through this analysis, each alternative strategy was assigned an Attractiveness Score (AS) and a Total Attractiveness Score (TAS), resulting in five cross-quadrant strategies with the highest level of attractiveness for implementation as the basis for developing a Sustainable Chili Pepper Agribusiness Development Model.

The results of this study align with the strategic management concept proposed by Moko et al. (2022), who stated that the SWOT Matrix is an instrument for integrating internal and external factors to generate various strategic alternatives before selecting the best

strategy using QSPM. From a sustainable agribusiness perspective, the resulting strategy is not only aimed at increasing productivity but also at strengthening the economic, social, institutional, and environmental dimensions in an integrated manner. Therefore, the SO strategy that dominates this study reflects that the success of the cayenne pepper agribusiness is determined not only by production resources but also by the ability to simultaneously exploit market opportunities, policy support, technological innovation, and strengthening farmer institutions.

The findings of this study reinforce those of Sutiawati et al. (2026), who stated that Quadrant I positions generate aggressive strategies through leveraging internal strengths to expand market opportunities. Similarly, Rosada et al. (2025) demonstrated that the SO strategy is the primary alternative in horticultural commodity development because it can increase business efficiency and expand market access. Research by Purnomo et al. (2025) also found that a combination of strengthening farmer institutions, government support, and technological innovation are determining factors for the success of sustainable agribusiness development. Meanwhile, Prasasti (2024) emphasized that SWOT-derived strategies need to be reprioritized using the QSPM to ensure more objective decisions and a strong quantitative basis.

The synthesis of research results indicates that the SWOT strategy formulation not only produces a list of alternative strategies but also illustrates the systematic relationship between internal and external conditions in supporting cayenne pepper agribusiness development. The dominance of SO strategies indicates that agribusiness development in the research area is more effective through a growth approach that optimizes local strengths to capture market opportunities and government policies. However, successful implementation still requires the support of WO, ST, and WT strategies as adaptation mechanisms to various internal constraints and changes in the external environment.

Determining Strategic Priorities Using the Quantitative Strategic Planning Matrix (QSPM)

After obtaining alternative strategies through the SWOT matrix, the next step is to determine the priority strategies for developing the cayenne pepper agribusiness using the Quantitative Strategic Planning Matrix (QSPM) method (Hasbiadi et al. 2024). The QSPM analysis is conducted by assigning an Attractiveness Score (AS) to each internal and external strategic factor for each alternative strategy. The AS value is then multiplied by the weight of each factor to obtain the Total Attractiveness Score (TAS). The strategy with the

highest TAS value is prioritized as the main strategy in developing a sustainable cayenne pepper agribusiness in Oba and North Oba Districts. Based on the results of the SWOT analysis, five alternative strategies in the

Strength Opportunity (SO) group were evaluated using the QSPM method. The assessment results show differences in the level of attractiveness of each strategy, as presented in Table 7.

Table 7. Priority Strategies for Developing Chili Agribusiness Based on QSPM Analysis

Code	Strategic Alternative	Total Attractiveness Score (TAS)	Rank
SO2	Strengthen farmer organizations through government support to expand interregional marketing networks.	5.80	1
SO1	Optimize the utilization of fertile agricultural land and farmers' experience to increase production in line with market demand.	5.46	2
SO3	Adopt environmentally friendly cultivation technologies to improve productivity and product quality.	5.33	3
WO2	Enhance farmers' capacity through training in modern cultivation technologies and farm management practices.	4.50	4
ST2	Strengthen coordination among farmer groups to ensure a stable supply and maintain product quality.	4.29	5

The QSPM analysis results show that the strategy of strengthening farmer group institutions through government support to expand inter-regional marketing networks (SO2) achieved the highest Total Attractiveness Score (TAS) of 5.80, thus being designated a priority strategy in developing a sustainable cayenne pepper agribusiness. The high TAS score indicates that this strategy has the strongest linkages with the internal and external factors identified through the IFAS and EFAS analyses. The next priority strategies are optimizing the use of fertile land and farmer experience to increase production in line with market demand (SO1) with a TAS score of 5.46, followed by the implementation of environmentally friendly cultivation technologies to improve productivity and yield quality (SO3) with a TAS score of 5.33. Both strategies focus on leveraging internal strengths to capture evolving market opportunities.

Meanwhile, the strategy of increasing farmer capacity through cultivation technology training (WO2) achieved a TAS score of 4.50, while the strategy of strengthening farmer group coordination to maintain supply continuity (ST2) achieved a TAS score of 4.29. Despite having lower scores than the SO strategy group, both strategies remain important as supporting strategies in supporting the successful implementation of the main strategy. Overall, the QSPM analysis results indicate that the priority for cayenne pepper agribusiness development in Oba and North Oba Districts is directed at strengthening farmer institutions, increasing productivity through the utilization of local resources, and implementing sustainable cultivation technologies. These strategies then form the basis for developing a sustainable cayenne pepper agribusiness development model.

Discussion

Basis for Model Development

The IFAS analysis results show that cayenne pepper agribusiness development in Oba and North Oba Districts is dominated by strengths, with a total score of 1.81, while weaknesses scored 0.83. This indicates that farmers' internal capacity is relatively strong to support agribusiness development. The availability of productive land, farmer experience, the existence of farmer groups, family labor, and government support are key assets that can be leveraged to increase productivity and competitiveness. Conversely, limited business capital, low technology adoption, weak post-harvest management, and limited access to market information remain obstacles that require strategic intervention.

These findings align with Barney's Resource-Based View (RBV) theory, which states that competitive advantage is built through the utilization of valuable, rare, difficult-to-imitate, and effectively organized internal resources (Darmawan et al., 2026). In the context of sustainable agribusiness, internal resources encompass not only physical assets but also human capital, institutions, and farmer organizational capacity, which are fundamental to successful agricultural development. Herawati (2025) research indicates that strengthening farmer capacity, farmer group institutions, and utilizing local resources are key prerequisites for building a sustainable horticultural agribusiness system. Therefore, the IFAS results in this study serve as the primary basis for developing the model, as they demonstrate that agribusiness development must be oriented toward optimizing internal strengths while simultaneously mitigating the various weaknesses still faced by farmers.

The EFAS analysis yielded an opportunity score of 1.70, higher than the threat score of 0.88. These results indicate that the external environment still offers

positive prospects for the development of the cayenne pepper agribusiness in Tidore Islands City. Increasing market demand, support from government programs, developments in cultivation technology, interregional marketing opportunities, and transportation infrastructure represent opportunities that can be utilized to accelerate agribusiness growth. However, price fluctuations, climate change, attacks by plant pests, and limited distribution of production inputs remain threats that must be anticipated.

In Sustainable Agribusiness theory, the external environment is a factor that determines the agribusiness system's ability to adapt to economic, social, and environmental changes. Sustainable agribusiness requires strategies that are responsive to market dynamics, climate change, technological developments, and government policies to maintain long-term business sustainability. Research by Azizah (2020) shows that the success of horticultural agribusiness development is significantly influenced by farmers' ability to capitalize on external opportunities while minimizing the impact of various threats. Based on these findings, the EFAS results serve as the second foundation for developing a model, integrating opportunity and threat factors into an adaptive and sustainability-oriented development strategy.

The integration of IFAS and EFAS results places the development of the cayenne pepper agribusiness in Quadrant I (Growth Strategy) with coordinates (0.49; 0.41). This position indicates that strong internal conditions are supported by significant external opportunities, so the most appropriate strategy is a growth strategy. This means that the focus of development is no longer directed at survival strategies, but rather at expansion efforts through increased production capacity, technological innovation, institutional strengthening, and expanding marketing networks. According to the SWOT theory developed by Weihrich, organizations in Quadrant I have the ability to leverage internal strengths to optimally capture external opportunities. This concept aligns with the Sustainable Agribusiness approach, which positions growth as a process of increasing the capacity of the agribusiness system without neglecting economic, social, and environmental aspects. This finding is supported by research by Rikardus (2025), which shows that growth strategies produce more effective results when supported by strong farmer institutions, technological innovation, and collaboration between stakeholders. Therefore, the SWOT position serves as the third foundation for developing the model, namely determining the direction of agribusiness development towards a sustainable growth strategy. The final stage of model development was based on the results of the Quantitative Strategic Planning Matrix (QSPM) analysis,

which was used to determine the strategy with the highest level of attractiveness. The results showed that the strategy of strengthening farmer group institutions and developing marketing networks achieved the highest Total Attractiveness Score (TAS), making it a priority for developing a sustainable cayenne pepper agribusiness. This strategy was then supported by increased production, the implementation of environmentally friendly cultivation technologies, and the development of partnerships as complementary strategies.

According to Strategic Management theory, strategies selected through a quantitative evaluation process have a higher level of objectivity because they simultaneously consider all internal and external factors. The QSPM approach allows for a systematic decision-making process, ensuring that the chosen strategy truly aligns with actual conditions on the ground. Research by Iskariyanto et al. (2025) also shows that strategies that integrate institutional strengthening, technological innovation, market access, and partnerships can increase competitiveness while maintaining the sustainability of horticultural agribusiness. Therefore, the QSPM results become the final basis for compiling a conceptual model, because it translates the results of strategic analysis into an operational, measurable and applicable implementation program.

Conceptual Model for Sustainable Chili Pepper Agribusiness Development

The integrated analysis of IFAS, EFAS, SWOT, and QSPM resulted in a conceptual model that describes the mechanism for developing a sustainable cayenne pepper agribusiness in Oba and North Oba Districts. This model was developed as a synthesis of the internal conditions of farmers, external environmental dynamics, priority strategies, and the principles of Sustainable Agribusiness. Unlike the SWOT results, which only produce alternative strategies, and the QSPM, which determines strategic priorities, this conceptual model systematically explains the relationships between components so that it can serve as an implementation framework for local governments, agricultural extension workers, farmer groups, and agribusiness actors in realizing a productive, adaptive, and sustainable cayenne pepper agribusiness system, as shown in the figure 1.

The conceptual model for sustainable cayenne pepper agribusiness development produced in this study is based on the integration of the Internal Factor Analysis Summary (IFAS), External Factor Analysis Summary (EFAS), Strengths, Weaknesses, Opportunities, Threats (SWOT), and Quantitative Strategic Planning Matrix (QSPM) analyses. This model illustrates the systematic relationship between internal

and external farming conditions and prioritized strategies capable of generating sustainable agribusiness development. This approach aligns with the Sustainable Agribusiness theory, which states that agribusiness sustainability is determined not only by increased productivity but also by the agribusiness system's ability to simultaneously integrate economic, social, institutional, and environmental dimensions. (Khaira et al. (2025) also point out that effective agribusiness development strategies must be developed through an analysis of internal and external factors before being formulated into implementable strategies with clear priorities.



Figure 6. Concept of chili pepper agribusiness development

The first stage in the model is input, namely the identification of internal factors (IFAS) and external factors (EFAS). Internal factors reflect the resource capacity of farmers, including land availability, farmer experience, the existence of farmer groups, family labor, and local government support. Meanwhile, external factors reflect the strategic environment that influences agribusiness development, such as increasing market demand, government program opportunities, developments in cultivation technology, inter-regional marketing opportunities, infrastructure conditions, price fluctuations, and climate change. From the perspective of the Resource-Based View (RBV) theory, internal factors represent a source of competitive advantage that must be optimally utilized, while external factors represent opportunities and threats that must be anticipated through adaptive strategies. Research by Anggorowati et al. (2022) indicates that the combination of these two groups of factors forms the basis for formulating an agribusiness development strategy appropriate to the regional characteristics of Tidore Islands City. This finding is consistent with research on chili agribusiness development in Boyolali and various sustainable agribusiness studies that place the identification of IFAS and EFAS as the foundation for strategy development.

The second stage is strategic analysis, which integrates SWOT analysis and QSPM. Based on the research results, the SWOT coordinates place the cayenne pepper agribusiness in Quadrant I (Growth Strategy), indicating that internal strengths can be

utilized to seize external opportunities. This position indicates that the development strategy should be aggressive by utilizing the resources that farmers already have. Furthermore, a QSPM analysis was used to determine the most feasible strategy to implement based on the Total Attractiveness Score (TAS) value, thus making the decision-making process more objective and measurable. The integration of SWOT and QSPM as used in this study has been widely recommended as a strategic approach because it can reduce subjectivity in selecting priority strategies and produce more applicable decisions in the agribusiness sector (Nurfadila et al., 2026).

The third stage is strategy implementation, which is the core of this research's conceptual model. Based on the QSPM results, the priority strategy is translated into five main programs: strengthening farmer group institutions, increasing production, adopting sustainable cultivation technologies, strengthening marketing networks, and developing partnerships and market access. These five components are interrelated and form a unified agribusiness system. Institutional strengthening serves as a driver of coordination among farmers, increasing production through the application of more efficient and environmentally friendly cultivation technologies, while marketing and partnerships serve to expand market access and improve farmers' bargaining power. This concept aligns with the theory of Sustainable Agribusiness, which emphasizes the importance of integrating production, institutional, marketing, technology, and policy subsystems in creating a resilient agribusiness system. Fadil et al. (2025) also point out that institutional strengthening and collaboration between stakeholders are key factors in enhancing the sustainability of farming businesses.

The implementation of this strategy is expected to result in increased productivity, farmer income, and the competitiveness of the cayenne pepper agribusiness. Increased productivity indicates the successful application of technology and cultivation management, while increased income is a consequence of production efficiency and expanded market access. Improved competitiveness demonstrates farmers' ability to navigate market dynamics and interregional competition. According to the Competitive Advantage theory in agribusiness, competitive advantage is built not only through cost efficiency but also through technological innovation, strong institutions, and the ability to adapt to environmental changes (Gustia et al., 2024). Recent studies have shown that increased productivity and institutional strengthening significantly contribute to the competitiveness of horticultural commodities, including chili peppers cabai (Sapriyadi et al., 2025).

The final stage of the model is the outcome, namely the realization of a sustainable cayenne pepper agribusiness encompassing economic, social, and environmental sustainability. Economic sustainability is realized through increased income and farming efficiency, social sustainability through institutional strengthening and collaboration between stakeholders, and environmental sustainability through the application of environmentally friendly cultivation technologies and adaptation to climate change. Thus, the resulting conceptual model not only explains the relationships between research variables but also offers an implementation framework that can be used as a reference by local governments, agricultural extension workers, and farmer groups in formulating policies for cayenne pepper development. The main contribution of this research lies in the integration of IFAS-EFAS, SWOT, and QSPM into a single conceptual model that generates priority strategies and guides implementation toward a sustainable cayenne pepper agribusiness system. These findings reinforce recent literature that emphasizes that agribusiness success depends on the synergy between internal capacity, the external environment, measurable strategies, and consistent implementation (Arbian et al., 2026).

Relationship between components in the Sustainable Cayenne Pepper Agribusiness Development Model

The sustainable cayenne pepper agribusiness development model developed in this study demonstrates that each component is interconnected and influences each other, forming an integrated system. This interconnectedness begins with internal and external factors as the basis for strategy development, followed by the implementation of priority strategies, ultimately resulting in a sustainable cayenne pepper agribusiness. The interconnectedness of these components is based on a synthesis of the results of IFAS, EFAS, SWOT, and QSPM analyses, and is supported by the Sustainable Agribusiness theory, which positions sustainability as the result of synergy between internal resources, the external environment, strategy, and effective implementation (Ernita et al., 2024).

The IFAS analysis indicates that the primary strengths of the cayenne pepper agribusiness in Oba and North Oba Districts stem from the availability of productive land, farmer experience, the existence of farmer groups, family labor, and local government support. Conversely, limited capital, low technology adoption, weak post-harvest management, and limited access to market information are inhibiting factors that must be addressed through development strategies. These conditions demonstrate that the strategy must leverage all existing strengths while gradually

mitigating internal weaknesses. From a Resource-Based View (RBV) perspective, internal resources are strategic assets that can create competitive advantage if managed effectively (Aisyah et al., 2022). Therefore, the strategy developed in this study is aimed at strengthening farmer capacity through institutional development, improving cultivation competencies, and utilizing local resources as the primary capital for agribusiness development. This finding aligns with research by Rasmikayati et al. (2026), which states that the quality of internal resources is a key determinant of the success of horticultural agribusiness development strategies, particularly in island regions with limited access to markets and technology.

In addition to being influenced by internal conditions, development strategies are also shaped by external factors originating from the business environment. The EFAS analysis results indicate that increasing market demand, government program support, developments in cultivation technology, and interregional marketing opportunities represent strategic opportunities that need to be optimally utilized. Conversely, price fluctuations, climate change, attacks by plant pests, and limited distribution of production inputs are threats that must be anticipated in strategy development.

According to Contingency Strategy theory, agribusiness organizations or systems must be able to adapt their strategies to changes in the external environment to maintain performance and competitiveness (Alpatova et al., 2021). Therefore, the strategies formulated in this study are not only oriented towards increasing production, but also towards strengthening marketing networks, developing partnerships, implementing adaptive technology, and enhancing institutional capacity as a means of adapting to the dynamics of the business environment. These results support research by Harahap et al. (2025), which showed that agribusiness strategies that adapt to market and climate changes have a higher success rate in maintaining the sustainability of horticultural farming businesses.

The strategies prioritized through QSPM analysis were then translated into operational implementation programs. This study yielded five priority strategies: strengthening farmer group institutions, increasing production, adopting sustainable cultivation technologies, strengthening marketing, and developing partnerships and market access. These five strategies are not standalone but mutually supportive in forming a more efficient and competitive agribusiness system.

In Strategic Management theory, a strategy will only produce change if it is translated into measurable implementation through programs, activities, and collaboration between stakeholders (Suhaedi, 2024). Therefore, the success of cayenne pepper agribusiness

development depends not only on the accuracy of the strategy formulation, but also on the ability of local governments, agricultural extension workers, farmer groups, and business actors to consistently implement the strategy. Harudin (2025) also emphasized that implementing a strategy based on multi-stakeholder collaboration can increase the effectiveness of agribusiness development while accelerating the adoption of technological innovation in the horticultural sector.

Strategy implementation results in increased productivity, farmer income, and the competitiveness of the cayenne pepper agribusiness. These three outputs then become prerequisites for achieving a sustainable cayenne pepper agribusiness. In the developed model, sustainability is viewed as the integration of three main dimensions: economic, social, and environmental sustainability. The economic dimension is reflected in increased income and farming efficiency, the social dimension is realized through strengthening farmer institutions and partnerships, and the environmental dimension is achieved through the application of environmentally friendly cultivation technologies and adaptation to climate change.

This relationship aligns with the theory of Sustainable Agribusiness, which asserts that the success of agribusiness development is measured not only by increased production but also by the agribusiness system's ability to create a balance between economic growth, community welfare, and long-term environmental sustainability (Normasyhuri et al., 2025). Research conducted by Humaidi et al. (2026) also shows that institutional integration, technological innovation, market access, and natural resource management are key factors in building a resilient and sustainable agribusiness system.

Based on the relationships between these components, the model developed in this study forms a logical flow: internal and external factors influence strategy formulation, the strategy is translated into priority program implementation, and this implementation results in a sustainable cayenne pepper agribusiness. This systemic relationship is the study's primary conceptual contribution, integrating the results of the SWOT and QSPM analyses into an agribusiness development framework that can be applied as a basis for formulating policies and programs for cayenne pepper development in the archipelago, particularly North Maluku Province.

Conclusion

This study shows that the development of the cayenne pepper agribusiness in Oba and North Oba Districts, Tidore Islands City, has good prospects for

sustainable development. The IFAS analysis indicates that strengths outweigh weaknesses, while the EFAS analysis indicates that external opportunities outweigh threats. This position places the cayenne pepper agribusiness in Quadrant I (Growth Strategy), indicating that development strategies should be directed at utilizing internal strengths to optimally capture external opportunities. Based on the SWOT and QSPM analyses, recommended priority strategies include strengthening farmer group institutions, increasing production capacity, implementing sustainable cultivation technologies, strengthening marketing networks, and developing partnerships and market access. These strategies were selected because they have the highest level of attractiveness in supporting increased productivity, farmer income, and the competitiveness of the cayenne pepper agribusiness, while also enhancing farmers' ability to cope with market dynamics and climate change. The main contribution of this research is the development of a Sustainable Chili Pepper Agribusiness Development Model that integrates IFAS, EFAS, SWOT, and QSPM analyses into a single conceptual framework that systematically connects internal and external conditions with priority strategies and their implementation. This model provides a more comprehensive approach than previous studies that generally stop at strategy formulation, because it is able to explain the relationship between strategic factors, program implementation, and the achievement of agribusiness sustainability. Therefore, this model has the potential to be a reference in the formulation of policies and programs for chili pepper development in the archipelago and other regions with similar characteristics, while also supporting the achievement of the Sustainable Development Goals (SDGs), especially SDG 2 (Zero Hunger), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action) through strengthening productivity, farmer institutions, marketing efficiency, and the implementation of sustainable agribusiness practices.

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