**The PentaHelix Model in the Development of Agrotourism in Sembalun District, East Lombok Regency**

# ABSTRACT

This research aims to analyze the role of each pentahelix element (government, community, academia, business, and media) in agrotourism development, identify internal and external factors influencing agrotourism, and formulate strategies to optimize collaboration among these elements in Sembalun District, East Lombok Regency. This research uses both qualitative and quantitative approaches and The field research was conducted in Sembalun District, East Lombok Regency, West Nusa Tenggara Province, in February 2025. Although the data collection period was one month, it was preceded by careful preparation and coordination to ensure the quality and completeness of the data. Data collection is conducted through in-depth interviews and surveys with key stakeholders in agrotourism development. The analytical methods used include A'WOT Analysis, IFAS/EFAS, and a combination of QSPM.

The research results show that each pentahelix element plays an important and interconnected role. The government acts as a regulator and facilitator by providing policies and infrastructure, which are then supported by the community. The community plays an active role in implementing and managing agrotourism, while academia provides the theoretical foundation and research for innovation. The business sector opens opportunities for investment and job creation, while the media plays a role in promoting and enhancing the image of the destination. The synergy among these elements creates sustainable agrotourism development in Sembalun.

Based on the analysis of internal and external factors, eight key factors were found to have the greatest influence on agrotourism development. The highest-scoring external factors include increased tourist interest in nature tourism (0.51), supportive government policies (0.50), digitalization and social media as promotional tools (0.46), and rising awareness of sustainability (0.40). However, the main challenges include negative news and hoaxes (0.46), dependence on seasons and weather (0.45), lack of government attention to agrotourism compared to other tourism sectors (0.43), and limited policy and infrastructure support (0.37). Therefore, the development strategy should focus on utilizing tourism trends and strengthening policy support.

To optimize collaboration among the pentahelix elements, the recommended strategies based on QSPM are: (1) Optimizing regulations and government support by expanding collaboration with academia and business; (2) Leveraging digital media to enhance promotion of nature-based and agricultural tourism; (3) Increasing collaboration among pentahelix elements to optimize access to funding for businesses and other elements; and (4) Enhancing digital infrastructure to expand media access for tourism promotion and support the digitalization of agrotourism services. These strategies are expected to strengthen synergy among the elements and support the sustainability of agrotourism in Sembalun.

*Keywords: Pentahelix Model, Strategy, Impact, Role, Agro-Tourism*

# 1. INTRODUCTION

Agriculture is a vital sector for Indonesia, a country with vast agricultural land. However, agricultural land in Indonesia continues to shrink, largely due to conversion into urban and industrial areas. In 2023, the Indonesian Ministry of Agriculture reported that the total agricultural land area in Indonesia reached 8.2 million hectares, with 0.5 million hectares of it being fallow, often due to land degradation or weather factors. The reduction of agricultural land not only threatens food security but also the livelihoods of millions of people who depend on agriculture. In response, sustainable agricultural initiatives, including agrotourism, have been promoted as a way to increase the economic value of agricultural activities, improve conservation, and empower local communities.

In Sembalun, East Lombok, agrotourism has great potential for development, particularly due to the area's natural beauty and agricultural products such as apples and strawberries. However, the region faces challenges in implementing a coordinated, multi-stakeholder approach to agrotourism development. Although the Pentahelix model, which involves collaboration among the government, society, academia, business actors, and media, is recognized as an effective framework, its implementation in Sembalun is still limited. Previous studies by Sentana et al. (2023) and Aprianti et al. (2024) revealed challenges in coordination, government support, and business involvement. These studies highlight weak coordination among stakeholders, lack of government support, and insufficient synergy between businesses and the media, all of which hinder the development of agrotourism.

This study aims to explore the role of each Pentahelix element in agrotourism development in Sembalun, focusing on identifying obstacles in effective collaboration and proposing strategies to optimize the involvement of all stakeholders. The study will assess how the Pentahelix model can be applied to support the sustainable growth of agrotourism. The research will provide insights into the roles and interactions of each stakeholder group, assess obstacles to effective collaboration, and propose strategies to enhance synergy. The findings of this study will be valuable for policymakers, local communities, and business and media actors involved in agrotourism development, contributing to the growth of a sustainable agrotourism sector and improving the welfare of local farmers.

# 2. MATERIALS AND METHODS

This research employs a qualitative approach, supported by a quantitative method, to analyze the development of agrotourism in Sembalun, East Lombok Regency, using the Pentahelix model. The unit of analysis in this research is the role of the five elements in the Pentahelix model: government, community, academia, business, and media. The research was conducted in Sembalun District, East Lombok Regency.

The sampling technique used in this study is purposive sampling, which involves selecting participants based on their direct involvement or knowledge of the development of agrotourism in the region. The total number of informants in this study is 20, consisting of various stakeholders from government, community, academia, business, and media sectors. The selection of informants was based on their active participation in the agrotourism development process in Sembalun.

This study has two main objectives: first, to explore and analyze the role of each Pentahelix element in the development of agrotourism, and second, to formulate strategies for the effective development of agrotourism. The primary data collection method used is in-depth interviews with key stakeholders to gain insights into the roles, barriers, and opportunities they perceive in the development of agrotourism. A structured interview guide will be used to ensure consistency in the questions asked of all participants.

Data analysis will be conducted using a qualitative approach to identify key themes, roles, and interactions between the Pentahelix elements. The findings from the qualitative analysis will be complemented by quantitative data using the A'WOT analysis, which combines the Analytic Hierarchy Process (AHP) and SWOT (Strengths, Weaknesses, Opportunities, and Threats) to identify internal and external factors affecting the development of agrotourism in Sembalun and to formulate strategies that will be subsequently rated according to their level of importance. The results of the A'WOT analysis will be used as input for further analysis using the Quantitative Strategic Planning Matrix (QSPM).

This study also uses secondary data, including reports from the Tourism Office and related government agencies, to support the qualitative findings. All collected data will be systematically analyzed to ensure a comprehensive understanding of the factors influencing the development of agrotourism in Sembalun.

**Table 1. Internal Factor Evaluation (IFE) Matrix Format**

|  |  |  |  |
| --- | --- | --- | --- |
| **Internal Factor** | **Weight** | **Rating** | **Score** |
| **Strengths** |  |  |  |
| (List the strengths that positively impact agritourism, such as government policies, funding, infrastructure development, academic involvement, community participation, and media promotion.) | (The relative importance of each factor, ranging from 0.0 to 1.0; the total weight must sum to 1.) | (1 = Major weakness, 2 = Minor weakness, 3 = Minor strength, 4 = Major strength) | (Weight × Rating) |
| **(Weaknesses)** |  |  |  |
| (List the weaknesses that hinder agritourism development, such as limited funding, lack of collaboration, data collection challenges, limited business capital, and insufficient digital infrastructure.) | (The relative importance of each factor, ranging from 0.0 to 1.0; the total weight must sum to 1.) | (1 = Major weakness, 2 = Minor weakness, 3 = Minor strength, 4 = Major strength) | (Weight × Rating) |
| **Total Skor IFE** | total |  | (Sum of Strengths - Sum of Weaknesses) |

*Source: (Rangkuti, F. (2016)*

**Table 2. Internal Factor Evaluation (EFE) Matrix Format**

|  |  |  |  |
| --- | --- | --- | --- |
| **External Factor** | **Weight** | **Rating** | **Score** |
| **Opportunities** |  |  |  |
| (List the opportunities that can support agritourism development, such as increasing tourist interest, potential collaboration with investors/academics, digitalization for promotion, sustainability awareness, and government policies supporting tourism.) | (The relative importance of each factor, ranging from 0.0 to 1.0; the total weight must sum to 1.) | (1 = No opportunity, 2 = Limited opportunity, 3 = Moderate opportunity, 4 = Significant opportunity) | (Weight × Rating) |
| **Threats** |  |  |  |
| (List the threats that may hinder agritourism development, such as lack of government focus, seasonal/weather dependency, inconsistent local regulations, and misinformation or negative news.) | (The relative importance of each factor, ranging from 0.0 to 1.0; the total weight must sum to 1.) | (1 = Major threat, 2 = Minor threat, 3 = Minor challenge, 4 = Not a significant issue) |  |
| **Total Skor IFE** | total |  |  |

*Source: (Rangkuti, F. (2016)*

**Table 3. AHP Saaty Pairwise Comparison Matrix Format**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Criteria | C1 | C2 | C3 | C4 | C5 | Priority Vector |
| C1 (Criterion 1) | 1 |  |  |  |  | The final calculated weight for each criterion, indicating its relative importance. |
| C2 (Criterion 2) |  | 1 |  |  |  |  |
| C3 (Criterion 3) |  |  | 1 |  |  |  |
| C4 (Criterion 4) |  |  |  | 1 |  |  |
| C5 (Criterion 5) |  |  |  |  | 1 |  |
| Total |  |  |  |  |  |  |

**Table 4. Matriks QSPM Format**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Faktor Kunci | Weight |  | Alternatif Strategi | | |
|  | 1 | 2 | |
| AS | TAS | AS | TAS |
| *Opportunities* 1.  2.  3. |  | Tractive Score for Stratefi1 with opportunities 1 dst | Weiight x AS |  |  |
| *Threats* 1.  2.  3. |  |  |  |  |  |
| *Strengths* 1.  2.  3. |  |  |  |  |  |
| *Weakness*  1.  2.  3. |  |  |  |  |  |
| Total |  |  |  |  |  |

*Source: (David, 2016)*

**Table 5. Informant Caracteristik Format**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Category** | **Subcategory** | **Number** | **Percentage (%)** |
| **1** | **Gender** | Male |  |  |
|  |  | Female |  |  |
|  | **Total** |  |  | **100** |
| **2** | **Age Group** | 21-30 years |  |  |
|  |  | 31-40 years |  |  |
|  |  | 41-50 years |  |  |
|  | **Total** |  |  | **100** |
| **3** | **Education Level** | Associate Degree (D3) |  |  |
|  |  | Bachelor's Degree (S1) |  |  |
|  |  | Master's Degree (S2) |  |  |
|  | **Total** |  |  | **100** |

**3. RESULTS AND DISCUSSION**

Agrotourism in Sembalun District, East Lombok Regency, holds significant potential in supporting sustainable tourism development through the Pentahelix model approach. With its breathtaking landscapes, lush agricultural fields, and well-

preserved farming systems, Sembalun offers a tourism experience that integrates agriculture, culture, and eco-tourism. Activities such as fruit picking, horticultural farm visits, and agricultural education based on local wisdom serve as key attractions for visitors. Additionally, the active involvement of local communities, including tourism awareness groups (Pokdarwis) and farmers, plays a crucial role in maintaining the sustainability of agrotourism in the region.

This study explores the role of each Pentahelix element in agrotourism development in Sembalun, identifying existing obstacles and opportunities. The findings indicate that although all elements have been involved in agrotourism development, several challenges remain, such as limited government funding, suboptimal coordination among stakeholders, and constraints in infrastructure and digital accessibility for tourism promotion.The following sections will provide a detailed discussion of the role of each Pentahelix element, followed by an analysis of the obstacles and opportunities in developing agrotourism in Sembalun. Finally, strategic recommendations will be proposed to enhance collaboration among all Pentahelix stakeholders to ensure the sustainability of agrotourism in the region.

**3.1 Respondent Characteristics**

The characteristics of informants in this study include gender, age, education level, role in the Pentahelix model, and form of involvement in agrotourism in Sembalun District. The total number of informants in this study is 20, consisting of academics, government representatives, business actors, media, and local communities involved in agrotourism in Sembalun District.

Table 6. Informant Caracteristik Format

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Category | Subcategory | Number | Percentage (%) |
| 1 | Gender | Male | 13 | 65 |
|  |  | Female | 7 | 35 |
|  | Total |  | 20 | 100 |
| 2 | Age Group | 21-30 years | 9 | 45 |
|  |  | 31-40 years | 6 | 30 |
|  |  | 41-50 years | 5 | 25 |
|  | Total |  | 20 | 100 |
| 3 | Education Level | Associate Degree (D3) | 2 | 10 |
|  |  | Bachelor's Degree (S1) | 11 | 55 |
|  |  | Master's Degree (S2) | 7 | 35 |
|  | Total |  | 20 | 100 |

***Source****: Primary Data Processed, 2025*

**3.2 Analysis of the Roles of Pentahelix Elements**

The analysis of the roles of Pentahelix elements in agrotourism development in Sembalun District involves triangulation and synthesis of various data sources. Triangulation is used to validate research findings by comparing different perspectives from stakeholders, policies, and theories.

1. Government – Acts as a regulator, facilitator, and catalyst for agrotourism development. The government has established zoning policies, issued regulations (e.g., Regent Regulation No. 40/2021 and No. 56/2021), provided infrastructure support, and promoted agrotourism through events like the Rinjani Festival. These efforts align with sustainable development theories (Brundtland, 1987) and tourism policies (Tourism Law No. 10/2009).
2. Community – Functions as a key driver in local tourism, ensuring sustainability through engagement and education. Community involvement supports sustainable tourism (Lane, 2009). Ministerial Regulation No. 14/2016 further emphasizes community-based tourism development.
3. Academia – Provides scientific research and recommendations for agrotourism planning and development. While governments and communities rely on academic data, businesses find some academic recommendations less practical. Research on tourism innovation (Hjalager, 2010; Schumpeter, 1934) highlights the importance of research-based advancements. Presidential Regulation No. 59/2017 supports the use of scientific approaches in development policies.
4. Media – Plays a role in promoting agrotourism, building the destination’s image, and providing a platform for evaluation. Digital marketing strategies (Kotler et al., 2017) are essential for increasing tourism appeal. Government Regulation No. 50/2011 outlines national tourism development plans, reinforcing media's role in destination marketing.
5. Business Sector – Serves as the primary operator of agrotourism activities, contributing to local economic growth and job creation. Supported by media promotions and government policies, the business sector drives employment and income generation. Research by Hall (2019) highlights the economic benefits of agrotourism, as seen in Sembalun, where local communities actively participate in agrotourism-related enterprises.

## 3.3 analysis of internal and external factors.

**3.3.1 External Factor Evaluation Matrix (EFE) for Agrotourism Development in Sembalun**

The development of agrotourism in Sembalun District involves various internal factors that influence its sustainability and management. These factors include strengths and weaknesses within the agrotourism system, human resources, institutional capacity, and service innovation The Pentahelix approach, which includes five key actors—government, community, academia, business, and media—serves as a relevant framework to identify and optimize these internal factors. Each element plays an important and interconnected role in supporting the sustainability and competitiveness of agrotourism.

**Strenght**

1. The government has issued regional regulations (Perda) to provide a legal foundation that supports the development of agrotourism.

The local government of Sembalun has actively enacted regional regulations to support agrotourism. A significant example is **Regional Regulation (Perda) No. 12 of 2016** on the Development of Tourism Villages, which includes agrotourism aspects. This regulation provides a legal foundation for managing agriculture-based tourism destinations and empowering local communities. Through institutions such as the Tourism and Agriculture Offices, the government offers ongoing guidance to tourism villages, including the agriculturally rich Sembalun Village. The regulation emphasizes sustainable natural resource management to position Sembalun as a leading sustainable tourism destination in East Lombok. According to **Sutrisno et al. (2020)**, government policies that support agriculture-based tourism are one of the key strengths in agrotourism development in the region.

1. Farmers have received assistance and training to develop agrotourism-based businesses, which strengthens local entrepreneurial capacity.

Local farmers receive assistance and training programs to develop agrotourism-based ventures. One such initiative is the **Agrotourism Management Training**, organized by the Agriculture Office in collaboration with the University of Mataram. This program aims to enhance farmers’ capacity to transform their agricultural products into tourist attractions. Formerly focused on rice and vegetable farming, Sembalun farmers are now trained in agroedutourism and environmental-based tourism. **Fadli et al. (2021)** highlight that these training initiatives have significantly increased human resource capacity in utilizing agricultural potential for tourism, thereby improving local community welfare.

1. Infrastructure development and destination promotion have been actively pursued to improve accessibility and attract visitors.

Although Sembalun is already known for its natural beauty, infrastructure development remains crucial. The government has improved road networks connecting tourist sites to urban centers and developed public amenities like parking areas, tourist information centers, and sanitation facilities. In terms of promotion, the government utilizes digital platforms such as official websites, social media, and collaborations with travel agencies to increase Sembalun's visibility. Media partnerships also help promote local agrotourism products online. Octavianti et al. (2024) emphasize that the development of infrastructure and strategic destination promotion in Sembalun is crucial for enhancing its resilience and attractiveness post-pandemic and after natural disasters. Their study highlights how improved road networks and supporting tourism facilities play a key role in increasing tourist comfort and accessibility to geosites in Sembalun. Additionally, they underscore the importance of utilizing digital promotion platforms and media collaborations to revitalize tourist interest and sustain visitation levels, especially during recovery periods..

1. Academics contribute scientific research and data, which serve as a basis for evidence-based policymaking in agrotourism development.

Academics from the University of Mataram contribute significantly by providing data-driven studies that inform government policy. These scientific insights are crucial for designing evidence-based policies. For example, the agricultural sector can serve as a core resource for agrotourism development. Parung, Gunawan, Budhyantoro, dan Artadana (2019) emphasize the role of universities in developing edu-agrotourism as part of their Tri Dharma responsibilities—education, research, and community service. By leveraging local potential, universities contribute not only to tourism experiences but also to public education and knowledge dissemination. Their involvement helps design agrotourism programs that empower communities through skill development, economic opportunities, and cultural preservation. This collaborative model enhances sustainability while ensuring that academic insights directly benefit rural tourism actors.

1. Communities are actively engaged in education, innovation, and the preservation of local culture and the environment, fostering sustainable tourism practices.

Local communities actively participate in environmental education and cultural preservation. Through groups like **Pokdarwis**, residents educate tourists about sustainable farming practices and traditional ceremonies such as Upacara Nyelamaq. They also innovate by creating agricultural tour packages and offering local processed products to visitors. Community members are dedicated to managing eco-friendly tourist sitesMedia supports the promotion of agrotourism and enhances the image of the destination through various digital platforms. Based on the study by Ruhiyawati, Nugroho, and Narottama (2023), local communities in Sembalun Bumbung are actively involved in education, innovation, and cultural as well as environmental preservation to support sustainable tourism. Through groups like Pokdarwis, they educate tourists on sustainable farming practices and traditional ceremonies such as Upacara Nyelamaq. The community also develops agricultural tour packages and offers local processed products. Digital media, including platforms like Instagram and YouTube, is used to promote agrotourism and strengthen the destination’s image.

1. Media plays a pivotal role in promoting agrotourism in Sembalun. Digital platforms such as Instagram, YouTube, and Facebook are used to showcase the area’s natural beauty and unique agroexperiences. The government and local communities also collaborate with travel influencers and bloggers to increase reach. This digital promotion appeals not only to domestic but also international tourists interested in eco-friendly and agroeducational tourism. The research conducted by Sari et al. (2022) shows that the use of Instagram as a marketing communication medium for agrotourism is effective in capturing attention, increasing interest, and encouraging visitor action. This finding is also supported by a study conducted by Jayanti (2024), which explores the influence of social media on tourism in Gunung Mas, Bogor, and emphasizes the importance of platforms such as Instagram, Facebook, and YouTube in promoting tourist destinations.

Weaknesses

1. The government faces budget limitations in providing adequate support for agrotourism development.

Although regulations and programs exist, budget constraints remain a major obstacle. Many planned programs cannot be implemented effectively due to insufficient funding. For instance, the construction of supporting infrastructure is often hindered by financial limitations. notes that regional governments frequently struggle with allocating sufficient resources for tourism, especially agrotourism, which demands large investments.

1. Collaboration among pentahelix elements (government, academia, business, community, and media) remains suboptimal, hindering synergistic efforts.

While collaboration among Pentahelix actors is encouraged, its practical implementation in Sembalun remains suboptimal. Each actor operates based on different interests and priorities, resulting in fragmented communication and coordination. For instance, the government and community are not fully integrated in resource management, and academia and media often work in isolation.

1. Academics experience difficulties in data collection due to differences in business orientation and priorities.

Academics often face challenges in collecting field data due to differing priorities with agrotourism businesses. While researchers aim for empirical studies, entrepreneurs prioritize practical and immediate gains. This misalignment leads to communication gaps that hinder effective data collection and policy planning.

1. Businesses face limited capital and restricted access to funding, which hampers their ability to grow agrotourism-based enterprises.

Agrotourism entrepreneurs in Sembalun often operate with limited capital and face difficulty accessing funding sources such as banks or investors. Even when government support exists, accessing these funds requires complicated procedures and documentation.

1. Communities encounter challenges in coordination and funding, which reduce the effectiveness of their initiatives.

Although community involvement is strong, local groups frequently struggle with coordination and financial resources. Planned activities such as training, land management, or cultural events are often hindered by a lack of operational funds and poor inter-group communication..

1. Media faces limitations in digital infrastructure and is affected by hoaxes or misinformation, which can negatively impact the destination's image.

While media is central to promoting Sembalun, digital infrastructure remains a challenge. Poor internet connectivity limits outreach, and the spread of misinformation or hoaxes negatively impacts the region’s tourism image

Table. 7 Internal Factor Evaluation Matrix (IFE)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Internal Factor | Weight | Rating | Score | Priority |
| Strengths |  |  |  |  |
| The government has issued regional regulations (Perda) to provide a legal foundation that supports the development of agrotourism. | 0.08 | 4 | 0.33 | 4 |
| Farmers have received assistance and training to develop agrotourism-based businesses, which strengthens local entrepreneurial capacity. | 0.08 | 4 | 0.32 | 5 |
| Infrastructure development and destination promotion have been actively pursued to improve accessibility and attract visitors. | 0.1 | 4.05 | 0.39 | 1 |
| Academics contribute scientific research and data, which serve as a basis for evidence-based policymaking in agrotourism development. | 0.07 | 4 | 0.27 | 6 |
| Communities are actively engaged in education, innovation, and the preservation of local culture and the environment, fostering sustainable tourism practices. | 0.1 | 4.05 | 0.39 | 2 |
| Media supports the promotion of agrotourism and enhances the image of the destination through various digital platforms. | 0.08 | 4 | 0.34 | 3 |
| Weaknesses |  |  |  |  |
| The government faces budget limitations in providing adequate support for agrotourism development. | 0.1 | 3.15 | 0.31 | 1 |
| Collaboration among pentahelix elements (government, academia, business, community, and media) remains suboptimal, hindering synergistic efforts. | 0.1 | 3.15 | 0.31 | 2 |
| Academics experience difficulties in data collection due to differences in business orientation and priorities. | 0.07 | 3 | 0.22 | 4 |
| Businesses face limited capital and restricted access to funding, which hampers their ability to grow agrotourism-based enterprises. | 0.08 | 2.95 | 0.22 | 5 |
| Communities encounter challenges in coordination and funding, which reduce the effectiveness of their initiatives. | 0.07 | 4.1 | 0.28 | 3 |
| Media faces limitations in digital infrastructure and is affected by hoaxes or misinformation, which can negatively impact the destination's image. | 0.07 | 2.45 | 0.18 | 6 |
| Total IFE Score | 1 |  | 0.51 |  |
| ***Source****: Primary Data Processed, 2025* | | | | |

Based on the results from the Internal Factor Evaluation (IFE) matrix, several strengths and weaknesses are highlighted that need to be considered when formulating strategies for agrotourism development in Sembalun. One of the main strengths is the ongoing infrastructure development supported by the government, such as road improvements and other facilities to support transportation access to the agrotourism area. This factor received the highest score among the strengths, at 0.39, indicating that good infrastructure is crucial for improving accessibility and comfort for visitors.

The active participation of the local community in education, innovation, and maintaining the environment and local culture received a score of 0.39, reflecting its important role in ensuring the sustainability of agrotourism. This involvement benefits both the conservation of nature and the overall experience of tourists, allowing them to learn about local culture and environmentally friendly farming practices.

The regional regulation (Perda) issued by the government, which supports agrotourism, has a score of 0.33, making it a key driver in the development of this sector. The regulation ensures legal certainty for agrotourism managers and opens opportunities for attracting investors or business players in the sector. In addition, assistance and training for farmers in agrotourism-based businesses provide valuable knowledge on sustainable agricultural practices and how to manage agricultural tourism. This assistance positively impacts farmers by enhancing their capacity and the potential for increased income, scoring 0.32.

The media plays a crucial role in promoting the destination, leveraging digital platforms to spread awareness. However, media faces challenges related to limited digital infrastructure and the spread of fake news, which could undermine the tourism image.

On the other hand, several weaknesses hinder agrotourism development in Sembalun. One notable issue is the government's budget limitations, with a score of 0.31. Although there is regulatory support, financial constraints can limit the effectiveness of supporting programs. Collaboration between pentahelix elements is also not optimized, with a score of 0.31, indicating that better coordination is needed between the government, community, academia, businesses, and media to create synergies for agrotourism development.

Academics face difficulties in data collection due to different orientations or interests between academics and other sectors. This challenge, scoring 0.22, highlights the need for solutions to improve data collection and use in policy development.

Businesses face limited capital and access to funding, which restricts their ability to expand or improve existing facilities. A score of 0.22 indicates the need for additional financial support from both government and private sectors.

The community, a vital element in agrotourism development, also faces challenges in coordination and funding, with a score of 0.28. Improving coordination and addressing funding issues will be essential for better community engagement and smoother agrotourism development.

Lastly, the media's limited digital infrastructure and the spread of fake news can affect the effectiveness of tourism promotion. A score of 0.18 indicates that media should be better prepared to address these challenges to optimize the promotion of Sembalun as a top-tier tourism destination. In conclusion, while Sembalun has numerous strengths, several weaknesses must be addressed to unlock its full agrotourism potential. By overcoming these obstacles, agrotourism in Sembalun can thrive, offering benefits to the local community and contributing to environmental sustainability.

**3.3.2 External Factor Evaluation Matrix (EFE) for Agrotourism Development in Sembalun**

External factors play a crucial role in shaping the development of agrotourism in regions like Sembalun. These include opportunities such as the growing public awareness of sustainability, increased interest from tourists in eco-friendly travel, and supportive government policies for rural tourism development. However, agrotourism also faces threats from outside forces, such as unfavorable weather conditions, inconsistent government focus, and the spread of negative or false information via social media. Moreover, conflicting local regulations like awig-awig can hinder collaboration and strategic development. Addressing these external dynamics is essential to ensure the long-term sustainability and success of agrotourism initiatives.

Opportunities

1. Increased interest from tourists in nature-based and agricultural tourism.

In recent years, there has been a growing interest in nature-based and agricultural tourism, particularly agrotourism. Sembalun, known for its mountainous beauty and biodiversity, has great potential to attract tourists seeking an immersive experience in nature and agricultural culture. Increased awareness of environmental conservation and a preference for eco-friendly tourism have been key drivers in this growth. According to a survey by Marketeers (2024), 75% of Indonesian tourists prefer nature-based destinations like mountains and national parks, while 65% opt for beaches.

1. The potential for broader collaboration with academics and investors.

There is a significant opportunity for collaboration with academics and investors to support the development of agrotourism in Sembalun. Academics can provide in-depth studies and research-based solutions to improve agrotourism management, while investors can fund infrastructure and facility development. This partnership could also lead to joint research programs focusing on sustainable agrotourism, benefiting both parties. According to Simatupang and Pakpahan (2023), collaboration between various stakeholders, including academics and investors, plays a crucial role in the development of agrotourism. Academics can provide research and data-driven solutions to enhance agrotourism management, while investors can support the development of necessary infrastructure. The synergy between the two can accelerate the growth of sustainable agrotourism, offering long-term benefits for both local communities and the tourism sector as a whole.

1. Digitalization and social media can enhance agrotourism promotion.

Digitalization and social media have become significant tools in promoting agrotourism. With accessible digital platforms, Sembalun can leverage social media to introduce its tourist destinations more widely and efficiently, expanding market reach and providing real-time information. A study by Sastiari, Pitana, and Parining (2023) from the Agribusiness Study Program, Faculty of Agriculture, Udayana University, confirmed the effectiveness of Instagram as a promotional tool in agrotourism. Conducted at Kumulilir Agrotourism in Sebatu Village, Gianyar Regency, the research showed that Instagram successfully creates a positive image of the destination and significantly influences tourists' interest in visiting. This finding underscores the growing importance of digital platforms in enhancing the visibility and attractiveness of rural tourism destinations like Sembalun.

1. Growing public awareness of sustainability.

Public awareness of sustainability has been growing, focusing on environmental preservation and eco-friendly resource management. This trend presents an opportunity to develop sustainable agrotourism, attracting environmentally-conscious tourists. Communities are more engaged in conservation, reducing plastic waste, and organic farming, contributing to the image of a responsible agrotourism destination. The growing public awareness of sustainability is essential for fostering responsible tourism practices. As noted in a study by Lumbanraja and Lumbanraja (2023), agrotourism in Indonesia, particularly in plantation sectors like coffee, contributes significantly to achieving the Sustainable Development Goals (SDGs). This reinforces the notion that promoting sustainable agrotourism not only supports environmental preservation but also aligns with broader socio-economic goals, such as poverty reduction, climate action, and promoting decent work, enhancing the attractiveness of destinations like Sembalun.

1. Government policies supporting tourism sector development.

The Indonesian government has developed policies to support the growth of the tourism sector, including agrotourism, as part of economic diversification. Policies such as providing incentives for agrotourism businesses and improving infrastructure in tourist areas have accelerated the development of this sector.

Threats

1. Lack of government focus on agrotourism compared to other tourism sectors, such as coastal tourism.

Despite the potential of agrotourism, there is a lack of government focus compared to the beach tourism sector, which receives more funding and policy attention. This has led to the neglect of agrotourism development, even though Sembalun has immense potential to boost local economies and maintain environmental sustainability.

1. Dependency on seasons and weather affecting the business sector.

Agrotourism is highly dependent on seasons and weather, which can be a threat to the sustainability of businesses in Sembalun. Rainy seasons or unfavorable weather conditions can affect agricultural productivity and outdoor tourism activities such as fruit harvesting or farming experiences.

1. Lack of policy support and infrastructure for agrotourism businesses.

Although general tourism policies exist, there is a lack of specific policies supporting agrotourism businesses. Regional governments often lack regulations that focus on agrotourism development, such as infrastructure, accessibility, and marketing. A study by Trisnanto et al. (2023) revealed that **institutional and policy support for agrotourism development remains weak,** as reflected by a low institutional index score (49.74). This indicates that **local governments often lack specific regulations and strategic frameworks** to support the sustainability of agrotourism, particularly in terms of infrastructure, accessibility, and marketing. These findings reinforce the need for **targeted policy intervention and stronger institutional commitment** to enhance the viability of agrotourism businesses.

1. Differences in local rules and regulations (awig-awig) hindering development.

One threat to agrotourism development in Sembalun is conflicting local views and regulations, such as awig-awig (customary rules) that govern land use and economic activities. Rigid or outdated customary laws may conflict with the modern principles of agrotourism management, creating barriers to collaboration.

1. Negative news and fake news affecting the destination's image.

Negative news or hoaxes related to the conditions or facilities of agrotourism destinations can damage their image and deter potential visitors. False reports, often spread via social media, can lead to decreased trust in the destination. The impact of social media, destination image, and tourism facilities on tourists' revisit intentions is well-documented. Cahyani, Safitri, and Mahmud's (2024) study highlights the importance of social media in shaping the image of tourism destinations and influencing tourists' decisions to revisit. The research emphasizes that positive portrayals of tourism facilities and destinations on social media contribute to creating a favorable image, which, in turn, boosts tourist interest in returning. Therefore, fostering a positive narrative through digital platforms can mitigate the effects of negative news and enhance the attractiveness of tourism destinations, such as agrotourism sites in Sembalun.

Table. 8 External Factor Evaluation Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| External Factor | Weight | Rating | Score | Priority |
| Opportunities |  |  |  |  |
| Increased interest from tourists in nature-based and agricultural tourism. | 0.11 | 4.85 | 0.51 | 1 |
| The potential for broader collaboration with academics and investors. | 0.1 | 4 | 0.39 | 5 |
| Digitalization and social media can enhance agrotourism promotion. | 0.1 | 4.45 | 0.46 | 3 |
| Growing public awareness of sustainability. | 0.09 | 4.6 | 0.4 | 4 |
| Government policies supporting tourism sector development. | 0.1 | 5 | 0.5 | 2 |
| Threats |  |  |  |  |
| Lack of government focus on agrotourism compared to other tourism sectors, such as coastal tourism. | 0.12 | 3.7 | 0.43 | 3 |
| Dependency on seasons and weather affecting the business sector. | 0.09 | 5 | 0.45 | 2 |
| Lack of policy support and infrastructure for agrotourism businesses. | 0.12 | 3.2 | 0.37 | 4 |
| Differences in local rules and regulations (awig-awig) hindering development. | 0.09 | 3.7 | 0.32 | 5 |
| Negative news and fake news affecting the destination's image. | 0.1 | 4.8 | 0.46 | 1 |
| Total EFE Score | 1 |  | 0.23 |  |
| ***Source****: Primary Data Processed, 2025* | | | | |

Based on the analysis of the External Factor Evaluation (EFE) matrix, the main opportunity for agrotourism development in Sembalun is the increased interest from tourists in nature-based and agricultural tourism, with a score of 0.51. As more tourists seek authentic agricultural and nature experiences, this opportunity presents a significant growth avenue for the region.

The potential for broader collaboration with academics and investors also presents a chance for further development, with a score of 0.39. This collaboration can provide research support and funding that will accelerate the growth of agrotourism.

Digitalization and social media offer significant advantages in promoting agrotourism, with a score of 0.46, enabling efficient outreach to a wider audience.

Growing public awareness of sustainability (scoring 0.40) also provides an opportunity to further promote environmentally friendly agrotourism. Public demand for sustainable tourism practices will likely support the sector's growth.

The government policies supporting the tourism sector are critical, with a score of 0.50, creating an opportunity for further development in infrastructure and promotions, which will enhance the destination's competitiveness.

However, several threats also need to be considered. The lack of government focus on agrotourism compared to other tourism sectors, such as coastal tourism, is a significant concern, scoring 0.43. This may limit the attention and support needed for agrotourism to thrive.

Dependency on seasonal weather patterns also poses a threat to agrotourism, as it can affect agricultural yields and the availability of attractions, with a score of 0.45. The lack of policy support and infrastructure for agrotourism businesses, with a score of 0.37, remains a challenge, requiring attention from both the government and private sectors to develop this area

**3.4 Strategy for Optimizing the Collaboration of Pentahelix Elements in Agrotourism Development**

The A'WOT method (Analytical SWOT) is employed in this research to develop strategies for agrotourism development based on the Pentahelix model in Sembalun District. This method combines SWOT Analysis and the Analytical Hierarchy Process (AHP) to produce more objective and data-driven results.

This approach will help in optimizing the collaboration among Pentahelix elements and contribute to the long-term sustainability of agrotourism in the region.

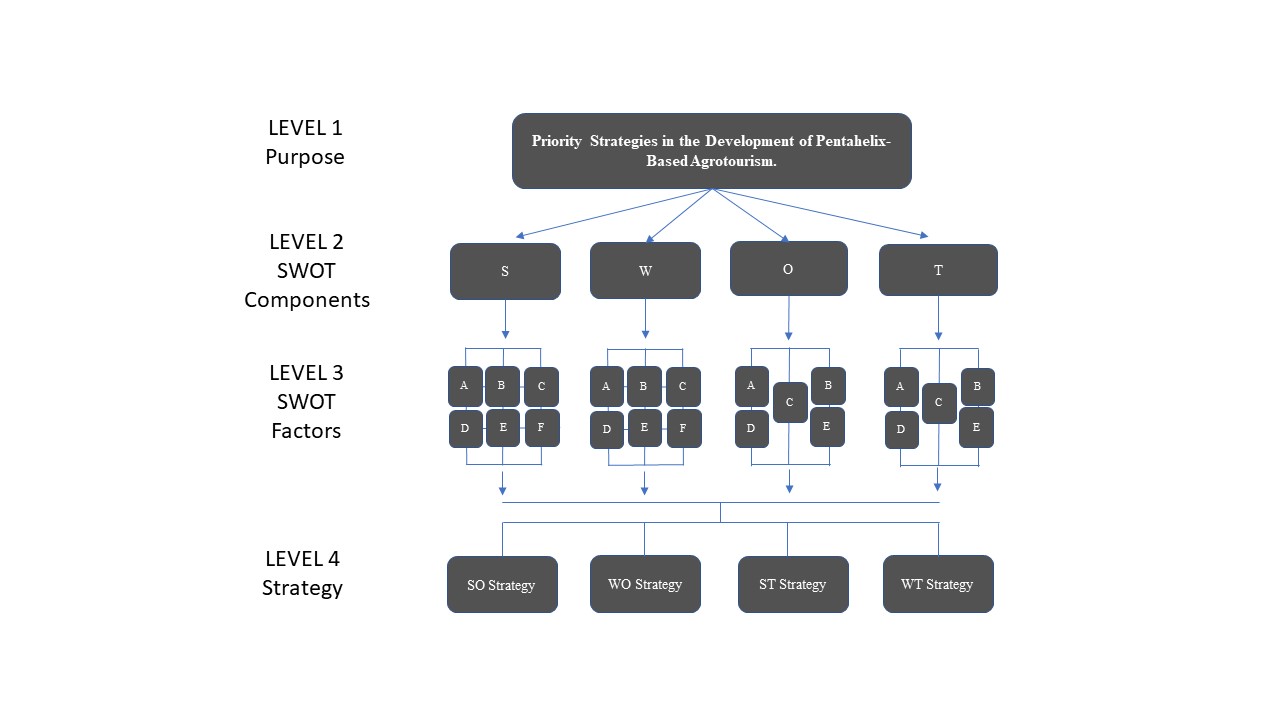


Figure 1. A’WOT Hierarchical Structure (Kangas et al., 2001

factors that influence the development of agrotourism through the IFE (Internal Factor Evaluation) and EFE (External Factor Evaluation) matrices. Priority weighting of the SWOT components obtained from the internal and external matrices is then carried out. Next, SWOT factors are weighted using the AHP (Analytic Hierarchy Process) to determine the level of importance of each factor through pairwise comparisons. The results of these weightings serve as the basis for formulating strategies based on the four main SWOT combinations (SO, WO, ST, WT) to determine the optimal strategy priorities.

**3.4.1 AHP Analysis for SWOT**

Table. 9 AHP Analysis for SWOT

|  |  |  |
| --- | --- | --- |
| **Component** | **Score** | **Priority** |
| INTERNAL STRATEGY FACTORS | | |
| STENGHT (S) | 2.05 | 2 |
| WEAKNES (W0 | 1.53 | 4 |
| **Total = 0.51** | | |
| EKSTERNAL STRATEGY FACTORS | | |
| OPPORTUNITIES (O) | 2.27 | 1 |
| THREATS (T) | 2.03 | 3 |
| **Total = 0.23** | | |
| ***Source****: Primary Data Processed, 2025* | | |

Based on the data analysis, the priority ranking of the SWOT components is as follows: the **opportunity** component received the highest score of 2.27, meaning it is the most important SWOT component, followed by the **strength** component with a score of 2.05, then the **threat** factor with a score of 2.03, and lastly, the **weakness** component with a score of 1.53. To visualize the position of agrotourism development using the A’WOT model, a SWOT diagram is used to represent the strategic position. The results of the SWOT quadrant calculation show that the position on the x-axis is at coordinate 0.51 and on the y-axis at coordinate 0.23, indicating that the internal and external conditions of agrotourism in Sembalun District are favorable. These results are similar to the research conducted by Santana, Dolorosa, & Kurniati (2023), who also found that the tourism destination in their study was in Quadrant I, thus suggesting an aggressive growth strategy. They emphasize that tourism in this position must optimize the existing resources and enhance tourist attractions through innovation and promotion.

**3.4.2 AHP Analysis for SWOT Factors**

pairwise comparison matrix for each SWOT priority factor derived from the analysis of the EFE and IFE matrices. The identified priority factors are as follows: F1 - Infrastructure development and tourism area promotion have been undertaken; F2 - The community is active in education, innovation, and preserving the environment and local culture; F3 - The government faces budget limitations in supporting agrotourism; F4 - Collaboration among pentahelix elements is not yet optimal; F5 - Increasing tourist interest in nature-based and agricultural tourism; F6 - Government policies support the development of the tourism sector; F7 - Negative news and hoaxes that can damage the image of the destination; and F8 - Dependence on seasons and weather affects the business sector. These prioritized SWOT factors are then analyzed using a pairwise comparison matrix. The results from each pairwise comparison matrix from all informants are combined into a representative pairwise comparison matrix

Matriks perbandingan berpasangan refresentatif

Table 10. AHP Analysis for SWOT Factors (Refresentatif)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Faktor** | **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** |
| **F1** | 1.00 | 3.10 | 3.90 | 5.30 | 2.93 | 5.38 | 2.35 | 3.95 |
| **F2** | 0.32 | 1.00 | 2.17 | 2.70 | 2.17 | 3.78 | 2.00 | 2.35 |
| **F3** | 0.26 | 0.46 | 1.00 | 2.35 | 0.50 | 1.02 | 0.68 | 0.87 |
| **F4** | 0.19 | 0.37 | 0.43 | 1.00 | 0.87 | 2.17 | 0.36 | 0.43 |
| **F5** | 0.34 | 0.46 | 2.00 | 1.15 | 1.00 | 2.10 | 2.00 | 2.77 |
| **F6** | 0.19 | 0.26 | 0.98 | 0.46 | 0.36 | 1.00 | 0.32 | 0.66 |
| **F7** | 0.43 | 0.50 | 1.47 | 2.77 | 0.50 | 1.15 | 1.00 | 2.00 |
| **F8** | 0.25 | 0.43 | 1.15 | 2.35 | 0.36 | 2.00 | 0.50 | 1.00 |
| **Total** | 2.97 | 6.59 | 13.08 | 18.09 | 8.69 | 18.60 | 9.22 | 14.02 |

***Source****: Primary Data Processed, 2025*

After obtaining the results of the representative pairwise comparison matrix, normalization and consistency testing (CR) are performed, and the calculation results can be seen in the following table.

Table AHP Analysis for SWOT FACTOR

Table 11. AHP Analysis for SWOT Factors (priority)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Faktor** | **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** | **Priority** | **EV** |
| **F1** | 0.34 | 0.47 | 0.30 | 0.29 | 0.34 | 0.29 | 0.26 | 0.28 | 0.32 | 0.95 |
| **F2** | 0.11 | 0.15 | 0.17 | 0.15 | 0.25 | 0.20 | 0.22 | 0.17 | 0.18 | 1.16 |
| **F3** | 0.09 | 0.07 | 0.08 | 0.13 | 0.06 | 0.06 | 0.07 | 0.06 | 0.08 | 1.00 |
| **F4** | 0.06 | 0.06 | 0.03 | 0.06 | 0.10 | 0.12 | 0.04 | 0.03 | 0.06 | 1.12 |
| **F5** | 0.11 | 0.07 | 0.15 | 0.06 | 0.12 | 0.11 | 0.22 | 0.20 | 0.13 | 1.13 |
| **F6** | 0.06 | 0.04 | 0.07 | 0.03 | 0.04 | 0.05 | 0.03 | 0.05 | 0.05 | 0.88 |
| **F7** | 0.14 | 0.08 | 0.11 | 0.15 | 0.06 | 0.06 | 0.11 | 0.14 | 0.11 | 0.98 |
| **F8** | 0.09 | 0.06 | 0.09 | 0.13 | 0.04 | 0.11 | 0.05 | 0.07 | 0.08 | 1.13 |
| **Total** | | | | | | | | | 1 | 8.36 |

***Source****: Primary Data Processed, 2025*

The results of the representative pairwise comparison matrix, obtained from the assessments of each informant, were then normalized, meeting a CR value of 0.036, indicating that the pairwise comparison matrix is consistent, as the value is less than 0.1. Based on the priority weight results, the highest priority factor is F1 (0.32) - Infrastructure development and tourism area promotion have been undertaken; followed by F2 (0.18) - The community is active in education, innovation, and preserving the environment and local culture; F5 (0.13) - Increasing tourist interest in nature-based and agricultural tourism; F7 (0.11) - Negative news and hoaxes that can damage the image of the destination; F3 (0.08) - The government faces budget limitations in supporting agrotourism; and F8 (0.08) - Dependence on seasons and weather affects the business sector.

**3.4.3 Strategy**

The determination of strategies is at the final level of the hierarchy and is carried out by formulating strategic alternatives in the SWOT matrix, which is the result of the combination of alternative strategies. Each alternative strategy can be seen in the following SWOT matrix. The alternative strategies generated earlier are then analyzed using a pairwise comparison matrix. The calculation results are normalized and tested for consistency using the consistency ratio (CR) tes.

Table 12. SWOT Matrix

|  |  |  |
| --- | --- | --- |
| **IFE**        **EFE** | ***Strengths* (S)**   1. The government has issued regional regulations (Perda) to provide a legal foundation that supports the development of agrotourism. 2. Farmers have received assistance and training to develop agrotourism-based businesses, which strengthens local entrepreneurial capacity. 3. Infrastructure development and destination promotion have been actively pursued to improve accessibility and attract visitors. 4. Academics contribute scientific research and data, which serve as a basis for evidence-based policymaking in agrotourism development. 5. Communities are actively engaged in education, innovation, and the preservation of local culture and the environment, fostering sustainable tourism practices. 6. Media supports the promotion of agrotourism and enhances the image of the destination through various digital platforms. | **Weaknesses (W)**   1. The government faces budget limitations in providing adequate support for agrotourism development. 2. Collaboration among pentahelix elements (government, academia, business, community, and media) remains suboptimal, hindering synergistic efforts. 3. Academics experience difficulties in data collection due to differences in business orientation and priorities. 4. Businesses face limited capital and restricted access to funding, which hampers their ability to grow agrotourism-based enterprises. 5. Communities encounter challenges in coordination and funding, which reduce the effectiveness of their initiatives. 6. Media faces limitations in digital infrastructure and is affected by hoaxes or misinformation, which can negatively impact the destination's image. |
| ***Opportunities* (O)**   1. The growing interest of tourists in nature-based and agricultural tourism presents a significant opportunity for agrotourism development. 2. There is potential for broader collaboration with academics and businesses, which can enhance innovation and investment in the sector. 3. Digitalization and social media offer effective tools for promoting agrotourism and increasing destination visibility. 4. Public awareness of sustainability issues is increasing, aligning with the principles of responsible and eco-friendly tourism. 5. Government policies increasingly support the development of the tourism sector. | **SO Strategies**   1. Optimize government regulations and support (S1) by expanding collaboration with academics and businesses to enhance agrotourism development (O2, O5). 2. Leverage academic research findings (S4) to support the formulation of sustainability-based policies (O4). 3. Utilize digital media (S6) to increase the promotion of nature-based and agricultural tourism (O1, O3). 4. Enhance community involvement in innovation and education for sustainability-based tourism (S5, O4). | **Strategi WO**   1. Enhance collaboration among pentahelix elements (W2) to optimize government support in providing funding access for businesses and other elements (O2, O5). 2. Facilitate academic data collection by collaborating with communities and businesses (W3, O2). 3. Develop funding access for businesses and communities (W4, W5) through government policy support (O5). 4. Improve digital infrastructure to expand media access for tourism promotion and support the digitalization of agrotourism services (W6, O3). |
| ***Threats* (T)**   1. The lack of government focus on agrotourism, compared to more popular attractions such as coastal tourism, limits its development. 2. Dependence on seasonal and weather conditions poses a risk to the stability and productivity of agrotourism businesses. 3. Insufficient policy support and infrastructure for agrotourism enterprises hinder their growth and competitiveness. 4. Differences in local customs and regulations (awig-awig) may restrict the implementation of tourism development programs. 5. Negative news and misinformation (hoaxes) can damage the destination's image and reduce tourist trust. | **Strategi ST**   1. Utilize regional regulations (S1) to encourage greater government focus on agrotourism compared to other types of tourism (T1). 2. Develop business diversification programs to reduce dependence on seasonal and weather conditions (S2, S3, T2). 3. Leverage digital media and academics (S4, S6) to counter hoaxes and negative news that may damage the destination's image (T5). 4. Strengthen the role of the community in bridging local regulations (S5, T4). | **Strategi WT**   1. Optimize the budget through alternative funding schemes such as CSR and tourism grants (W1, T3). 2. Develop capacity-building programs for communities and businesses to improve coordination (W5, T4). 3. Develop weather impact mitigation strategies by diversifying tourism products (W2, T2). 4. Enhance digital literacy to counter hoaxes that can damage the destination's image (W6, T5). |

***Source****: Primary Data Processed, 2025*

From the SWOT factors, 16 alternative strategies were generated, consisting of four SO strategies, four WO strategies, four WT strategies, and four ST strategies. These alternative strategies will serve as a basis for the development of agrotourism in Sembalun District. To apply the most appropriate strategy, further analysis will be conducted to determine the priority of the strategies.

The 16 alternative strategies generated were then analyzed using a pairwise comparison matrix. There are five pairwise comparison matrices from each informant for each pentahelix element. These five pairwise comparison matrices are processed to produce a single representative pairwise comparison matrix that reflects all responses. The results of this data processing are presented in the representative pairwise comparison matrix. After obtaining the representative pairwise comparison matrix, the normalization calculations and consistency ratio (CR) tests can be seen in the following table.

Table 13. Matriks perbandingan berpasangan refresentatif

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Alternative** | **SO1** | **SO2** | **SO3** | **SO4** | **WO1** | **WO2** | **WO3** | **WO4** | **ST1** | **ST2** | **ST3** | **ST4** | **WT1** | **WT2** | **WT3** | **WT4** |
| **SO1** | 1.0 | 1.3 | 0.5 | 2.4 | 0.8 | 0.0 | 2.3 | 0.5 | 0.8 | 2.1 | 2.5 | 2.1 | 2.9 | 1.8 | 1.2 | 1.1 |
| **SO2** | 0.8 | 1.0 | 1.0 | 0.4 | 0.2 | 0.6 | 0.3 | 0.6 | 1.4 | 1.2 | 0.5 | 0.6 | 0.4 | 1.0 | 1.2 | 0.5 |
| **SO3** | 2.2 | 1.0 | 1.0 | 2.5 | 1.1 | 1.0 | 0.6 | 0.8 | 0.9 | 1.4 | 1.6 | 1.3 | 0.9 | 0.5 | 1.6 | 1.1 |
| **SO4** | 0.4 | 2.6 | 0.4 | 1.0 | 5.0 | 0.6 | 0.7 | 0.3 | 0.9 | 0.6 | 0.9 | 0.5 | 0.9 | 0.9 | 0.6 | 0.5 |
| **WO1** | 2.0 | 4.1 | 0.9 | 0.2 | 1.0 | 0.7 | 0.7 | 0.9 | 0.8 | 1.0 | 0.9 | 0.5 | 2.3 | 1.0 | 0.9 | 1.1 |
| **WO2** | 0.3 | 1.6 | 1.0 | 0.9 | 1.4 | 1.0 | 0.9 | 1.4 | 1.0 | 0.4 | 1.2 | 1.0 | 1.4 | 0.9 | 0.5 | 1.2 |
| **WO3** | 0.4 | 1.3 | 1.2 | 1.5 | 1.0 | 1.1 | 1.0 | 1.5 | 1.1 | 0.4 | 1.2 | 0.9 | 1.1 | 0.8 | 0.4 | 1.2 |
| **WO4** | 1.9 | 1.6 | 1.2 | 1.3 | 1.1 | 2.5 | 0.9 | 1.0 | 0.8 | 0.9 | 0.8 | 1.4 | 0.8 | 0.7 | 1.2 | 0.9 |
| **ST1** | 1.2 | 0.7 | 1.8 | 1.1 | 1.2 | 1.0 | 0.9 | 1.2 | 1.0 | 0.4 | 0.7 | 0.7 | 1.2 | 0.8 | 0.9 | 1.0 |
| **ST2** | 0.5 | 0.8 | 0.7 | 1.2 | 1.0 | 1.3 | 1.2 | 1.2 | 0.8 | 1.0 | 0.5 | 0.8 | 0.8 | 0.7 | 1.1 | 3.0 |
| **ST3** | 0.2 | 1.0 | 0.7 | 1.0 | 1.1 | 1.2 | 0.8 | 1.2 | 1.1 | 0.7 | 1.0 | 1.3 | 1.0 | 0.3 | 1.4 | 0.8 |
| **ST4** | 0.5 | 1.6 | 1.0 | 1.2 | 0.9 | 0.5 | 1.1 | 1.1 | 1.4 | 1.2 | 0.4 | 1.0 | 0.7 | 0.8 | 0.7 | 1.0 |
| **WT1** | 0.3 | 1.3 | 1.1 | 1.1 | 0.6 | 1.1 | 0.4 | 1.3 | 0.8 | 1.2 | 1.0 | 1.4 | 1.0 | 0.3 | 0.5 | 0.8 |
| **WT2** | 0.6 | 1.0 | 1.2 | 0.7 | 0.8 | 1.1 | 0.8 | 1.4 | 1.2 | 0.9 | 1.3 | 1.2 | 1.3 | 1.0 | 0.8 | 0.9 |
| **WT3** | 0.8 | 0.8 | 1.0 | 1.2 | 0.9 | 1.2 | 1.3 | 0.7 | 1.1 | 0.9 | 0.3 | 1.4 | 1.1 | 1.2 | 1.0 | 0.8 |
| **WT4** | 0.9 | 2.1 | 1.4 | 1.9 | 0.9 | 0.8 | 0.3 | 1.0 | 1.0 | 0.3 | 1.2 | 0.4 | 1.2 | 1.1 | 1.2 | 1.0 |
| total | 14.1 | 23.7 | 16.0 | 19.5 | 19.0 | 15.6 | 14.0 | 16.3 | 16.0 | 14.8 | 16.1 | 16.3 | 19.1 | 14.0 | 15.4 | 17.1 |

Source: Primary Data Processed, 2025

The results of the refractory comparison matrix of alternative strategies were then normalized and tested for consistency to see if the data used met the criteria. Follow the normalized pairs comparison matrix table

Table 14. Matriks Perbandingan Berpasangan(bobot perioritas

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Alternative** | **SO1** | **SO2** | **SO3** | **SO4** | **WO1** | **WO2** | **WO3** | **WO4** | **ST1** | **ST2** | **ST3** | **ST4** | **WT1** | **WT2** | **WT3** | **WT4** | **Priority** | **EV** |
| **SO1** | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.09 | 1.3 |
| **SO2** | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.05 | 1.1 |
| **SO3** | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.07 | 1.2 |
| **SO4** | 0.0 | 0.1 | 0.0 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.06 | 1.1 |
| **WO1** | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.07 | 1.3 |
| **WO2** | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.06 | 0.9 |
| **WO3** | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.06 | 0.8 |
| **WO4** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.07 | 1.2 |
| **ST1** | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.06 | 1.0 |
| **ST2** | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.06 | 0.9 |
| **ST3** | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.06 | 0.9 |
| **ST4** | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.06 | 0.9 |
| **WT1** | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.05 | 1.0 |
| **WT2** | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.06 | 0.9 |
| **WT3** | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.06 | 0.9 |
| **WT4** | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.06 | 1.1 |
| eigen vactor | | | | | | | | | | | | | | | | | 1.0 | 16.6 |

***Source:*** *Primary Data Processed, 2025*

**CI**= (16.5 - 16) / (16 - 1) = 0.039 **CR** = 0.039 / 1.6 = 0.024 (**CR < 0.1,** meaning the data is consistent).

Based on the AHP calculation results for strategy formulation, the data was found to be consistent, with a CR value of 0.024, indicating that the generated data is reliable and can be used. The priority ranking of strategies is as follows:

SO1 → 0.089

SO1 (Optimizing regulations and government support (S1) by expanding collaboration with academia and businesses to support agrotourism development (O2, O5)).

SO3 → 0.074

SO3 (Utilizing digital media (S6) to enhance the promotion of nature-based and agricultural tourism (O1, O3)).

WO1 → 0.072

WO1 (Strengthening collaboration among pentahelix elements (W2) to optimize government support in providing funding access for businesses and other stakeholders (O2, O5)).

WO4 → 0.070

WO4 (Enhancing digital infrastructure to expand media access for tourism promotion and support the digitalization of agrotourism services (W6, O3)).

The strategies derived from the pairwise comparison matrix were selected based on the four highest-priority alternatives, which will be used as input for the next analytical tool. The application of QSPM aims to obtain stronger and more validated data results.

**Quantitative Strategic Planning Matrix (QSPM)**

The Quantitative Strategic Planning Matrix (QSPM) is a strategic analysis tool used to evaluate the most suitable alternative strategies based on an organization's internal and external factors (David & David, 2017). QSPM serves as a follow-up stage after the SWOT and IFAS/EFAS analyses, aiming to rank alternative strategies by assigning weights and relative attractiveness scores to each strategic factor. This method relies on inputs from previous stages, particularly the results of the SWOT and AHP analyses, to provide a quantitative justification for selecting the best strategies. The priority weights derived from the AHP analysis are then utilized in QSPM as Attractiveness Scores (AS) to assess the relative appeal of each alternative strategy. Thus, each strategy in QSPM is evaluated based on objective weights obtained from AHP.

In the context of this research, QSPM is used to determine the optimal strategy for developing agrotourism based on the pentahelix model in Sembalun District. AHP provides a quantitative method to determine the weight of internal and external factors, thereby reducing subjectivity in strategic decision-making (Saaty, 2008). By utilizing AHP, the factor weights used in QSPM are more structured and analytically justified, facilitating the calculation of the Total Attractiveness Score (TAS) in QSPM.

The integration of AHP and QSPM enhances accuracy and consistency in strategy formulation. By determining strategy weights before conducting QSPM, this study ensures that the resulting decisions are not solely based on intuition but on validated data, as tested through the AHP Consistency Ratio (CR). Additionally, the combination of these methods strengthens the reliability of the strategy recommendations, as AHP assesses the importance of factors, while QSPM evaluates the attractiveness of strategies based on those factors (Görener et al., 2012). In this study, QSPM is utilized as a tool to prioritize strategies for agrotourism development based on the pentahelix model in Sembalun. The use of AHP before QSPM provides a strong analytical foundation, ensuring that strategy weights are determined objectively before strategy evaluation using QSPM. This approach enhances the scientific and practical accountability of the resulting strategies.

Alternative Strategies from QSPM Analysis

Based on the SWOT Matrix analysis, four alternative strategies were identified as priority recommendations from AHP, adjusted to the needs and conditions of agrotourism in Sembalun District using the pentahelix approach. The four alternative strategies are as follows:

1. Optimizing regulations and government support (S1) by expanding collaboration with academia and businesses to support agrotourism development (O2, O5).
2. Utilizing digital media (S6) to enhance the promotion of nature-based and agricultural tourism (O1, O3).
3. Strengthening collaboration among pentahelix elements (W2) to optimize government support in providing funding access for businesses and other stakeholders (O2, O5).
4. Leveraging digitalization to address the lack of digital infrastructure for media and enhance tourism promotion (W6, O3).

Table 15. QSPM Analysis

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strategic Factors** | **Weight** | **SO1** | | **SO3** | | **WO1** | | **WO4** | |
| **AS** | **TAS** | **AS** | **TAS** | **AS** | **TAS** | **AS** | **TAS** |
| **Strengths** |  |  |  |  |  |  |  |  |  |
| 1. Regional regulations support agrotourism | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 2. Assistance and training for farmers | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 3. Infrastructure and promotion efforts | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 |
| 4. Academics provide scientific studies | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 5. Active community in education & innovation | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 6. Media supports digital promotion | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 |
| **Weaknesses** |  |  |  |  |  |  |  |  |  |
| 1. Limited government budget | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 |
| 2. Suboptimal collaboration between elements | 0.1 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 | 3 | 0.3 |
| 3. Academics face data collection difficulties | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 |
| 4. Businesses face capital constraints | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 5. Communities struggle with coordination | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 6. Media faces digital infrastructure limitations | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| **Opportunities** |  |  |  |  |  |  |  |  |  |
| 1. Increasing interest in nature & agricultural tourism | 0.1 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 | 3 | 0.3 |
| 2. Greater collaboration potential | 0.1 | 4 | 0.4 | 3 | 0.3 | 4 | 0.4 | 4 | 0.4 |
| 3. Digitalization enhances promotion | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 4. Growing sustainability awareness | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| 5. Policies support the tourism sector | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| **Threats** |  |  |  |  |  |  |  |  |  |
| 1. Lack of government focus on agrotourism | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3.2 | 0.32 |
| 2. Dependency on seasons and weather | 0.1 | 4 | 0.4 | 3 | 0.3 | 4 | 0.4 | 4 | 0.4 |
| 3. Lack of policy & infrastructure support | 0.1 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 | 3 | 0.3 |
| 4. Differences in local regulations | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 3 | 0.3 |
| 5. Negative news & hoax issues | 0.1 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 | 4 | 0.4 |
| **Total TAS** | 1 |  | 8.8 |  | 8.4 |  | 8.00 |  | 7.92 |
| *Source: Primary Data Processed, 2025* | | | | | | | | | |

After calculating the Total of Attractiveness Score (TAS) for each alternative strategy, the strategies are ranked based on the highest AS value, which indicates the most feasible strategy to be implemented.

Table 16. QSPM Ranking

|  |  |  |  |
| --- | --- | --- | --- |
| **Strategy** | **Alternative Strategy** | **TAS Value** | **Ranking** |
| SO1 | Optimize regulations and government support (S1) by expanding collaboration with academia and business to support agrotourism development (O2, O5) | 8.3 | 1 |
| SO3 | Utilize digital media (S6) to enhance promotion of nature-based and agricultural tourism (O1, O3) | 7.36 | 3 |
| WO1 | Improve collaboration among pentahelix elements (W2) to optimize government support in providing funding access for businesses and other elements (O2, O5) | 7.15 | 2 |
| WO4 | Improve digital infrastructure to expand media access in tourism promotion and support the digitalization of agrotourism services (W6, O3) | 7.13 | 4 |

*Source: Primary Data Processed, 2025*

for agrotourism development in Sembalun is optimizing regulations and government support by expanding collaboration between academia and businesses (TAS: 8.30). This strategy is crucial because strong regulations and synergy with the academic and business sectors can accelerate the sustainable development of agrotourism. Additionally, enhancing collaboration among the pentahelix elements to support funding access for businesses and other stakeholders (TAS: 7.15) is an important strategy to overcome capital constraints. Utilizing digital media as a promotional tool for nature- and agriculture-based tourism (TAS: 7.36) is also an effective strategy to attract tourists, aligning with the increasing trend of digitalization in the tourism sector.

Moreover, strengthening digital infrastructure to expand media access and support the digitalization of agrotourism services (TAS: 7.13) is necessary to improve information accessibility and provide a more modern tourism experience. The synergistic implementation of these four strategies will accelerate the growth of pentahelix-based agrotourism in Sembalun, creating a more inclusive, innovative, and sustainable tourism ecosystem.

Explanation of Each Strategy:

1. SO1 Strategy - Optimizing Regulations and Government Support by Expanding Collaboration with Academia and Businesses for Agrotourism Development (TAS: 8.30)

This strategy has the highest TAS score, indicating that it is the most attractive and feasible to implement. The government's role in providing regulations that support investment and academic collaboration will be a key factor in the sustainable development of agrotourism. The lack of collaboration among pentahelix elements (W2) has been a significant obstacle in Sembalun’s agrotourism development, particularly in terms of funding access for business actors and local communities. However, there is great potential for broader collaboration between academia and businesses (O2), as well as increasing government policies that support tourism sector development (O5).

This strategy aims to strengthen synergy among pentahelix elements so that the government can more effectively channel funding to businesses and other stakeholders involved in agrotourism development. Better coordination will ensure that funding policies are more targeted, fostering a sustainable business environment.

**Implementation:**

* Regional Regulation (Perda) on Sustainable Agrotourism Development and Ministerial/Local Government Decrees on Agrotourism Operational Standards.
* Establishment of a Pentahelix Collaboration Forum for Funding Access.This forum will serve as a communication platform for the government, academia, businesses, communities, and media to discuss funding policies aligned with agrotourism development needs. Academia can play a role in conducting economic and social impact studies of investments in the agrotourism sector, while businesses and local communities can receive guidance on accessing grants, soft loans, or other investment schemes.
* Encouraging Special Funding Schemes for Agrotourism. The government can utilize tourism-supportive policies (O5) to provide financial incentives such as loan interest subsidies, small business credit schemes (KUR) for agrotourism enterprises, or grants for agricultural and tourism-based MSMEs. Businesses can leverage academic collaboration potential (O2) to develop research- and innovation-based funding proposals to attract investors and donor institutions. Communities and entrepreneurs can gain broader access to Corporate Social Responsibility (CSR)-based funding from companies interested in contributing to agrotourism development.
* Integrating Digitalization into Funding Access.Digitalization (O3) can be utilized by creating an information platform that facilitates entrepreneurs’ access to various financing schemes from the government, banks, and private investors. This platform can also enhance transparency in fund management and document funded agrotourism projects. Social media can be used to disseminate funding opportunities and encourage broader involvement in supporting the agrotourism sector.
* Developing Regulations that Support Pentahelix Funding Synergy. The government can issue regulations that encourage business-academia-community partnerships in agrotourism funding schemes, such as requiring academic collaboration in any grant proposals submitted for government funding.

1. SO3 Strategy - Utilizing Digital Media to Enhance the Promotion of Nature- and Agriculture-Based Tourism (TAS: 7.36)

This strategy is also a strong approach to increasing the attractiveness of agrotourism. Digital technology utilization will enhance the visibility and appeal of tourist destinations, particularly for domestic and international tourists. This is supported by the findings of Buhalis and Law (2008), which indicate that digitalization in tourism marketing through e-tourism can enhance destination competitiveness and significantly increase tourist visits. In the context of agrotourism development in Sembalun, one of the main challenges faced is the lack of digital infrastructure, particularly for media in promoting the destination (W6), leading to suboptimal tourism promotion. However, digitalization and social media offer significant potential for boosting agrotourism promotion (O3). This strategy aims to improve digital infrastructure, strengthen local media capacity, and leverage digital technology for broader, more effective, and engaging agrotourism promotion.

**Implementation:**

* Training and Mentoring for Media and Local Communities.Collaboration between academia and businesses can facilitate digital marketing, photography, videography, and storytelling training for local media, tourism communities, and agrotourism business owners. Training sessions can cover social media optimization, SEO (Search Engine Optimization) techniques, and digital advertising strategies to make tourism promotion more effective and reach a wider audience.
* Development of Digital Platforms and Online Promotional Campaigns. Creating an official website or digital marketplace specifically for Sembalun agrotourism, featuring tourist information, tour packages, visitor testimonials, and online booking options.
* Expanding the use of social media platforms (Instagram, TikTok, YouTube, Facebook, Twitter) to promote tourist attractions, local products, and success stories of farmers and business owners in the agrotourism sector.
* Developing 360° virtual tours to allow potential tourists to explore destinations online before visiting. Integrating Augmented Reality (AR) and QR Codes at tourist sites to provide interactive educational experiences about plants, agricultural processes, and agrotourism history.

1. Enhancing Collaboration Among Pentahelix Elements to Optimize Government Support for Funding Access (TAS: 7.16)

This strategy, while relevant, has a slightly lower attractiveness than media-based and regulatory strategies. It aims to address the lack of collaboration among pentahelix elements (W2) and optimize funding access for businesses and other stakeholders by leveraging government policies that support sustainable tourism (O2, O5). With a more coordinated approach, the government’s role as a funding facilitator can be more effective in supporting agrotourism development in Sembalun.

**Implementation:**

* Establishing the Sembalun Pentahelix Collaboration Forum by forming a pentahelix communication and cooperation platform and developing a stakeholder and funding opportunity database.
* Improving Funding Access for Businesses and Communities by optimizing grants and government incentives and developing crowdfunding schemes for agrotourism development.
* Enhancing the Capacity of Business Actors and Communities in Funding Access through financial management and funding proposal training, as well as business mentoring and access to startup incubators.

1. Strengthening Digital Infrastructure to Expand Media Access for Tourism Promotion and Support Agrotourism Service Digitalization (TAS: 7.13)

This strategy, though scoring the lowest, remains relevant. Government support for agrotourism policies is essential but must be integrated with other strategies for optimal results. Study Hall (2019) highlights that policy interventions should align with local needs for more effective implementation.

**mplementation:**

* Strengthening Digital Infrastructure for Agrotourism, such as providing free WiFi at key tourism spots in collaboration with local governments and internet providers. Locations could include Bukit Pergasingan, Sembalun Tourism Village, strawberry farms, and traditional markets. Additionally, QR codes at each tourist site can direct visitors to digital platforms containing essential tourism information.
* Developing the Official Sembalun Agrotourism Website, featuring comprehensive tourism-related conten.

# 4. CONCLUSION

Based on the research findings and data analysis, it can be concluded that each element of the pentahelix plays an interconnected and crucial role in the development of agrotourism in Sembalun District, East Lombok Regency. The government acts as a regulator and facilitator, providing policies and infrastructure support, which is monitored by the community. The community actively participates in the implementation and management of agrotourism, while academia contributes through theoretical foundations and research for innovation and product development. The business sector fosters investment opportunities and job creation, and the media promotes the destination and enhances its image, strengthening the local economy and supporting sustainability. Key internal and external factors influencing the sector include the growing interest in nature-based tourism, government policies supporting tourism, digitalization, and increased public awareness of sustainability. However, challenges such as negative news, dependence on seasonal factors, limited government focus on agrotourism, and insufficient infrastructure need to be addressed. The recommended strategies for optimizing pentahelix collaboration include prioritizing government regulation and support, utilizing digital media for promotion, improving collaboration among the elements to optimize funding access, and leveraging digitalization to overcome infrastructure limitations. These strategies are crucial for ensuring sustainable agrotourism development in Sembalun.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that no generative AI technologies like large language models (ChatGPT, copilot, etc.) Moreover, text-to-image generators have been used during the writing or editing of this manuscript.

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# COMPETING INTERESTS

Authors have declared that no competing interests exist.

**AUTHORS’ CONTRIBUTIONS**

Ayu Danavia designed the study, conducted the research, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Anas Zaini and Halimatus Sa’diyah, as the supervisors, guided the study, reviewed the methodology, provided critical feedback, and assisted in the manuscript revision. All authors read and approved the final manuscript.

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**APPENDIX**

Appendix 1. Weight of Internal Factor

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Informan | Ssignifikan Value | | | | | | | | | | | |  | Internal Strategy Facror | | | | | | | | | | | |  |
| (Strenght) | | | | | | (Weakness) | | | | | | Total | (Strenght) | | | | | | (Weakness) | | | | | | Weight |
| A | B | C | D | E | F | A | B | C | D | E | F |  | A | B | C | D | E | F | A | B | C | D | E | F |  |
| 1 | Tourism Office (G1) | 4 | 2 | 4 | 2 | 4 | 5 | 4 | 2 | 1 | 2 | 3 | 1 | 34 | 0.12 | 0.06 | 0.12 | 0.06 | 0.12 | 0.15 | 0.12 | 0.06 | 0.03 | 0.06 | 0.09 | 0.03 | 1.00 |
| 2 | Tourism Office (G2) | 5 | 5 | 1 | 4 | 5 | 1 | 1 | 4 | 5 | 4 | 1 | 3 | 39 | 0.13 | 0.13 | 0.03 | 0.10 | 0.13 | 0.03 | 0.03 | 0.10 | 0.13 | 0.10 | 0.03 | 0.08 | 1.00 |
| 3 | Tourism Office (G3) | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 4 | 5 | 5 | 1 | 48 | 0.06 | 0.08 | 0.08 | 0.10 | 0.06 | 0.10 | 0.08 | 0.10 | 0.08 | 0.10 | 0.10 | 0.02 | 1.00 |
| 4 | Agriculture Office (G4) | 5 | 1 | 2 | 2 | 5 | 5 | 2 | 3 | 4 | 3 | 1 | 2 | 35 | 0.14 | 0.03 | 0.06 | 0.06 | 0.14 | 0.14 | 0.06 | 0.09 | 0.11 | 0.09 | 0.03 | 0.06 | 1.00 |
| 5 | Agriculture Office (G5) | 5 | 1 | 2 | 2 | 5 | 1 | 1 | 1 | 4 | 1 | 3 | 2 | 28 | 0.18 | 0.04 | 0.07 | 0.07 | 0.18 | 0.04 | 0.04 | 0.04 | 0.14 | 0.04 | 0.11 | 0.07 | 1.00 |
| 6 | Head of Village (G6) | 2 | 3 | 1 | 4 | 2 | 1 | 5 | 4 | 4 | 4 | 2 | 4 | 36 | 0.06 | 0.08 | 0.03 | 0.11 | 0.06 | 0.03 | 0.14 | 0.11 | 0.11 | 0.11 | 0.06 | 0.11 | 1.00 |
| 7 | Head of Sembalun Subdistrict (G7) | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 5 | 4 | 5 | 4 | 5 | 40 | 0.08 | 0.08 | 0.05 | 0.05 | 0.08 | 0.03 | 0.08 | 0.13 | 0.10 | 0.13 | 0.10 | 0.13 | 1.00 |
| 8 | DMO Media (M1) | 3 | 2 | 5 | 2 | 3 | 1 | 4 | 4 | 3 | 4 | 3 | 1 | 35 | 0.09 | 0.06 | 0.14 | 0.06 | 0.09 | 0.03 | 0.11 | 0.11 | 0.09 | 0.11 | 0.09 | 0.03 | 1.00 |
| 9 | Tourism Office (M2) | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 5 | 2 | 5 | 1 | 1 | 37 | 0.08 | 0.11 | 0.05 | 0.11 | 0.08 | 0.11 | 0.08 | 0.14 | 0.05 | 0.14 | 0.03 | 0.03 | 1.00 |
| 10 | Inside Sembalun (M3) | 5 | 4 | 4 | 4 | 5 | 3 | 3 | 5 | 4 | 5 | 4 | 3 | 49 | 0.10 | 0.08 | 0.08 | 0.08 | 0.10 | 0.06 | 0.06 | 0.10 | 0.08 | 0.10 | 0.08 | 0.06 | 1.00 |
| 11 | Academics (A1) | 4 | 3 | 4 | 1 | 4 | 3 | 1 | 3 | 1 | 3 | 1 | 2 | 30 | 0.13 | 0.10 | 0.13 | 0.03 | 0.13 | 0.10 | 0.03 | 0.10 | 0.03 | 0.10 | 0.03 | 0.07 | 1.00 |
| 12 | Academics (A2) | 3 | 4 | 4 | 5 | 3 | 1 | 3 | 5 | 1 | 5 | 1 | 5 | 40 | 0.08 | 0.10 | 0.10 | 0.13 | 0.08 | 0.03 | 0.08 | 0.13 | 0.03 | 0.13 | 0.03 | 0.13 | 1.00 |
| 13 | Academics (A3) | 5 | 4 | 4 | 5 | 5 | 3 | 5 | 4 | 1 | 4 | 2 | 4 | 46 | 0.11 | 0.09 | 0.09 | 0.11 | 0.11 | 0.07 | 0.11 | 0.09 | 0.02 | 0.09 | 0.04 | 0.09 | 1.00 |
| 14 | DMO | 2 | 1 | 5 | 2 | 2 | 3 | 3 | 5 | 1 | 5 | 4 | 2 | 35 | 0.06 | 0.03 | 0.14 | 0.06 | 0.06 | 0.09 | 0.09 | 0.14 | 0.03 | 0.14 | 0.11 | 0.06 | 1.00 |
| 15 | Tourism Awareness Group of Bumbung (K2) | 4 | 3 | 3 | 5 | 4 | 1 | 1 | 3 | 3 | 3 | 4 | 4 | 38 | 0.11 | 0.08 | 0.08 | 0.13 | 0.11 | 0.03 | 0.03 | 0.08 | 0.08 | 0.08 | 0.11 | 0.11 | 1.00 |
| 16 | Tourism Awareness Group of Sembalun Lawang (K3) | 2 | 5 | 1 | 2 | 2 | 3 | 5 | 3 | 1 | 3 | 2 | 3 | 32 | 0.06 | 0.16 | 0.03 | 0.06 | 0.06 | 0.09 | 0.16 | 0.09 | 0.03 | 0.09 | 0.06 | 0.09 | 1.00 |
| 17 | Tourism Awareness Group of Sembalun Village (K4) | 4 | 3 | 4 | 1 | 4 | 5 | 2 | 4 | 4 | 4 | 3 | 3 | 41 | 0.10 | 0.07 | 0.10 | 0.02 | 0.10 | 0.12 | 0.05 | 0.10 | 0.10 | 0.10 | 0.07 | 0.07 | 1.00 |
| 18 | Agrotourism (B1) | 5 | 5 | 2 | 4 | 5 | 2 | 3 | 2 | 5 | 2 | 1 | 1 | 37 | 0.14 | 0.14 | 0.05 | 0.11 | 0.14 | 0.05 | 0.08 | 0.05 | 0.14 | 0.05 | 0.03 | 0.03 | 1.00 |
| 19 | Restaurant (B2) | 1 | 1 | 4 | 4 | 1 | 2 | 1 | 2 | 1 | 2 | 5 | 5 | 29 | 0.03 | 0.03 | 0.14 | 0.14 | 0.03 | 0.07 | 0.03 | 0.07 | 0.03 | 0.07 | 0.17 | 0.17 | 1.00 |
| 20 | Accommodation (B3) | 4 | 2 | 2 | 4 | 4 | 1 | 2 | 5 | 3 | 5 | 1 | 4 | 37 | 0.11 | 0.05 | 0.05 | 0.11 | 0.11 | 0.03 | 0.05 | 0.14 | 0.08 | 0.14 | 0.03 | 0.11 | 1.00 |
|  | Total | 72 | 60 | 60 | 64 | 72 | 51 | 56 | 74 | 56 | 74 | 51 | 56 |  | 1.95 | 1.59 | 1.63 | 1.70 | 1.95 | 1.37 | 1.49 | 1.96 | 1.50 | 1.96 | 1.39 | 1.52 | 20.00 |
|  | Average | 3.6 | 3.0 | 3.0 | 3.2 | 3.6 | 2.6 | 2.8 | 3.7 | 2.8 | 3.7 | 2.6 | 2.8 |  | 0.10 | 0.08 | 0.08 | 0.08 | 0.10 | 0.07 | 0.07 | 0.10 | 0.07 | 0.10 | 0.07 | 0.08 | 1.00 |

Appendix 2. Weight of Eksternal Factor

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Informant | Signifikan value | | | | | | | | |  |  | Eksternal Strategy | | | | | | | | | |  |
| (Opportunity) | | | | | (Threats) | | | |  | Total | (Opportunity) | | | | | (Threats) | | | | | Weight |
| A | B | C | D | E | A | B | C | D | E |  | A | B | C | D | E | A | B | C | D | E |  |
| 1 | G1 | 3 | 2 | 3 | 2 | 2 | 5 | 2 | 1 | 4 | 2 | 26 | 0.12 | 0.08 | 0.12 | 0.08 | 0.08 | 0.19 | 0.08 | 0.04 | 0.15 | 0.08 | 1.00 |
| 2 | G2 | 3 | 2 | 1 | 3 | 5 | 5 | 2 | 4 | 4 | 2 | 31 | 0.10 | 0.06 | 0.03 | 0.10 | 0.16 | 0.16 | 0.06 | 0.13 | 0.13 | 0.06 | 1.00 |
| 3 | G3 | 2 | 3 | 1 | 5 | 1 | 1 | 2 | 3 | 4 | 2 | 24 | 0.08 | 0.13 | 0.04 | 0.21 | 0.04 | 0.04 | 0.08 | 0.13 | 0.17 | 0.08 | 1.00 |
| 4 | G4 | 2 | 4 | 3 | 1 | 4 | 5 | 1 | 4 | 5 | 4 | 33 | 0.06 | 0.12 | 0.09 | 0.03 | 0.12 | 0.15 | 0.03 | 0.12 | 0.15 | 0.12 | 1.00 |
| 5 | G5 | 4 | 2 | 3 | 4 | 1 | 3 | 1 | 2 | 4 | 5 | 29 | 0.14 | 0.07 | 0.10 | 0.14 | 0.03 | 0.10 | 0.03 | 0.07 | 0.14 | 0.17 | 1.00 |
| 6 | G6 | 3 | 2 | 3 | 1 | 5 | 4 | 1 | 2 | 5 | 3 | 29 | 0.10 | 0.07 | 0.10 | 0.03 | 0.17 | 0.14 | 0.03 | 0.07 | 0.17 | 0.10 | 1.00 |
| 7 | G7 | 4 | 2 | 4 | 4 | 4 | 1 | 3 | 3 | 4 | 3 | 32 | 0.13 | 0.06 | 0.13 | 0.13 | 0.13 | 0.03 | 0.09 | 0.09 | 0.13 | 0.09 | 1.00 |
| 8 | M1 | 3 | 2 | 1 | 5 | 5 | 4 | 5 | 1 | 3 | 2 | 31 | 0.10 | 0.06 | 0.03 | 0.16 | 0.16 | 0.13 | 0.16 | 0.03 | 0.10 | 0.06 | 1.00 |
| 9 | M2 | 3 | 3 | 4 | 5 | 3 | 5 | 2 | 2 | 4 | 2 | 33 | 0.09 | 0.09 | 0.12 | 0.15 | 0.09 | 0.15 | 0.06 | 0.06 | 0.12 | 0.06 | 1.00 |
| 10 | M3 | 4 | 4 | 3 | 4 | 4 | 5 | 2 | 5 | 5 | 2 | 38 | 0.11 | 0.11 | 0.08 | 0.11 | 0.11 | 0.13 | 0.05 | 0.13 | 0.13 | 0.05 | 1.00 |
| 11 | A1 | 3 | 2 | 1 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 22 | 0.14 | 0.09 | 0.05 | 0.14 | 0.14 | 0.05 | 0.14 | 0.09 | 0.09 | 0.09 | 1.00 |
| 12 | A2 | 4 | 2 | 4 | 1 | 1 | 3 | 2 | 2 | 4 | 5 | 28 | 0.14 | 0.07 | 0.14 | 0.04 | 0.04 | 0.11 | 0.07 | 0.07 | 0.14 | 0.18 | 1.00 |
| 13 | A3 | 3 | 4 | 4 | 1 | 1 | 2 | 1 | 1 | 2 | 5 | 24 | 0.13 | 0.17 | 0.17 | 0.04 | 0.04 | 0.08 | 0.04 | 0.04 | 0.08 | 0.21 | 1.00 |
| 14 | K1 | 2 | 4 | 3 | 4 | 4 | 1 | 5 | 4 | 3 | 4 | 34 | 0.06 | 0.12 | 0.09 | 0.12 | 0.12 | 0.03 | 0.15 | 0.12 | 0.09 | 0.12 | 1.00 |
| 15 | K2 | 3 | 3 | 1 | 3 | 4 | 2 | 4 | 2 | 1 | 5 | 28 | 0.11 | 0.11 | 0.04 | 0.11 | 0.14 | 0.07 | 0.14 | 0.07 | 0.04 | 0.18 | 1.00 |
| 16 | K3 | 3 | 3 | 3 | 3 | 5 | 2 | 2 | 3 | 3 | 5 | 32 | 0.09 | 0.09 | 0.09 | 0.09 | 0.16 | 0.06 | 0.06 | 0.09 | 0.09 | 0.16 | 1.00 |
| 17 | K4 | 4 | 3 | 1 | 5 | 5 | 3 | 1 | 4 | 4 | 5 | 35 | 0.11 | 0.09 | 0.03 | 0.14 | 0.14 | 0.09 | 0.03 | 0.11 | 0.11 | 0.14 | 1.00 |
| 18 | B1 | 3 | 4 | 5 | 3 | 3 | 2 | 4 | 5 | 2 | 3 | 34 | 0.09 | 0.12 | 0.15 | 0.09 | 0.09 | 0.06 | 0.12 | 0.15 | 0.06 | 0.09 | 1.00 |
| 19 | B2 | 2 | 4 | 2 | 3 | 4 | 2 | 5 | 1 | 2 | 4 | 29 | 0.07 | 0.14 | 0.07 | 0.10 | 0.14 | 0.07 | 0.17 | 0.03 | 0.07 | 0.14 | 1.00 |
| 20 | B3 | 2 | 4 | 2 | 3 | 1 | 3 | 4 | 5 | 5 | 4 | 33 | 0.06 | 0.12 | 0.06 | 0.09 | 0.03 | 0.09 | 0.12 | 0.15 | 0.15 | 0.12 | 1.00 |
|  | Total | 60 | 59 | 52 | 63 | 65 | 59 | 52 | 56 | 70 | 69 |  | 2.01 | 1.96 | 1.72 | 2.09 | 2.12 | 1.94 | 1.73 | 1.80 | 2.31 | 2.31 | 20.00 |
|  | Rata-rata | 3 | 2.95 | 2.6 | 3.15 | 3.25 | 2.95 | 2.6 | 2.8 | 3.5 | 3.45 |  | 0.10 | 0.10 | 0.09 | 0.10 | 0.11 | 0.10 | 0.09 | 0.09 | 0.12 | 0.12 | 1.00 |

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| Appendix 3. Rating of internal Factor | | | |  |  |  |  |  |  |  |  |  |  |  |
| No | Informant | Internal Stratey Factor | | | | | | | | | | | | |
| (Strenght) | | | | | | (Weaknes) | | | | |  | Total |
| A | B | C | D | E | F | A | B | C | D | E | F |
| 1 | G1 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 4 | 2 | 40 |
| 2 | G2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 2 | 3 | 2 | 4 | 2 | 39 |
| 3 | G3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 2 | 2 | 4 | 1 | 38 |
| 4 | G4 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 2 | 3 | 2 | 3 | 2 | 40 |
| 5 | G5 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 2 | 3 | 2 | 4 | 2 | 41 |
| 6 | G6 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 2 | 4 | 4 | 2 | 42 |
| 7 | G7 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 3 | 3 | 3 | 3 | 2 | 42 |
| 8 | M1 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 5 | 3 | 3 | 2 | 45 |
| 9 | M2 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 45 |
| 10 | M3 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 47 |
| 11 | A1 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 3 | 3 | 3 | 5 | 3 | 45 |
| 12 | A2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 3 | 3 | 3 | 5 | 3 | 43 |
| 13 | A3 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 3 | 3 | 3 | 4 | 2 | 41 |
| 14 | K1 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 5 | 4 | 45 |
| 15 | K2 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 5 | 4 | 44 |
| 16 | K3 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 2 | 4 | 5 | 4 | 45 |
| 17 | K4 | 3 | 4 | 4 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 4 | 3 | 42 |
| 18 | B1 | 3 | 4 | 4 | 4 | 3 | 4 | 2 | 4 | 2 | 4 | 5 | 5 | 44 |
| 19 | B2 | 3 | 4 | 4 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 44 |
| 20 | B3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 46 |
|  | Total | 81 | 80 | 80 | 80 | 81 | 80 | 49 | 63 | 60 | 63 | 82 | 59 |  |
|  | Rata-rata | 4.05 | 4.00 | 4.00 | 4.00 | 4.05 | 4.00 | 2.45 | 3.15 | 3.00 | 3.15 | 4.10 | 2.95 |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | Nama Responden | Faktor Strategi Eksternal | | | | | | | | | | |
| (Opportunity) | | | | | (Threats | | | |  | Total |
| A | B | C | D | E | A | B | C | D | E |
| 1 | G1 | 5 | 5 | 5 | 4 | 5 | 5 | 3 | 5 | 2 | 4 | 43 |
| 2 | G2 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 2 | 4 | 45 |
| 3 | G3 | 5 | 5 | 5 | 4 | 5 | 5 | 3 | 5 | 3 | 4 | 44 |
| 4 | G4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 3 | 3 | 42 |
| 5 | G5 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 3 | 4 | 43 |
| 6 | G6 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 3 | 44 |
| 7 | G7 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 3 | 45 |
| 8 | M1 | 5 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 43 |
| 9 | M2 | 5 | 3 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 44 |
| 10 | M3 | 5 | 3 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 3 | 43 |
| 11 | A1 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 3 | 4 | 40 |
| 12 | A2 | 5 | 5 | 4 | 5 | 4 | 5 | 2 | 5 | 5 | 4 | 44 |
| 13 | A3 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 43 |
| 14 | K1 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 4 | 44 |
| 15 | K2 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 42 |
| 16 | K3 | 5 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 3 | 41 |
| 17 | K4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 3 | 42 |
| 18 | B1 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 46 |
| 19 | B2 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 44 |
| 20 | B3 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 44 |
|  | Total | 100 | 80 | 92 | 89 | 97 | 96 | 74 | 100 | 64 | 74 | 866 |
|  | Rata-rata | 5.00 | 4.00 | 4.60 | 4.45 | 4.85 | 4.80 | 3.70 | 5.00 | 3.20 | 3.70 | 43.30 |