NON-TIMBER FOREST PRODUCTS DEVELOPMENT: A SMALL BUSINESS STRATEGY OF WALNUT

PRATIWI RINI, MAKKARENNU* AND RIDWAN

Department of Forestry, Hasanuddin University, 90245 Makassar, South Sulawesi, Indonesia.

*Corresponding author: makkarennu@unhas.ac.id

Abstract: The management of Non-Timber Forest Products (NTFPs) holds significant benefits for forest-adjacent communities, including the potential for commercial ventures such as the walnut enterprise. This study aims to examine the walnut business in Onto Village, Bontomatene District, Selayar Islands Regency, Indonesia, analyse internal and external factors, and formulate a development strategy for the walnut business. This study employs SWOT analysis and the Analytic Hierarchy Process. The findings suggest that the walnut industry has the potential to be a profitable venture and a standout product in the region. Internal factor analysis indicates that the the availability of labour is the most significant strength (0.021) in the walnut business, while insufficient accessibility of commodity sources represents the most notable weakness (0.085). On the external front, a promising farming business emerges as the highest priority opportunity (0.146), whereas the absence of a walnut business development program poses the most significant threat (0.235). The prioritised strategy for implementation is the W-T2 strategy, with a value of 0.75, focusing on enhancing community and government cooperation to improve infrastructure, particularly roads leading to walnut fields.

Keywords: Walnut, SWOT analysis, IFAS, EFAS, AHP.
Abbreviations: Non-Timber Forest Products (NTFPs), Internal Factors Analysis Summary (IFAS), External Factors Analysis Summary (EFAS), Strength Weakness Opportunity Threat (SWOT), Analytical Hierarchy Process (AHP), Consistency Index (CI), Consistency Ratio (CR), Random Index (RI).

Introduction

Non-Timber Forest Products (NTFPs) are utilised by the majority of forest inhabitants (Lamichhane *et al*., 2021). Forest sustainability is maintained through the management of NTFPs as it is not only economically advantageous but also does not impact surrounding forest areas (Caspa *et al*., 2020). One of the NTFPs commodities handled by the community is walnuts. Walnuts are native Indonesian plants that thrive in great numbers in eastern Indonesian provinces like Sulawesi, Maluku, and North Maluku. Fresh walnuts contain 25% water, 8.2% protein, and 43.5% fat, while dried walnuts have a higher fat content at 71.3%. Additionally, walnut kernels are rich in nutrients such as vitamin E and antioxidants, making them a valuable food product (Rebufa *et al*., 2022). Walnut seeds also contain carotenoids, tocopherols, and phenolic components like as phenolic acids, tannins, and flavonoids (Jahanban *et al*., 2019).

Walnut leaves, along with the seeds, possess medicinal benefits due to their estrogen-like substances. Unlike walnut seeds, walnut leaves lack alkaloids and steroids but contain flavonoids, polyphenols, tannins, and saponins (Authier *et al*., 2022). Additionally, walnut shells serve as solid fuel and can be used as an alternative to coal and kerosene briquettes. They are considered cost-effective and can be produced in large quantities using readily available technology and basic equipment (Xie *et al*., 2021).

The study's business definition encompasses both walnut production and marketing. The

burgeoning walnut industry offers significant economic benefits to those involved in tree management and has the potential to drive economic growth, particularly in Onto Village, Bontomatene District, Selayar Islands Regency. Due to its promising prospects, many residents in this community engage in walnut cultivation and trade to fulfil their daily needs. According to data from the Department of Agriculture (2022), the Selayar Islands Regency collectively produced 273.19 tonnes of walnuts, with 29.24 tonnes originating from the Bontomatene District, which spans 41 hectares of land.

This research is motivated by the limitations of conventional walnut production methods, which lack modern technology to enhance productivity. Currently, walnut marking is primarily focused on unprocessed walnuts, with little product diversification and a simplistic business model in place. In light of these challenges, this study aims to develop walnut business strategies that will broaden the marketing scope and increase economic value for walnut farmers. The strategy formulation process will employ SWOT analysis and AHP methods.

Indonesia has established a variety of business growth strategies, particularly for forest goods, in response to the fluctuating nature of business development, necessitating the need for strategies to revitalise operations (Suwanmaneepong *et al*., 2018). The SWOT-AHP method is among the techniques developed to identify priority strategies (Tambunan, 2020). The SWOT approach involves analysing internal (strengths and weaknesses) and external (opportunities and threats) factors impacting a firm (Benzaghta *et al*., 2021). AHP is then employed to prioritise business growth plans (Goepel, 2018). The NTFPs industry is one of the sectors that requires strategic growth planning to thrive in the market.

The strategy for NTFPs development aims to achieve several key objectives: Reducing reliance on timber forest products, increasing forest community income from NTFPs, raising public awareness of forest areas, enhancing foreign exchange in the non-timber forestry sector, and generating new jobs in the forestry sector through non-timber commodities (Shrestha *et al*., 2020). The utilisation of NTFPs as alternative food sources, pharmaceutical compounds, fibre producers, and sap producers can contribute to both local and global economies (Thammanu *et al*., 2021). Following the principle of "forest for the people", the utilisation and management of NTFPs are intended to empower local communities (Chou, 2019). To ensure sustainable forest exploitation, the empowerment process must consider both economic and ecological aspects (Baral *et al*., 2018). The government's role should be that of a facilitator or supporter of development initiatives, with the community serving as the primary executor of NTFPs projects (Nguyen *et al*., 2020).

Materials and Methods

Selayar Islands Regency, South Sulawesi Province, Indonesia, was selected as the research site due to its status as one of the leading walnut-producing regions, yielding 273.19 tonnes annually, according to the Selayar Islands Regency Plantation Office (2022). The region's significant walnut production presents a prime opportunity for income growth, underscoring the need for the implementation of an effective marketing strategy.

Walnut, a native Indonesian plant, is extensively consumed as food. Belonging to the Burseraceae family, walnut trees are large, reaching heights of up to 40 metres, with canopy diameters of 30 metres and a trunk diameter ranging from 1 and 1.5 metres. They flourish in both lowland and highland areas of subtropical and tropical regions, thriving in temperatures between 25°C and 28°C and altitudes ranging from sea level to 600 metres. The fruit, oval to oblong in shape, measures 3 to 8 centimetres in length and 2 to 4 centimetres in width, initially green when unripe and transitioning to dark green and black upon maturation. While the seeds are white, the exterior of the fruit exhibits a brown hue.

Internal and External Factor Analyses Method

Combining internal and external factors that influence a company's development through SWOT analysis, internal factor analysis (IFAS) and external factor analysis (EFAS) matrices are essential analytical tools used in assessing a company's position (Rupom, 2020). This strategic approach aids in selecting the most suitable implementation plan (Dhari, 2020). SWOT analysis evaluates an organisation's strengths (S), weaknesses (W), opportunities (O), and threats (T), providing a comprehensive overview that can enhance strengths and opportunities while mitigating weaknesses and threats (Jonibek, 2021). It is a valuable and efficient analysis method, offering quick and accurate insights into recent corporate advancements (Pesce *et al*., 2018). Employing SWOT analysis enables the determination of optimal marketing strategies and serves as a guide for identifying opportunities to capture market share and rectify previous shortcomings (Vlados, 2019).

The company's strategic considerations are organised using the SWOT matrix as a tool. This matrix allows for a clear delineation of external opportunities, risks, as well as corporate strengths and weaknesses (Baldissera *et al*., 2023). From the insights provided by the SWOT matrix, various company development strategies, including SO, WO, ST, and WT strategies, can be derived (Gepner *et al*., 2022).

Analytical Hierarchy Process (AHP) Method

In order to explain assessment factors and weight factors under multi-factor situations, AHP uses pairwise comparisons (Dos *et al*., 2019). The consistency value is split into two pieces in the AHP approach, called the Consistency Index (CI) and Consistency Ratio (CR) sections. The CI value is determined by subtracting the number of criteria from the highest lambda and dividing the result by the decreased number of criteria. The CI calculation formula is as follows:

$$CI = \frac{\lambda \max - n}{n - 1}$$

The limit of inconsistency established by Saaty is the CR, which is calculated by comparing the values of the Random Index (RI) and CI, both of which are presented in Table 8. The matrix n's order affects this value. As a result, CR can be expressed as follows:

$$CR = CI/RI$$

where CR is the Consistency Ratio, CI is the Consistency Index, and RI is the random index

Table of RI values

N	1	2	3	4	5	6	7	8	9	10
R.I	0	0	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49

Results and Discussion

Internal Factor Analysis of the Walnut Business

Internal factors are the originating aspects that have an impact on how a firm develops its business, encompassing both its strengths and weaknesses. Table 1 lists the seven internal factors identified as influencing group cohesiveness.

External Factors Analysis of the Walnut Business

External influences stem from other businesses or organisations and may impact the growth of a business. In Table 2, factors labelled as opportunity and threat are presented under "External Factors".

Table 1: The average value of internal factor scoring

Code	Indicator	Statement	Average	Ratings
S	S1	High potential for plant growth	4.17	2
	S2	Contribution to high income	4.04	3
	S3	Walnut, including superior commodity area	3.21	5
	S4	High walnut prices	3.29	4
	S5	Long-term crop viability	4.50	1
	S6	Simple production if methods	2.50	6
	S7	Availability of labour	3.21	5
W	W1	Packaging not implemented	3.83	2
	W2	Absence of farmers	3.50	4
	W3	Inadequate mastery of cultivation techniques	4.46	1
	W4	Limited marketing involvement with the public and collectors	3.25	5
	W5	Lack of product diversification	3.25	5
	W6	Continued use of traditional tools	3.25	5
	W7	Poor accessibility	3.54	3

Table 2: The average value of external factor scoring

Code	Indicator	Statement	Average	Ratings
O	O1	Marketing initiatives span local and national scope	4.04	3
	O2	High demand	4.58	1
	O3	Direct marketing efforts and online media presence	3.88	4
	O4	High domestic trade value	4.17	2
	O5	Beneficial farm	2.75	5
T	T1	Lack of cooperation between industry and farmers	3.63	4
	T2	Limited market information	3.92	2
	T3	Low interest in productive labour	4.04	1
	T4	Insufficient support from related institutions or agencies	3.08	5
	T5	No business development programmes	3.83	3

Strength

Strength is crucial for a company to ensure the continuity of its business operations and achieve positive outcomes (Phadermrod *et al*., 2019). As depicted in Figure 1, among the seven elements, the factor with the highest strength is S7, "Availability of labour" (0.21). Conversely, the factor with the lowest strength is S2, associated with the statement "Contribution to high income" (value 0.08).

Weakness

Internal business conditions encompass weaknesses that may lead to failures in achieving business objectives (Quezada *et al.,* 2019). As depicted in Figure 2, the factor weakness comprises seven elements, and the computation results indicate that factor W7 (Weak accessibility) attains the highest score of 0.22 among them. Conversely, factor W1 (Not yet packaged) garners the lowest score of 0.08. Consequently, factor W7's impact is notably
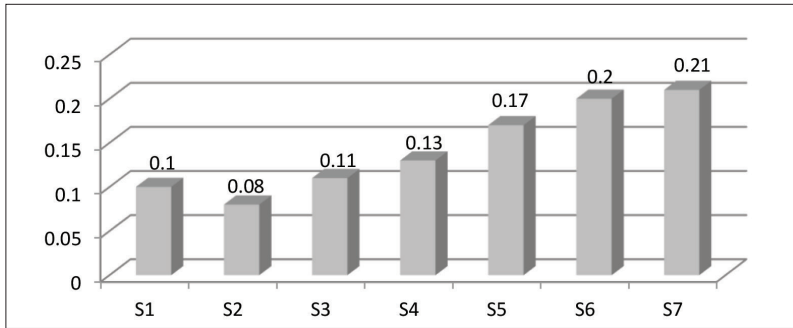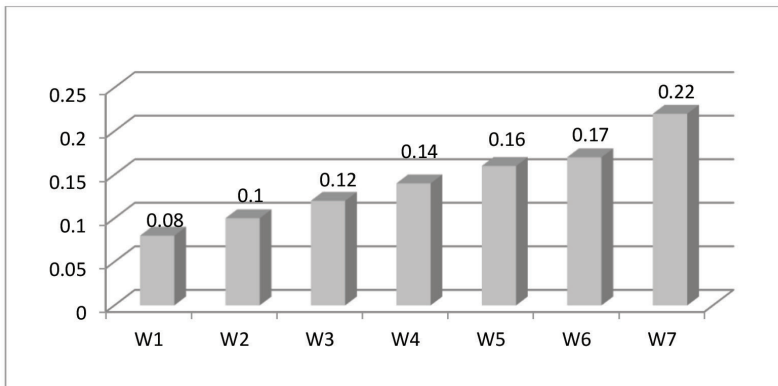
Figure 1: The average values of the strength factor

Figure 2: Average values of the weakness factor

lesser compared to factors W1, W2, W3, W4, W5, and W6.

Opportunity

Opportunity is a component of the environment beyond which a company can develop into a capable direct action company as well as a factor pusher (Namugenyi *et al*., 2019). There are five essential components to the business walnut, as shown in Figure 3. The findings indicate that O5, which stands for a prospective farmer and has a value of 0.41, is the opportunity component with the highest grade. The opportunity factor O2 scored the lowest, with a value of 0.13 (High demand). In conclusion, compared to O1, O2, O3, O4, and O6, the factor of larger O5 opportunity is greater.
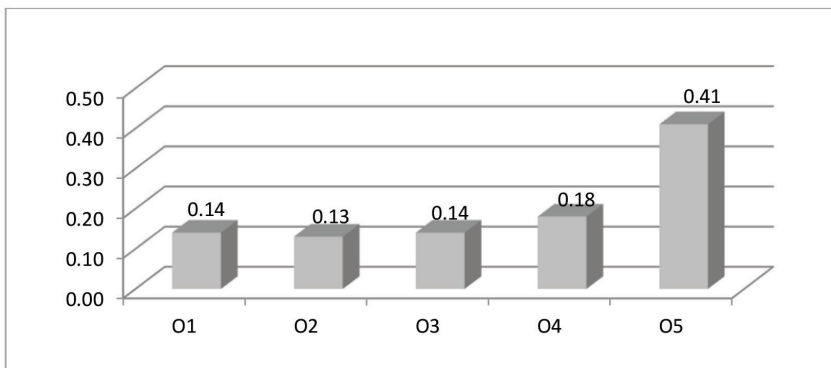

Figure 3: Average values of the opportunity factor

Threats

Threats encompass environmental variables capable of hindering the expansion of a moderately managed business (Bratko *et al*., 2019). T5 (No business development programme) garners the highest rating for the threat factor, with a value of 0.33. Meanwhile, T2 (Limited market information) represents the factor posing the least threat, scoring a value of 0.10 (Figure 4). Thus, based on these metrics, it can be inferred that, among factors such as T1, T2, T3, T4, and T5, T5 presents a greater propensity to pose a threat to commercial interests. The fourth SWOT category, identified as having the highest importance among each factor's strengths, weaknesses, opportunities and threats, is presented above. Additionally, the SWOT group is systematically analysed to ascertain the most critical element

Priority Strategy Walnut Business Development

The selection of a priority strategy is crucial in executing a strategic plan as it affects the productivity increase of the company's core commercial products. When formulating a business plan for walnuts, both internal and external factors must be considered. Walnut farmers must also take into account a number of other factors that can contribute to the success of their chosen business model. The roles of governments and agencies in boosting walnut productivity, along with potential alternative potential marketing channels for market expansion, are all essential considerations in operational strategy (Ben *et al*., 2019).

The formulated strategy options encompass several strategies:

SO strategy:

1. Utilise the available labour in walnut management so that the farm can be utilised to cover daily expenses.

2. Increase walnut production in light of the simplicity of the production process and the high price of walnuts.

3. Utilising walnuts as a source of income through extensive direct and social media marketing.

WO strategy:

1. Optimising the management of walnuts as a product so that they are not only sold raw so as to increase revenue.

2. Enhance farmers knowledge of effective and efficient management techniques and provide them with modern technology to boost productivity.

3. Improve the forest's accessibility so that it can be reached to support the production process.

ST strategy:

1. Utilise simple production processes to support the development of the walnut enterprise.
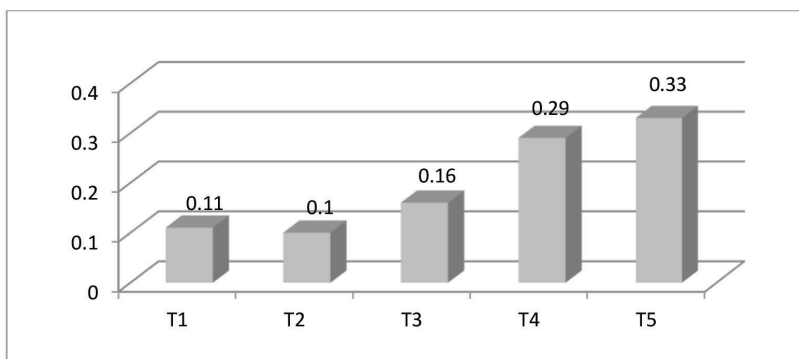

Figure 4: Average values of the threat factor

2. Utilise the high cost of walnuts by expanding the marketing network to facilitate exports.

WT strategy:

1. Encourage the development of walnut enterprises utilising modern and suitable technology/equipment.

2. Obtain government assistance in enhancing infrastructure, particularly roads leading to farmers' fields.

The results analysis and highest count from the overall formula approach with the greatest priority are as follows: The first strategy is W-T2 with a value of 0.75 (government support for improvements to infrastructure, especially roads to farmers' land); the second is S-T2 with a value of 0.55 (using high prices for walnuts to draw attention to organisations or institutions involved in expanding marketing); and, the third is W-O3 with a value of 0.50 (fixing accessibility or roads going to the commodity source). The results of the highest-mark priority strategy for the development of the walnut business (Figure 5) lead to the conclusion that W-T2 is the most significant strategy.

Conclusions

The description of the community-run walnut business in Onto Village, Bontomatene District, Selayar Islands Regency highlights walnut NTFPs as a promising business with the potential for superior product development in the region. This assessment covers various aspects including biophysical and environmental, economic, social, institutional, and technological factors Among the internal components, available labour, with a score of 0.021, stands out as the most influential strength contributing to the growth of the walnut firm. Weak accessibility, with a score of 0.085, is categorised as a weakness. In the opportunity group, external elements like beneficial farms, with a value of 0.146, are prioritised. On the other hand, in the threat category, the absence of a business development program (0.235) poses significant challenges. The W-T2 strategy (government support for improvements to infrastructure, especially roads to farmer's land) emerges as the priority strategy for developing the walnut business, with the highest score of 0.75.
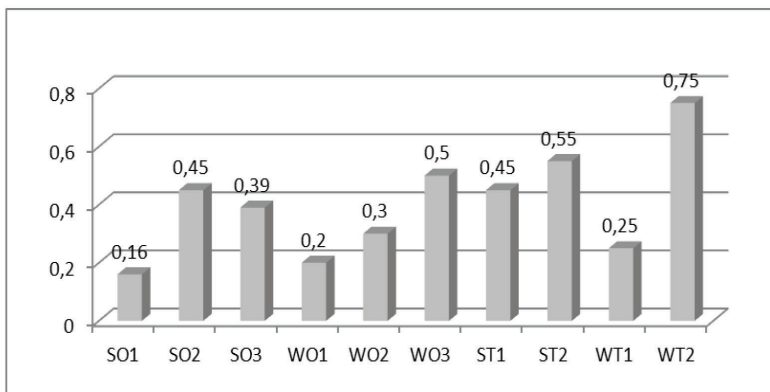
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Figure 5: Priority strategies for walnut business development

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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