DEVELOPMENT STRATEGY FOR A SUSTAINABLE PALM SUGAR COOPERATIVE BUSINESS MODEL IN SUKABUMI REGENCY

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Article history:

Received
2 December 2024

Revised
19 June 2025

Accepted
9 July 2025

Available online
31 July 2025

Abstract

Background: The Binekas Cooperative, a palm sugar producer cooperative in the Sukabumi Regency, faces an increasing demand for sustainable products that require enhanced economic, environmental, and social performance.
Purpose: This study aims to identify cooperative and smallholder profiles, existing business models, and internal and external factors, and formulate strategies for developing a sustainable cooperative business model.
Design/methodology/approach: Data were collected through interviews, questionnaires, and literature reviews, from May to August 2024. Analytical methods include situational analysis, Circular Business Model Canvas (CBMC), SOAR analysis (Strengths, Opportunities, Aspirations, and Results), IFAS-EFAS, and Analytic Hierarchy Process (AHP).
Findings/Result: The study found that the Binekas Cooperative has a simple organizational structure with strong community roots. Internal and external factors were mapped using CBMC and SOAR to generate four strategic options: expansion of capital access, green productivity optimization, business process standardization, and product diversification through digitalization. Using AHP, the top strategic priority identified was expanding access to capital through inclusive partnerships with member farmers.
Conclusion: The cooperative's priority strategy is to expand capital access by strengthening inclusive partnerships with smallholders, who play a key role in governance, and developing a strong, dynamic organizational structure.
Originality/value (State of the art): This study shows that the CBMC framework can encourage cooperatives to be adaptive by involving stakeholders under sustainability principles, strengthening governance, enhancing economic activities through social capital within communities, and promoting environmentally friendly production processes.

Keywords: AHP, CBMC, Cooperative, Palm Sugar, SOAR

How to cite:
Yusri, A., Sarma, M., & Rahardja, S. (2025). Development strategy for a sustainable palm sugar cooperative business model in Sukabumi Regency. Jurnal Manajemen & Agribisnis, 22(2), 248. https://doi.org/10.17358/jma.22.2.248

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INTRODUCTION

Indonesia is an agricultural country with diverse natural resources that has the potential to be developed as a national food commodity. According to Law No. 18/2012, the national food system places food sovereignty and independence as the foundations for implementing national food development. Food policies and systems are determined to ensure the fulfillment of the right to food by prioritizing the potential of local resources. In addition, the Ministry of Agriculture (2020), through the Food Security Agency's 2020–2024 policy, aims to stabilize food availability, affordability, and utilization, with a particular focus on promoting and accelerating the consumption of locally based foods, such as sugar palm (Arenga pinnata).

Sugar palm as an NTFP in Indonesia has promising business prospects owing to its economic value as a traded commodity. Regarding local demand, the largest demand for palm sugar comes from the food and beverage industry, which is spread around Tangerang, Jakarta, and Lampung (BI and CS, 2023). As for export demand, it was recorded that the export value of palm sugar to various importing countries showed an increasing trend from 53.5 million USD in 2019 to 81.2 million USD in 2021 (Ministry of Trade, 2022). Therefore, palm sugar is a promising export commodity. The sugar palm tree (Arenga pinnata Merr.) are widely distributed in 29 Indonesian provinces, including Papua, Maluku, North Maluku, North Sumatra, West Sumatra, West Java, Central Java, Banten, North Sulawesi, South Sulawesi, Southeast Sulawesi, Bengkulu, South Kalimantan, and Aceh, covering a total area of approximately 63,244 ha. With a production of 106,486 tons/year. West Java Province has the largest palm sugar distribution area in Java, with an area of approximately 15,020 ha and a production of 62,940 tons/year (Kementan, 2021). Sukabumi District is a major palm sugar–producing area, with Cisolok District standing out as one of its centers of high-quality production. Part of Cisolok's administrative area also falls within the management of Mount Halimun Salak National Park (TNGHS).

Cooperatives are one of the formal institutions that play the role of the main pillar in the economic system and are expected to play an active role in realizing the welfare and prosperity of the people (Sugiyanto 2022), in line with the 2020-2024 RPJMN on increasing economic added value through strengthening entrepreneurship, MSMEs, and cooperatives. In addition, as cooperatives are social institutions, social capital becomes very important by involving networks, norms, relationships, and social trust, which shapes the quantity and quality of a community's social interactions (World Bank, 2003).

The Binekas Cooperative (Pembinaan Ekonomi Kasepuhan) was selected as the focus of this study because of its unique position as a palm sugar producing cooperative rooted in a traditional community (kasepuhan) in the Cisolok Subdistrict, Sukabumi Regency, West Java. This cooperative fulfilled essential legal and food safety requirements and currently engages 121 farmers in semi-structured production activities. Despite its legal recognition, Binekas still operates with relatively simple institutional management, limited human resource capacity, inadequate farmer coaching, and suboptimal business scale (currently producing 12–15 tons per month, which is below the market potential of 20 tons per month). Participation among members remains low and challenges persist in financing and market linkages.

These issues occur in the context of the rapidly increasing domestic and global demand for sustainable palm sugar. West Java, with 15,020 ha of palm sugar-producing land and 62,940 tons of annual production (Kementan, 2021), is the leading producer in Indonesia. Cisolok itself is recognized as a center of high-quality palm sugar, with several production areas located within the conservation-managed Gunung Halimun Salak National Park (BTNGHS), where palm sap is sustainably harvested by indigenous farmers. Nationally, palm sugar exports grew from USD 53.5 million in 2019 to USD 81.2 million in 2021 (Kemendag, 2022), with strong future growth projections.

Previous studies on cooperative development in Indonesia have primarily focused on improving operational efficiency, financial governance, and member participation. For instance, Nurrochmat et al. (2020) emphasized the importance of cooperative institutional strengthening in enhancing business performance, while Hidayat (2023) explored the digital transformation potential in modern cooperatives. However, these studies often adopt linear business model perspectives and overlook the integration of sustainability dimensions, including economic, social, and environmental aspects. This is particularly evident in cooperatives that operate in indigenous and

ecologically sensitive contexts. Moreover, the use of strategic planning tools tends to center on traditional SWOT-based analysis, which highlights problems, but lacks the proactive and asset-based approaches needed in community-driven enterprises.

This study addresses this gap by introducing a novel analytical integration consisting of the Circular Business Model Canvas (CBMC), SOAR analysis, and Analytic Hierarchy Process (AHP). While CBMC has been applied to small and medium enterprises to explore circular economic adoption (Lewandowski, 2016; Fadhillah and Fahreza, 2023), its implementation in traditional or rural cooperative settings remains limited. Similarly, SOAR analysis has been recognized in the organizational development literature, but has not been widely used as a tool for rural cooperative transformation. The addition of AHP enhances the decision-making process by quantifying expert judgments to prioritize strategies based on impact and feasibility. Therefore, this study offers a structured and replicable model for advancing sustainability-oriented cooperative transformation, particularly in under-researched contexts, such as indigenous forest-based commodity cooperatives.

This study adopts a multi-framework approach to problem solving that combines qualitative and quantitative methods to ensure comprehensive and context-relevant analysis. The first step involved data collection through field observations, structured interviews, and questionnaires administered to cooperative leaders, farmer members, and market stakeholders. This was complemented by a self-assessment instrument based on cooperative modernization indicators provided by the Ministry of Cooperatives, and further enriched by expert consultations from professionals in agribusiness, sustainability, and policy.

The second step uses the Circular Business Model Canvas (CBMC) to assess the current business structure of the Binekas Cooperative by integrating sustainability principles such as resource efficiency, product lifecycle management, and stakeholder engagement. The third step applies SOAR analysis (Strengths, Opportunities, Aspirations, and Results) to reframe challenges into forward-looking strategies based on existing internal assets and future goals, in contrast to problem-centric models such as SWOT. Finally, the study employs the Analytic Hierarchy Process (AHP) to determine the most feasible and impactful strategy through structured expert judgment, enabling the prioritization of alternatives based on consistency and strategic alignment. This layered analytical process ensures that the proposed interventions are not only data-driven, but also aligned with both local needs and long-term sustainability objectives.

The objectives of this study were to identify the profile of the Binekas Cooperative and the palm sugar trade system involving the cooperative, assess the existing cooperative business model and its internal and external influencing factors, analyze strategic options for development, and determine a priority strategy for building a sustainable, modern cooperative model. Scientifically, this study contributes to cooperative transformation and sustainable agribusiness by applying a multi-framework strategic model combining the Circular Business Model Canvas (CBMC), SOAR analysis, and Analytic Hierarchy Process (AHP). Given this opportunity, the Binekas Cooperative is expected to modernize its business management and operations to meet market demands for responsible production and consumption, act as a local aggregator for Cisolok's palm sugar production, and increase the economic value generated by both its members and prospective smallholders.

METHODS

This study utilizes both primary and secondary data to build a comprehensive understanding of the Binekas Cooperative and its affiliated farmer groups in three villages: Cicadas Village, Sirnaresmi Village, and Gunung Keramat Village, located in Cisolok Sub-district, Sukabumi Regency, West Java. Primary data were collected through direct field observations and structured interviews using questionnaire guides, self-assessment instruments, and in-depth expert consultations. Respondents included key stakeholders such as the Cooperative Chairman, Farmer Group leaders, 35 selected farmer members (as palm sugar suppliers), and off-takers. Additionally, seven experts from relevant fields (cooperative development, agribusiness, policy, and sustainability) were involved in supporting the formulation and prioritization of strategic recommendations. Secondary data were obtained through a literature review and document analysis of internal cooperative records and publicly available sources (government reports, previous studies, and regulations).

Data collection was conducted using a combination of field-based observations, structured interviews, questionnaires, self-assessment tools, and expert consultations to ensure a comprehensive coverage of the cooperative's operational and institutional dynamics. Field observations were used to capture real-time practices in palm sugar production and organizational processes. Structured interviews and questionnaires were administered to cooperative leaders, farmer group representatives, selected member farmers, and off-takers to gather quantitative and qualitative information about governance, production, marketing, and participation. A self-assessment instrument based on cooperative modernization indicators from the Ministry of Cooperatives was used to evaluate institutional performance. Additionally, expert consultations involving professionals from the agribusiness, policy, and sustainability fields were conducted to validate the findings and support the strategic analysis. These combined techniques provide a robust foundation for analyzing the current condition and transformation potential of the Binekas Cooperative.

This study applies a multi-framework analytical approach that combines descriptive analysis, strategic planning tools, and structured decision-making models to ensure thorough and actionable evaluation. Descriptive analysis was used to summarize baseline information on the cooperative's institutional profile, member characteristics, and production system. Situational analysis helps contextualize internal and external challenges. The Circular Business Model Canvas (CBMC) is applied to assess the sustainability of the cooperative's business model by examining value creation, stakeholder roles, and resource efficiency. SOAR analysis is used to frame strategic options by identifying strengths, opportunities, aspirations, and expected results, focusing on positive potential, rather than problem-based narratives. Internal and external factors were scored using IFAS and EFAS matrices to prioritize key development areas. Finally, the Analytic Hierarchy Process (AHP) is employed to rank strategic alternatives based on expert pairwise comparisons, enabling the selection of the most feasible and impactful strategy. This integrated method supports data-driven, participatory, and sustainability-oriented decision-making.

The framework of this study is organized to follow a clear, structured flow, from identifying real-world problems to generating actionable strategic solutions. It begins by defining the core challenges faced by the Binekas Cooperative, which include institutional weaknesses, limited capital access, low participation among members, and untapped production capacity. These issues are positioned within the broader context of national cooperative reform priorities, increasing demand for sustainable agricultural products, and ecological sensitivity of the cooperative's operating area. To systematically assess these challenges, the Circular Business Model canvas is used as a diagnostic tool to evaluate how the cooperative creates, delivers, and captures value across sustainability dimensions. Building on this assessment, SOAR analysis is applied to design strategic alternatives by identifying internal strengths, external opportunities, shared aspirations, and measurable outcomes, using a positive framing approach that emphasizes potential rather than limitations. The final step involves prioritizing strategic options using Analytic Hierarchy Process, which structures expert input through pairwise comparisons and consistency-based scoring. This framework ensures that the study moves logically from empirical realities to a set of ranked stakeholder-validated strategies grounded in sustainability, inclusiveness, and relevance to the local context.

RESULTS

Cooperative and Farmer Member Profiles

The Binekas Cooperative is a legal and licensed palm sugar producer cooperative with an organizational structure consisting of three farmer groups located in Sinar Resmi Village, Cicadas Village, and Gunung Karamat Village, which are administrative areas within the Cisolok Subdistrict of Sukabumi Regency. The cooperative has 121 members and a production capacity of approximately 20 tons per month (equivalent to 600–650 kg per day or 4–5 tons per week), with marketing channels primarily directed toward local food companies and distributors. These villages also serve as the residential base of the *Kasepuhan* community, which is an indigenous society governed by traditional informal leadership structures. *Kasepuhan* farmers, who maintain strong cultural ties with their ancestral lands, utilize natural resources in a sustainable manner, particularly in forest areas located within or adjacent to Mount Halimun Salak National Park (TNGHS). Farmers' characteristics included age, education level, livelihood, income level, and the number of palm trees

owned. Based on age, 95% of the cooperative members were over 50 years of age. Regarding educational level, 86% of the respondents went to elementary school, 9% did not finish school, and 6% went to junior high school. Based on the income level, 43% are in the range of 1 - 1.5 million per month, followed by 29% in the range of 1.5 - 2 million per month, and the remaining 28% are above 2 million per month. Generally, land ownership in the Kasepuhan community is in the form of communal land, so every member of the community has the right to control and manage the land (Noviantri, 2011). The rules of palm tree ownership are based on the ownership of the land on which the palm trees grow. Ownership of a palm tree can only be transferred by selling the tree to another party. If the owner of the tree does not have the expertise to tap the sugar palm, the owner can give the right to tap the sugar palm to another party through a profit sharing system.

Overall, the palm sugar business scheme involving the Binekas Cooperative and its members can be described as the role of each trade system actor, as follows:

1. Farmers/tappers, farmers at the Hamlet/Village level who provide palm sap
2. Rural microenterprise, a family of farmers/tappers at the hamlet/village level who cook palm sap and produce palm sugar as raw material for palm sugar
3. Agents in the form of individuals or Farmer Groups at the Village level. In the Binekas Cooperative, Farmer Groups act as agents that also ensure the quality and quantity ofpalm sugar produced.
4. Ant sugar processing SMEs, namely the cooperative and several other SMEs, are in the form of CVs or individuals at the village and sub-district levels.
5. Markets, namely food companies, liquid palm sugar processors, and food distributors.

Internal and External Factors Analysis Faced by Cooperative

Self-assessment

Cooperative Assessment aims to measure the level of modernity of cooperatives based on five factors: institutional, business/production, marketing, finance, and digitization (Kemenkop UKM, 2023). Based on the gap analysis results, Binekas Cooperative has a total score of 50.41 in the category of "Less Modern" Cooperative. The biggest gaps are in market indicators, digitalization, and financial management. The self-assessment combined with the SOAR is shown in Tables 1 and Table 2.

Table 1. Identification of Internal Factors (self-assessment and SOAR)

	Internal Strategic Factors	Weight	Rating	Score
Strength (S)				
S1	Have all legal documents of the Cooperative	0.11	4	0.44
S2	Has a membership database and member recruitment mechanism	0.07	3	0.17
S3	Has a cooperative organizational structure (management, supervisors, and members)	0.11	4	0.44
S4	Have a business plan and business feasibility analysis	0.07	3	0.17
S5	Have CPPOB, HACCP, and HALAL certifications	0.11	4	0.44
	Total Score	0.47		1.68
Aspirations (A)				
A1	Having a transparent channel of information about the cooperative's development to members	0.07	3	0.17
A2	Understand and exercise the rights and obligations as a Cooperative member	0.11	4	0.44
A3	Have supporting facilities (office, PC/Laptop and its supporters, signage, etc.)	0.08	3	0.25
A4	Have instruments to raise own capital and access other financing	0.11	4	0.44
A5	Have comprehensive operational guidelines in each activity (SOP and IK)	0.10	4	0.40
A6	Guidance and Assistance by the Local Government and related	0.06	2	0.11
	Total Score	0.53		1.76

Table 2. Identification of External Factors (self-assessment and SOAR)

	External Strategic Factors	Weight	Rating	Score
Opportunities (O)				
O1	Have a training and capacity-building program for human resources	0.10	4	0.34
O2	Having a business unit manager and division of job desks effectively and efficiently	0.08	3	0.25
O3	Conduct market analysis and product innovation according to the needs	0.10	4	0.34
O4	Having a marketing strategy with effective and continuous product communication and distribution channels	0.11	4	0.44
O5	Standardized administrative and financial recording and reporting	0.11	4	0.44
O6	Have a comprehensive cooperative digital information base	0.11	4	0.44
	Total Score	0.60		2.23
Results (R)				
R1	Modern Cooperative Institution	0.11	4	0.44
R2	Community-based local economic development	0.11	4	0.44
R3	Improved product competitiveness	0.10	4	0.34
R4	Local Development	0.08	3	0.25
	Total Score	0.40		1.46

Circular Business Model Canvas (CBMC)

Lewandowski (2016) expanded the traditional Business Model Canvas (BMC) developed by Osterwalder and Pigneur by integrating sustainability considerations into what is known as the Circular Business Model Canvas (CBMC). The CBMC consists of 11 elements, including the original nine business model components, with the addition of two circularity-specific elements: adoption factors and take-back systems. These additional components address how a business integrates circular economic principles, particularly product life cycles, resource efficiency, and stakeholder engagement, across environmental, social, and governance (ESG) dimensions (Fadhillah and Fahreza, 2022).

The use of the CBMC framework in this study is justified by the nature of Binekas Cooperative's business environment, which is closely tied to the use of natural resources within and around Mount Halimun Salak National Park (TNGHS). As a palm sugar producer operating in an ecologically sensitive area, the cooperative faces increasing expectations of adopting sustainable and responsible production practices. Traditional business models (linear models) do not sufficiently capture sustainability risks and opportunities, especially in sectors involving indigenous resource-based livelihoods. Therefore, the circular approach offered by CBMC enables a more comprehensive assessment of the cooperative's current model by identifying the potential for circularity, minimizing waste, and creating long-term value not only economically, but also socially and environmentally.

The process of CBMC element identification involves participatory input from key stakeholders, including the chairperson of the cooperative, farmer group leaders, member farmers, and off-takers. The results of the CBMC and SOAR analyses are presented in Tables 3 and 4, respectively.

Based on the results of the self-assessment and identification of CBMC, the weight, rating, and score for each internal and external factor were then calculated and summed. The factors were grouped into main strategies, which were sorted by quadrant from the highest to the lowest value (Figure 1).

1. Quadrant III, with a combined score of 6.69 (3.99 + 2.70), is the OA strategy by creating aspiration-oriented strategies that are expected to take advantage of opportunities. This strategy produces alternatives in the form of Process Standardization and Development of Transparent Information Systems. Process standardization includes: a) HR training and development, b) raw material control, c) facilities and infrastructure, and d) governance.
2. Quadrant IV, with a score of 6.48 (3.69 + 2.79), is the OR strategy by creating an opportunistic strategy to achieve measurable results. This strategy provides an alternative formof product diversification.

Table 3. Identification of Internal Factors (CBMC and SOAR)

Categorization	Internal Strategic Factors		Weigh t	Rating	Score
	Strength (S)				
Key Resources	S1	Palm Plants and Ant Palm Sugar Processing Units	0.06	3	0.20
Key Activities	S2	Sap extraction and ant palm sugar processing	0.05	3	0.16
Key Partnership	S3	Farmer Groups and Farmer Members	0.05	3	0.13
Channels	S4	Direct transactions and telephone communication	0.03	2	0.05
Value Propositions Customer	S5	Organic and certified Palm Sugar CPPOB, HALAL, HACCP	0.07	4	0.29
	S6	Food companies and wholesalers	0.04	2	0.09
Segments Customer	S7	Trade and agreement	0.03	1	0.04
Relationship Revenue Streams	S8	Palm sugar sales, personal start-up capital and grants	0.04	2	0.10
Cost Structure	S9	Purchase of raw materials, labor, factory overhead, logistics, and transportation	0.03	1	0.04
Adoption Factors	S10	-	0.00	0	-
Take back systems	S11	Reuse palm blocks, reduce B3 material and chemical fertilizers	0.02	1	0.03
		Total Score	0.42		1.13
	Aspirations (A)				
Key Resources	A1	Supply and replacement of damaged agricultural inputs	0.06	3	0.21
Key Activities	A2	uniformity of ant sugar quality standards	0.06	3	0.20
Key Partnership	A3	Offtaker. consultant/audit firm	0.05	3	0.12
Channels	A4	Work process standardization and reporting guidebook	0.05	3	0.15
Value Propositions	A5	Soil and water conservation and prevention of forest land clearing	0.06	3	0.19
		Maintenance of agricultural inputs and processing production units	0.05	3	0.12
Customer Segments	A6	Product grade segmentation based on the target market at a reasonable price	0.07	4	0.29
Customer Relationship	A7	Involvement of Cooperatives in customer initiatives	0.03	2	0.05
Revenue Streams	A8	Sheep/goat farming business development	0.05	3	0.16
Cost Structure	A9	Research financing, certification /audit readiness and HR training	0.02	1	0.02
Adoption Factors	A10	Comparative studies with more advanced cooperatives	0.02	1	0.02
		Improving the application of digital technology and information systems	0.02	1	0.02
		Third-party involvement in monitoring. evaluation and performance appraisal	0.02	1	0.02
Take back systems	A11	Reduce plastic packaging. recycle wood pellets	0.02	1	0.02
		Total Score	0.58		1.59

Table 4. Identification of External Faktor (CBMC and SOAR)

Categorization	External Strategic Factors		Weight	Rating	Score
	Opportunities (O)				
Key Resources	O1	Human resource fulfillment, especially in Administration and IT	0.03	2	0.07
Key Activities	O2	Seeding of superior palm trees	0.03	2	0.07
Key Partnership	O3	TNGHS, Department of Agriculture, Department of Industry	0.03	3	0.08
Channels	O4	Development of Cooperative Information System	0.03	3	0.08
Value Propositions	O5	Update on regulations and licensing in Indonesia	0.03	3	0.08
		Upstream and organic HACCP Readiness	0.03	2	0.06
		CPPOB recertification. downstream HACCP. HALAL	0.02	2	0.05
Customer Segments	O6	Horeka. Shops / Restaurants to household consumers	0.02	2	0.05
Customer Relationship	O7	Partnership with contract agreement	0.03	3	0.09
		Incentive schemes in loyalty programs	0.04	3	0.11
Revenue Streams	O8	Production of ant and liquid palm sugar branding	0.02	2	0.05
		Carbon trading	0.01	1	0.02
Cost Structure	O9	Investment costs for liquid palm sugar processing plants Certification/audit fees	0.02	2	0.03
Adoption Factors	O10	Monitoring and evaluation using assessment tools for cooperative modernization	0.02	2	0.03
		Increasing understanding, capacity, and awareness oforganizing and environmentally friendly in the Cooperative forum	0.03	3	0.10
		Active in association membership. SME and Cooperative forums. business matching. and others	0.02	2	0.05
Take back systems	O11	Utilization of production wastewater (reuse), wood pellets (recycle), environmentally friendly packaging (reduce)	0.02	2	0.03
		Total Score	0.42		1.13
	Results (R)				
Key Resources	R1	The entire business process can be standardized. monitored. and evaluated periodically	0.04	3	0.14
Key Activities	R2	Market needs can always be met according to segmentation	0.04	4	0.15
Key Partnership	R3	Jurisdiction-based collaborative approach	0.03	2	0.06
Channels	R4	All information can be accessed transparently	0.04	3	0.12
Value Propositions	R5	Sustainable product	0.03	3	0.10
Customer Segments	R6	Market needs across segments can be accommodated and create customer loyalty	0.04	4	0.15
Customer Relationship	R7	Mutual partnership and loyal customer	0.04	3	0.13
Revenue Streams	R8	Increased revenue and benefit value to Cooperative members	0.04	3	0.14
Cost Structure	R9	Effective and efficient use of recurring costs and investments	0.03	2	0.06
Adoption Factors	R10	Cooperative works professionally and modernly	0.04	4	0.16
		Precise decision-making process	0.04	4	0.16
		Risk mitigation	0.04	4	0.16
Take back systems	R11	Sustainable products in domestic and export markets	0.03	3	0.10
		Total Score	0.58		1.59

3. Quadrant II, with a score of 6.16 (3,44 + 2,72) is an SA strategy by creating a strategy that uses strength to achieve aspiration. This strategy produces an alternative by expanding access to capital.
4. Quadrant I, with a score of 5.96 (3,14 + 2,82) is an SR strategy by creates a strategy that uses strengthto achieve measurable results. This strategy produces an alternative by optimizing green productivity.

From all the activities in the elements, the development of Modern Cooperatives by paying attention to good governance, increasing social access to the community, and utilizing ecological functions and environmentally friendly technology to meet market demand with certain standards can be presented in the development of a circular canvas business model, as shown in Figure 2.

Analytic Hierarchy Process (AHP)

AHP is used to organize information and expert opinions when choosing a preferred alternative (Saaty, 1994). Based on the results of the interviews with experts, all the answerswere consistent at all levels (inconsistencies below 10%). The five aspects that become factors for developing a sustainable modern cooperative business model, namely institutional, production, marketing, financial, and digitalization, are then translated into several alternative strategies, activities, and actors arranged into a hierarchical framework. A strategy-mapping diagram based on the AHP results is shown in Figure 3.

Figure 3 reveals that the most influential factor in achieving the goal of developing a sustainable palm sugar cooperative business model was the institutional factor with a weight value of 0.336. This indicates that strengthening the institutional aspect, particularly in terms of governance structure, organizational rules, transparency, and member participation, holds the greatest leverage for enabling cooperative transformation. Within this factor, farmers emerged as the most critical actors with a weight of 0.325. As frontline producers and key contributors of raw materials, farmers play a central role not only in the production process but also in shaping the success of institutional governance through active engagement and representation in cooperative management.

The most significant activity linked to farmers was farmer partnerships (0.202), which reflects the importance of building inclusive and productive relationships between the cooperative and its farmer base. These partnerships can take the form of contract-based raw material procurement from both member and non-member farmers, the implementation of quality- and quantity-based incentive schemes, and increased facilitation of access to supporting inputs or services. Such partnership-based institutional strengthening leads to greater member loyalty and better production consistency and shared accountability.

The top-ranked strategy resulting from AHP is to expand access to capital, with the highest priority weight of 0.414. This strategy aims to unlock broader financing opportunities through institutions such as LPDB-KUMKM, CSR funds, and impact investors, which are essential for scaling operations, improving infrastructure, and enhancing service provision to members.

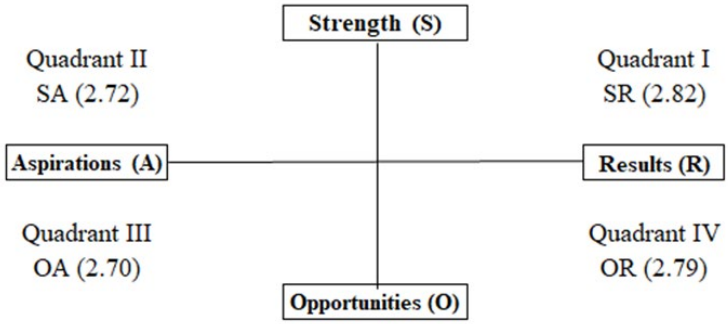

Figure 1. Cartesian Diagram of SOAR for the Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partners

1. Farmer Groups
2. Farmer Members
3. Local Governments (TNGHS, Cooperative Service, Agriculture Service, Industry Service)
4. Offtaker
5. Consultant / Business Companion
6. Financing institutions</td>
<td>Key Activities

1. Palm Sugar Extraction according to standards
2. Production and Processing of ant and advanced liquid Palm Sugar according to standards
3. Packaging and marketing
4. Seeding and cultivation</td>
<td rowspan="2">Value Proposition

1. 100% organic
2. Local Wisdom of the Kasepuhan Indigenous People
3. Community economic resources
4. CPOPPB, halal, HACCP and Organic certification</td>
<td>Customer Relationship

1. Trade
2. Supply deals
3. Contract agreement
4. Loyalty program</td>
<td>Customer Segment

1. Wholesalers
2. Food companies
3. Horeca
4. Retail and Household</td>
</tr>
<tr>
<td>Key Resources

1. Palm Tree
2. Farmer tapper, processors to cooperative administrators
3. Facilities and Infrastructure Ant and liquid sugar processing plants</td>
<td>Channel

1. Phone/whatsapp
2. Direct transactions
3. E-commerce dan web dashboard
4. Technical guidance on financial operations and administration
5. Annual Member Meeting</td>
<td>Take Back Systems

1. Economy Circulars (Responsible consumption)</td>
</tr>
<tr>
<td colspan="2">Cost Structure

1. Raw material and supporting costs
2. Labor wages
3. Overhead factory
4. Transportation costs
5. Infrastructure investment costs (hard/soft)
6. Coaching and certification fees/ audit</td>
<td colspan="2">Revenue Streams

1. Sales of local and export Ant Palm Sugar
2. Starting capital from individuals
3. Grants from third parties
4. Sales of local and export liquid palm sugar
5. Marketing of agricultural & livestock products
6. Potential incentives in Carbon trading</td>
<td>Adoption Factors

1. Professional Cooperative Management
2. Improvement of HR skills & competencies
3. Business risk mitigation
4. Multi stakeholder forum</td>
</tr>
</table>

Figure 2. Development of a Circular Canvas Business Model in Cooperatives

Managerial Implication

The findings imply that cooperative managers must prioritize institutional reform as a foundation for long-term transformation. This includes fostering member engagement, improving transparency in decision-making, and implementing effective communication systems. Managers should invest in digital infrastructure such as member databases, financial reporting tools, and supply chain coordination platforms to enhance operational efficiency and traceability. Furthermore, the cooperative should pursue green certifications and adopt environmentally responsible practices to align with market and regulatory expectations. In adapting to the modern economy, the Binekas Cooperative is advised to transition into a multiparty cooperative (Koperasi Multi Pihak/KMP) model. This structure enables cross-sectoral integration among members, boards, financial entities, off-takers, government, academia, and private actors under unified governance. Such a transformation facilitates coordinated resource mobilization, collaborative innovation, and shared risk management within the palm sugar ecosystem.

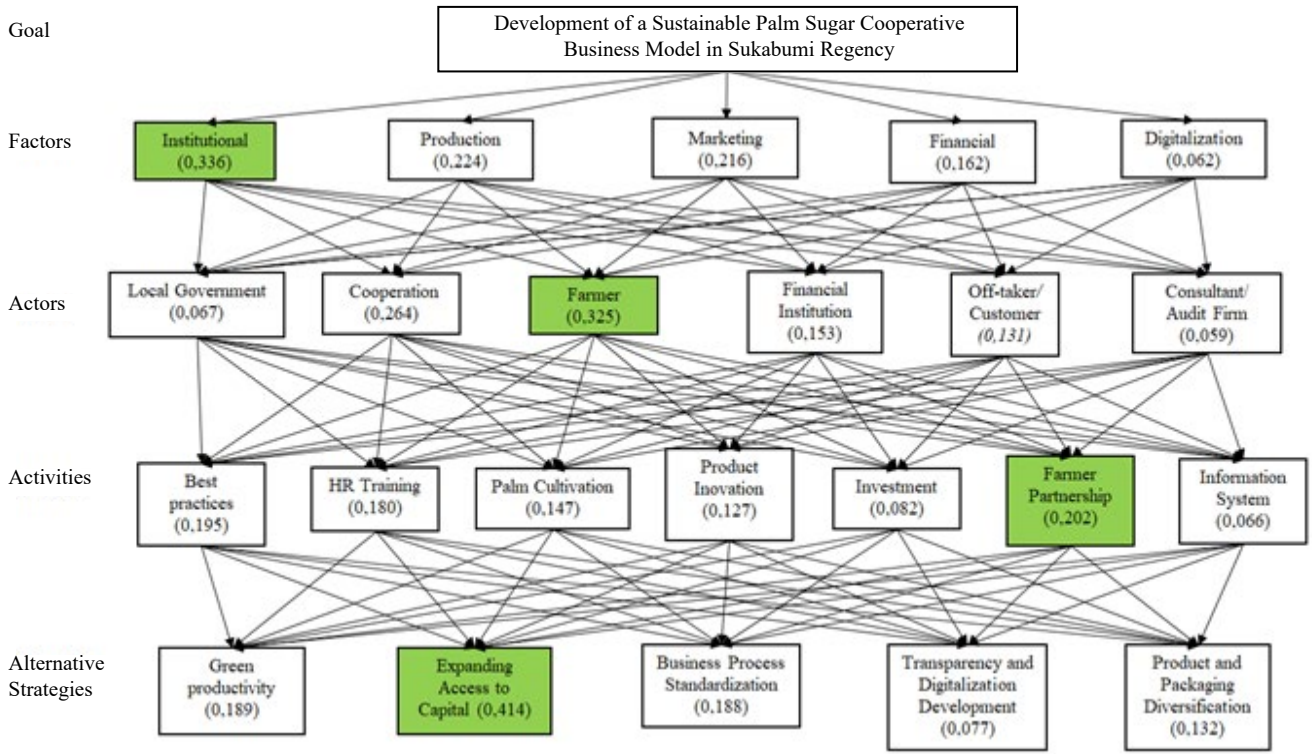

Figure 3. Hierarchical structure of AHP processing results

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study concludes that the Binekas Cooperative still operates with limited institutional and business capacities, although it is formally established and legally recognized. Members of the cooperative, originating from the Kasepuhan indigenous community, bring strong social capital and diverse demographic backgrounds, in terms of age, education level, palm tree ownership, and income. Many also engage in alternative livelihoods beyond palm sugar production, indicating the potential of diversification initiatives to enhance member welfare. Based on a combination of self-assessment, Circular Business Model Canvas (CBMC), and SOAR analysis, the cooperative's strategic position is categorized within the opportunity and aspiration quadrants. This positioning highlights the need to build a modern, sustainable business model in which the cooperative serves as a central aggregator for stakeholders and resources in the palm sugar value chain. The Analytic Hierarchy Process (AHP) further refines this strategic direction by identifying five priority areas: business process standardization, product and packaging diversification, capital access expansion, digital system development, and environmentally friendly productivity optimization. Among these, expanding access to capital is identified as the most critical priority, particularly through inclusive partnerships with farmer members who play a key role in strengthening cooperative governance and performance.

Recommendations

Based on this analysis, several recommendations were proposed. First, the cooperative should actively engage external stakeholders, including financial institutions, government agencies, private partners, and academia, to support strategic program implementation and capacity-building initiatives. Second, institutional strengthening should be built on shared commitment among members and leadership supported by transparent governance and open communication. Synergy with government initiatives at both the regional and national levels should be leveraged to accelerate institutional reform. Third, additional in-depth research is needed to understand the implications of regulatory changes, assess spatial suitability for palm sugar cultivation, and explore agronomic innovations that could strengthen cooperative-led agroindustries on a broader scale.

FUNDING STATEMENT: This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICTS OF INTEREST: The authors declare no conflict of interest.

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