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STRATEGIC ANALYSIS OF ECOTOURISM INDUSTRY IN SABAH: APPLICATION OF COMBINED SWOT/TOWS AND AHP

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ABSTRACT

Sabah is a wonderful place for a special holiday, offering inspiring natural scenery, diverse landscapes, unique cultures, exciting adventures, beautiful beaches, and fantastic cuisine for the adventurous taste buds. Therefore, Sabah is one of the top tourist destinations, both among tourists and local people. The purpose of this paper is to conduct a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of tourism in Sabah, which covers both internal and external factors. The analysis will be further enhanced to decide the best decision made by utilizing the Analytic Hierarchy Process (AHP) to determine priorities among SWOT factors. Therefore, the SWOT-AHP analysis is a strategy tool used for a qualitative study. The key determinants that influence the coastal, maritime, inland, and ecotourism in Sabah are as follows: Sabah has a rich biodiversity, Sabah has limited infrastructure; however, there is opportunity as there is growing interest in ecotourism, and the potential threat is due to the environmental degradation, which threat the ecosystems. Nevertheless, this paper also has limitations as it only focuses on a limited number of crucial internal and external elements. Thus, further research is essential in identifying the optimal strategy for ecotourism in Sabah.

Keywords: Tourism industry, Ecotourism, SWOT analysis, TOWS matrix, Analytic Hierarchy Process (AHP), Sabah

INTRODUCTION

Tourism refers to the activity of tourists. It is a social, cultural, and economic phenomenon that comprises the movement of people to other countries or foreign places beyond their usual environment for business or personal purposes. Tourism destination, on the other hand, is a physical space with or without administrative and analytical boundaries where a tourist may spend a night (UN Tourism, n.d.). It is further subdivided into several categories, including educational tourism, health tourism, and medical tourism. This study covers coastal, marine, and inland water tourism and ecotourism. Coastal, maritime, and inland water tourism refers to shore-based tourist activities such as swimming, surfing, sunbathing, and other seaside recreational, relaxing, and sporting activities that take place along the shore of a sea, lake, or river.

Furthermore, maritime tourism refers to sea-based activities like cruising, yachting, boating, and nautical sports, as well as the land-based services and infrastructure that support them. Inland water tourism occurs in aquatically affected habitats inside land limits, which include lakes, rivers, ponds, streams, groundwater, springs, cave waters, and other inland wetlands (UN Tourism, n.d.). In addition, ecotourism is a type of nature-based tourism activity in which visitors are motivated to see, learn, discover, experience, and appreciate biological and cultural diversity while maintaining a responsible attitude towards the ecosystem's integrity and the well-being of the community. It raises knowledge about biodiversity protection, the environment, and heritage sites among both residents and tourists (UN Tourism, n.d.).

Sabah is among the leading destinations for tourism. Sabah has posted 2.6 million visits from visitors in 2023, surpassing the 2.2 million target, due to aggressive and targeted marketing activities. Consequently, the Sabah Tourism Board set a more aggressive target of 2.8 million visitors, bringing the Malaysian state closer to its pre-COVID-19 high of 4.2 million. Besides, as a result of the initiatives of building tourism in the state,

Sabah Tourism Board received a silver medal at the Putra Aria Brand Awards in 2023 under transportation, travel, and tourism categories (BIMP-EAGA, 2024). Association of Accredited Advertising Agents Malaysia established the Putra Aria Brand Awards in 2022 with the goal of finding companies with a significant connection to Malaysian consumers (Putra Aria Brand Awards, n.d.).

However, there are several research issues have been identified in existing literature, which include a lack of integrated planning between tourism and environmental conservation, insufficient infrastructure, and growing environmental pressures. In addition, maritime and inland water tourism remain less explored in comparison to forest-based ecotourism. Therefore, most studies focus on isolated aspects such as marine parks, diving sites, or jungle ecotourism, without analyzing and addressing cross-sectoral challenges such as climate resilience. Thus, there is a lack of localized data on tourist behaviour, community benefits from tourism activity, and environmental impacts across different tourism types.

The main motivation for this study stems from the urgent need to support sustainable tourism strategies that enhance both Sabah's economic resilience and safeguard its unique ecosystems. Hence, by addressing these research gaps, this study aims to contribute to more inclusive, environmentally responsible, and community-centered tourism development models. This is important as there is increasing awareness of sustainability in post-pandemic travel preferences.

In short, by acknowledging Sabah as a top tourism destination, this paper will explore the strengths, weaknesses, opportunities, and threats (SWOT) analysis of the tourism of Sabah in detail. The identified SWOT will then be utilized to form strategies, which refer to the TOWS Matrix.

SWOT AND AHP MODEL

SWOT ANALYSIS

The first SWOT analysis, the SOFT model, was developed as an instrument for one of the first strategic planning systems, the Systems of Plans (Stewart, 1963). It facilitated company managers to carry out long-term organisational planning (Lada et al., 2024; Puyt et al., 2023). Stewart's Plans System facilitates planning for any activity and at any time, with three levels of planning: next-generation goods and markets (operational planning), the generation immediately following (development planning), and the generation following that (strategic planning). According to Stewart's view, each corporation is made up of autonomous patterns such as systems, organisations, and processes, thus, numerous players can contribute to a complicated but cohesive chain of thought (Steiner & Cannon, 1966).

SWOT analysis is a business analysis strategy that can be applied by an organization to all its products, services, and markets to determine the most appropriate way to develop them in the future. The methodology entails analyzing the weaknesses and strengths of the organization, as well as the market opportunities and threats that it faces (Team FME, n.d.). SWOT analysis is the terminology for a technique used to identify and analyze internal and external influences impacting the viability of a project, product, location, or standalone entity (Namugenyi et al., 2019).

Action planning is required as it obliges organizations to find a replacement solution or a better measure to augment the businesses after the external threats and internal weaknesses have been identified and documented, together with their instances of data. Therefore, those organizations that do not find and employ action plans or a way forward to correct organizational problems, the entire exercise of SWOT exercise proves to be futile (Namugenyi et al., 2019).

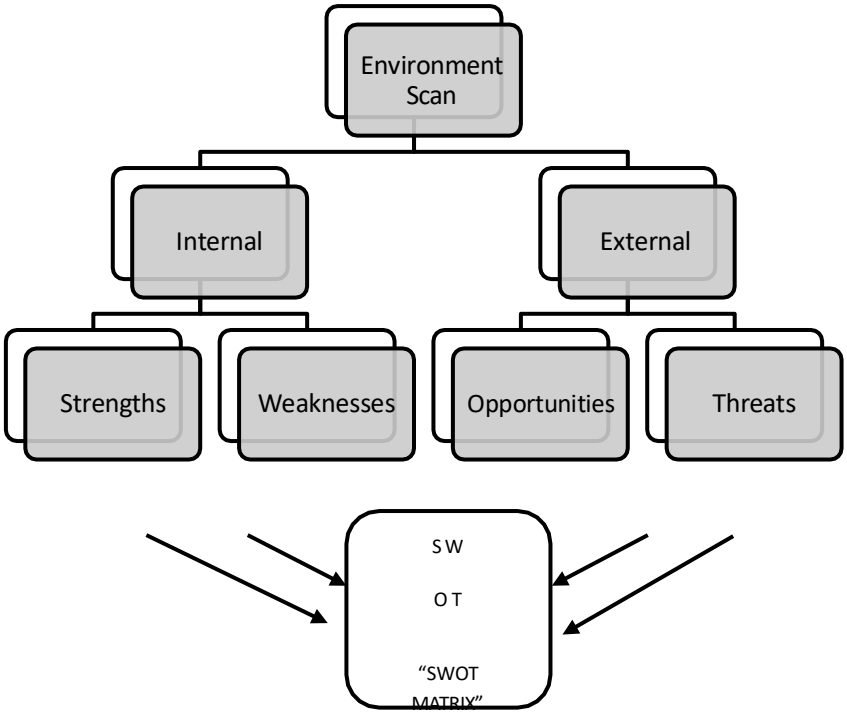

Figure 1: Framework of SWOT Analysis

ANALYTHIC HIERARCHY PROCESS

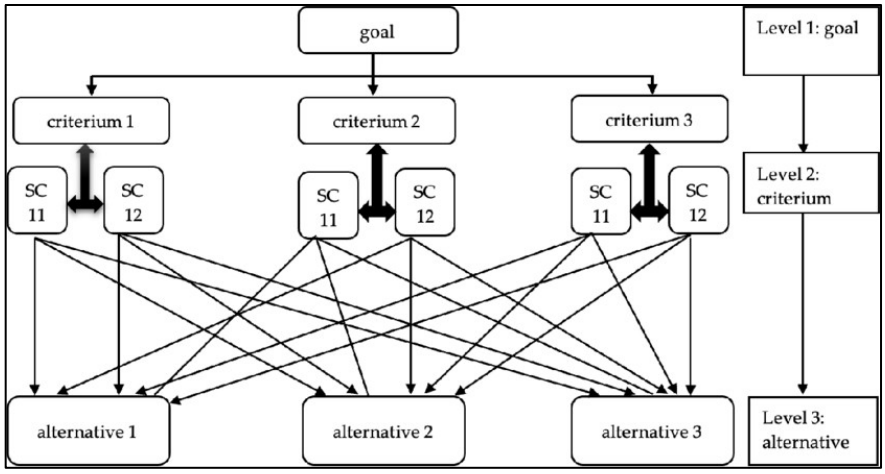

Figure 2: Analytic Hierarchy Process (AHP)

AHP is a broad measurement theory that is used to form ratio scales from discrete and continuous paired comparisons. Comparisons may be made either based on actual measurements or a simple scale representing the relative intensity of preferences and feelings. It is particularly concerned with non-consistency deviations, measurement, and interdependence among and between groups of elements in its structure (Saaty, 1987).

When creating hierarchies, one must include as much relevant material as possible to fully portray the problem, analyse the environment around the problem, identify the problems or traits that contribute to the solution, and identify the individuals involved with the problem. Organising the objectives, qualities, concerns, and stakeholders in a hierarchy serves two functions. First, it presents an overview of the situation's complicated

linkages. Second, it assists decision-makers in determining if the concerns at each level are of the same magnitude, allowing them to correctly compare such homogeneous parts (Thomas L. Saaty, 1989).

Table 1: Pairwise comparison scale

Importance	**Explanation**
1	Two criterion contribute equally to the objective
3	Experience and judgement slightly favor one over another
5	Experience and judgment strongly favor one over another
7	Criterion is strongly favored and its dominance is demonstrated in practice
9	Importance of one over another affirmed on the highest possible order
2, 4, 6, 8	Used to represent compromise between the priorities listed above

The Analytic Hierarchy Process (AHP) is used in this paper to ascertain the relative significance of the SWOT elements. The prioritisation process will begin with an assessment of the relative relevance of the criteria, after the study of the issue and the construction of its hierarchy. A comparison is conducted according to the criteria specified at the higher level, and the factors are systematically evaluated in groups based on the corresponding degrees of influence at each level. During AHP, several pairwise comparisons are performed using a standardized comparison scale consisting of nine levels (Görener et al., 2012).

The outcome of the pairwise comparison on n criteria can be succinctly represented by ($n \times n$) evaluation matrix B, where every component $b_{ij}(i, j = 1, 2, 3, \ldots, n)$ is the quotient of the weights of the criteria (Görener et al., 2012). The pairwise comparison can be visually represented using a square and reciprocal matrix. It is visible as seen below.

$$B = (bij)n\times n = \begin{matrix} b11 & b12 & \ldots & b1n \\ b21 & b22 & \ldots & b2n \\ bn1 & bn2 & \ldots & bnn \end{matrix}$$

In the last stage, each matrix is normalized and the relative weights are determined. The relative weights are determined by the principal eigenvector (w) associated with the maximum eigenvalue (λ_{max}), as shown below.

$$B_{\mathrm{w}} = \lambda_{max}\, W$$

If the pairwise comparisons exhibit total consistency, the matrix B will have a rank of 1 and the maximum eigenvalue $\lambda_{max} = n$. In this scenario, weights can be derived by normalizing either the rows or columns of B. The quality of the AHP's output is directly linked to the consistency of the judgments made during pairwise comparisons. The consistency is determined by the relationship between the entries of B, where B: $b_{ij} \times b_{jk} = b_{ik}$. The consistency index (CI) can be computed by employing the subsequent formula.

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

The ultimate consistency ratio (CR) is used to assess the level of consistency in the evaluations. The CR is calculated by dividing the CI by the random index (RI), as illustrated below.

$$CR = \frac{CI}{\overline{RI}}$$

The value of 0.1 is the predetermined upper limit for CR. If the final consistency ratio exceeds this threshold, the review technique must be repeated to improve consistency.

Table 2.0: Random Index

N	1	2	3	4	5	6	7	8	9	10
Random Consistency Index (RI)	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Source: Saaty (1980)

SWOT-TOWS-AHP MODEL

A method for deciding that evaluates the superiority of a range of alternatives was developed by Thomas L. Saaty, called the Analytic Hierarchy Process (AHP). The methodical assessment of the performance of each alternative concerning each criterion, after organising complex issues into a hierarchy of criteria and alternatives, helps to prioritise and make decisions. It helps to set priorities and make decisions.

Conversely, a SWOT analysis functions as a conceptual framework utilized to assess and evaluate a business endeavor, approach, entity, or undertaking. It is a framework specifically designed for strategic planning. Strengths, weaknesses, opportunities, and threats are all incorporated into this framework. The four domains of a SWOT analysis comprise internal factor classifications, such as strengths and weaknesses, and external factor classifications, including opportunities and threats, which are divided into two dimensions (GÜREL, 2017). An individual facet of the organization is discussed in each of these sections. Used properly, SWOT may be a useful starting point for effective strategy development (Kurttila et al., 1999).

SWOT is a crucial tool for developing strategies, providing a comprehensive understanding of all factors that can influence decision-making and strategic planning, both positively and negatively (Mary et al., 2017; Saygin, 2018). Additionally, as a sustainability extension of SWOT, Weihrich (1982) developed the TOWS matrix as an evolution of SWOT analysis. Thus, the TOWS matrix is designed to identify the systematic relationship between strengths, weaknesses, opportunities, and threats (Weihrich, 1982). After obtaining the results from the SWOT and TOWS analyses, the quest for optimal strategies for coastal, maritime, inland, and ecotourism in Sabah is conducted using AHP.

The idea in utilizing AHP within a TOWS framework is to systematically evaluate TOWS factors and assess their intensities (Kurttila et al., 1999). Through the integration of these two methodologies, the TOWS-AHP model is capable of furnishing a systematic framework that assists strategic planning and decision-making. This facilitates the process for organizations to discern and prioritize their strategic goals and activities by considering not only the opportunities and threats originating from the external environment, but also their

internal capabilities and limitations. The end outcome was hence improved strategic decision-making that was both more knowledgeable and more efficient.

The AHP technique operates by establishing the hierarchy of significance for different alternatives and the criteria employed to assess these alternatives. To begin, the criteria are ranked according to their significance in terms of achieving the goal, and then the priorities are established for those criteria. After that, the priorities are established by analyzing how well the various options perform concerning each of the criteria mentioned before. In conclusion, a process that involves assigning weights and combining them is utilized to ascertain the overall importance of the options concerning the contribution that they provide to the intended outcome (Vargas & St, 2022).

METHODOLOGY AND APPLICATION

The incorporation of the Analytic Hierarchy Process (AHP) into the SWOT analysis serves the primary purpose of conducting a methodical evaluation of the SWOT criteria and determining the degree to which they are comparable in terms of their significance. The framework of the Analytic Hierarchy Process (AHP), which was derived from the strengths, weaknesses, opportunities, and threats, utilizing this paper, is described in this paper. Three components constitute the organizational structure of the AHP: the decision objective, the SWOT groups, and the components that are integrated into each TOWS group. Figure 2 illustrates the hierarchical structure of the SWOT analysis that was taken into consideration.

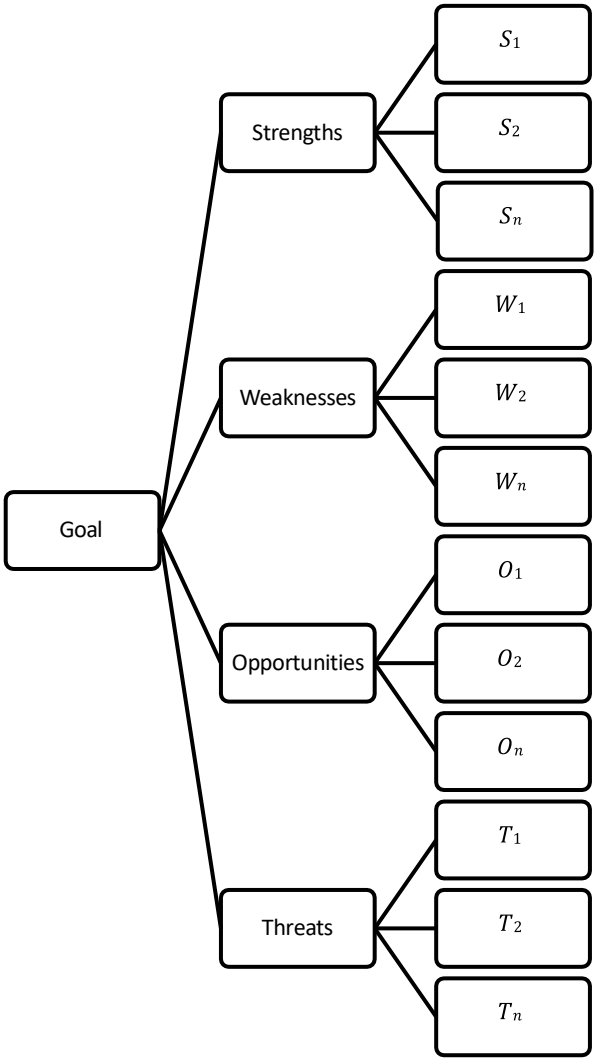

Figure 3: Hierarchical Structure of the SWOT Matrix

The purpose of this paper is to conduct a SWOT analysis of the tourism industry, specifically ecotourism, maritime, coastal, and inland water tourism via the Analytic Hierarchy Process (AHP). The analysis is done mostly based on Sabah, Malaysia. Saaty's comparison scale is utilized consistently throughout the process to enable pairwise comparisons and for each pair of SWOT criteria to be ranked on their relative importance. The summed matrix was applied to find vector weights or priorities for the constituents and groups of concern. This was done through combining the AHP with digitized TOWS factors.

To facilitate a more comprehensive understanding of the framework for strategic management derived from SWOT and AHP, a three-phase model has been constructed. A model is constructed as part of the first stage of the process. The second phase focuses on adjusting the factors, while the third phase prioritizes the evaluation model.

This is followed by the construction of a matrix and the execution of a SWOT analysis. The SWOT matrix has been updated to include the relevant aspects of the ecotourism industry in Sabah, which have been identified.

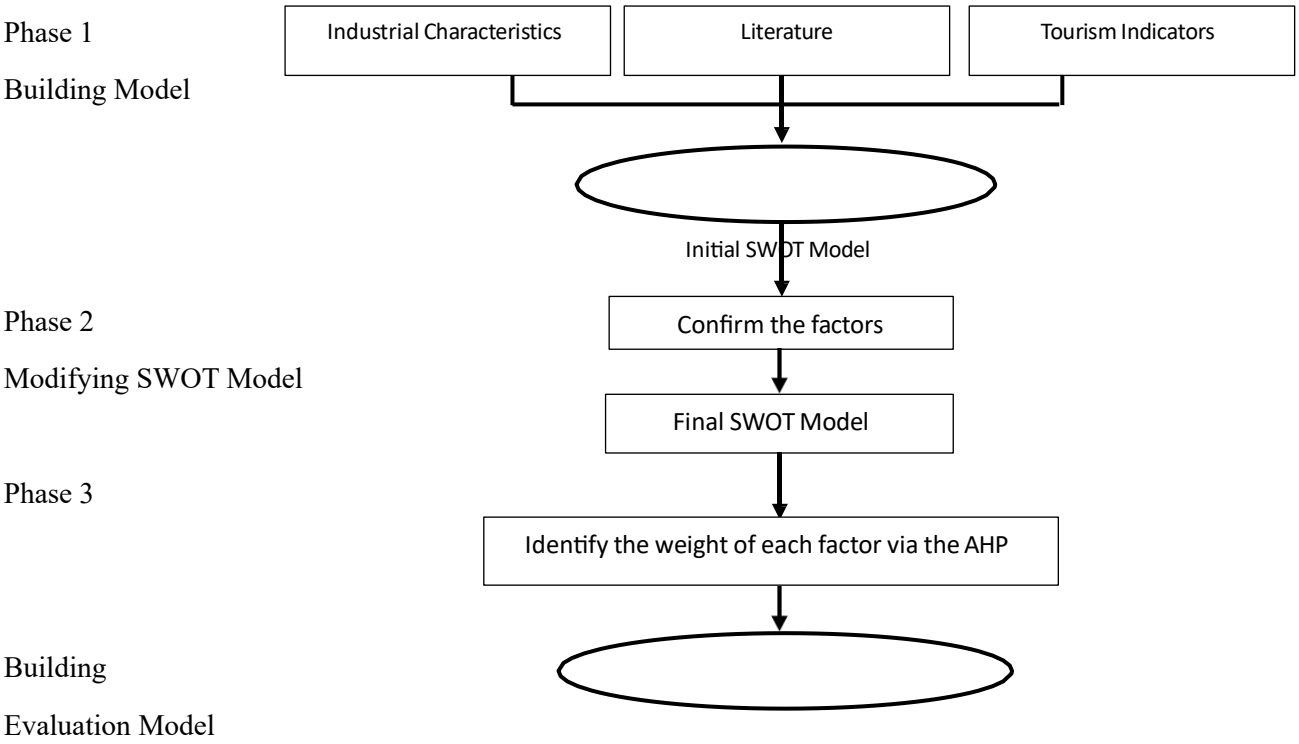

Figure 4: Phases of Proposed Methodology

SWOT ANALYSIS OF ECOTOURISM IN SABAH

The SWOT analysis of coastal, maritime, inland, and ecotourism in Sabah, as well as its external challenges, is presented in the following table.

Table 3: SWOT Analysis for the coastal, maritime, inland, and ecotourism industry in Sabah

Strengths (S)	**Weaknesses (W)**
(S1) Sabah has a rich biodiversity (Hasanal, 2009)	(W1) Sabah has limited infrastructure (Danting et al., 2018).
(S2) Involvement of Sabah state government in promoting ecotourism (Velnisa Paimin et al., 2014).	(W2) Experience lack of skilled human resource (Doksil & KJ TAN, 2025).
(S3) Marine ecotourism hotspots (Sabah Tourism Board, n.d.).	(W3) Economic disparities among local communities (Mayan *et al*., 2017).
(S4) Community engagement (Chong *et al.,* 2021).	(W4) Lack accessibility (Lee, 2019).
(S5) Offers a wide range of adventure activities (Hasanal, 2009).	
(S6) Easy access to key ecotourism markets (Kunjuraman & Hussin, 2020).	
Opportunities (O)	**Threats (T)**
(O1) Growing interest in ecotourism (STB/KePKAS, 2019 ; Sabri, 2024).	(T1) Environmental degradation threat ecosystems (UNEP, n.d.).
(O2) Embracing technology to improve engagement and accessibility to maritime sites (Konar et al., 2024).	(T2) Climate change pose risks to coastal and visitor tourism (Arabadzhyan et al., 2020). ecotourism
(O3) Expand its ecotourism offerings beyond traditional nature-based activities (Sabah Tourism Board, n.d.).	(T3) Face global competition (BERNAMA, 2022).
(O4) Regional collaborations for growth (STB/KeKPKAS, 2019).	(T4) Economic vulnerabilities (Hampton et al., 2023) .

RESULTS OF TOWS MATRIX

TOWS matrix is a conceptual tool for structured analysis to enable matching the organizational internal strengths and weaknesses with the external opportunities and threats. The SO strategy seeks to exploit the maximum strength and opportunity of the organization. The ST strategy is founded on the organizational strengths, which can defend against environmental threats. The WO strategy is designed to minimize weaknesses while maximizing opportunities. Lastly, the WT (Weaknesses-Threats) strategy emphasizes minimizing weaknesses and threats to a bare minimum (Weihrich, 1982).

Table 4: TOWS Matrix for the coastal, maritime, inland, and ecotourism industry in Sabah

Internal Factors / **External Factors**	**Strengths (S)** **S1: Sabah has a rich biodiversity.** **S2: Involvement of Sabah state government in promoting ecotourism.** **S3: Marine ecotourism hotspots.** **S4: Community engagement.** **S5: Offers a wide range of adventure activities.** **S6: Easy access to key ecotourism markets.**	**Weaknesses (W)** **W1: Sabah has limited infrastructure.** **W2: Experience lack of skilled human resource.** **W3: Economic disparities among local communities. W4: Lack accessibility.**
Opportunities (O) **O1: Growing interest in ecotourism.** **O2: Embracing technology to improve visitor engagement and accessibility to ecotourism sites.** **O3: Expand its ecotourism offerings beyond traditional nature-based activities.** **O4: Regional collaborations for growth.**	**SO Strategies** SO1: Leverage Sabah's rich biodiversity and marine ecotourism hotspots to attract the growing ecotourism market. (S1, S3, O1) SO2: Utilize government support and community engagement to implement technology for better visitor experience. (S2, S4, O2) SO3: Expand adventure activities and capitalize on ecotourism markets to offer unique experiences beyond traditional nature-based tourism. (S5, S6, 03)	**WO Strategies** WO1: Improve infrastructure and accessibility through embracing smart technologies. (W1, W4, O2) WO2: Address skill shortages through regional training programs and knowledge sharing collaborations. (W2, O4) WO3: Reduce economic disparities by expanding ecotourism activities to include local entrepreneurship. (W3, O3)

	SO4: Foster regional collaborations by showcasing strong community participation and diverse ecotourism offerings. (S4, S5, O4)	
Threats (T) **T1: Environmental degradation threat ecosystems. T2: Climate change pose risks to coastal and maritime tourism.** **T3: Face global competition. T4: Economic vulnerabilities.**	**ST Strategies** ST1: Utilize biodiversity and marine hotspots to promote conservation-focused tourism that counters environmental degradation and climate change. (S1, S3, T1, T2) ST2: Engage communities in sustainable practices to mitigate environmental risks. (S4, T1, T2) ST3: Emphasize unique ecotourism offerings to differentiate Sabah from global competitors. (S5, T3)	**WT Strategies** WT1: Develop capacity-building programs to address skill gaps and prepare for global competition. (W2, T3) WT2: Improve infrastructure to reduce vulnerability to environmental degradation and climate change. (W1, T1, T2) WT3: Increase local economic participation and enhance accessibility to reduce economic vulnerability. (W3, W4, T4)

The study by Awangku Hasanal Bahar Pengiran Bagul has highlighted a number of advantages of Sabah's ecotourism, including its abundant biodiversity, cultural heritage, diverse range of adventure activities, and exceptional opportunities for animal encounters. The author added that Sabah's rich living legacy makes it eligible for the ecotourism sector and makes it one of the world's twelve mega-diversity sites (Hassanal Bahar & Bagul, 2009). With its extensive coastline, abundant marine life, and advantageous location in the South China Sea, Sabah is well-positioned to gain from the transition to a sustainable economic model (Doksil & KJ TAN, 2025).

Furthermore, the third-largest island in the world is Borneo. Despite its small size, the island has all of Borneo's top attractions. For instance, stand-up paddle boarding at Sapi Island, scuba diving at Semporna and Tun Sakaran Marine Park, and sea walking to observe vibrant tropical fish, rays, and coral reefs are some of Sabah's most popular water sports. White water rafting is also available in locations like Kiulu, Kedamaian, and Padas River. Jet boat rides are another type of water sport (Sabah Tourism Board, n.d.).. Thus, eco-friendly resorts, marine conservation programs, and community-based tourism are examples of sustainable tourism initiatives that can boost economic gains while safeguarding delicate ecosystems. As a result, Sabah's coastal industries and wealth of marine resources present a strategic opportunity for sustained economic growth (Doksil & KJ TAN, 2025).

There is also potential for ecotourism. That means Sabah has been hosting the ASEAN Tourism Human Resources Management and Development Network for Ecotourism Programme, a regional network that promotes the development of the tourism industry. The kinabatangan region has been selected as part of the sustainable tourism destinations to conserve wildlife and encourage green ecotourism, as the State Government is keen to advance Sabah's tourism industry, particularly in ecotourism. This is because the Kinabatangan River supports Borneo's indigenous orangutan and proboscis monkey, hence one of the richest ecosystems in the world (STB/KePKAS, 2019).

But even with all of its potential, Sabah continues to face significant obstacles. Climate change and environmental threats are among the most evident challenges. Extreme weather events, coral bleaching, and rising sea levels pose a threat to marine ecosystems and coastal communities. Sabah's waters are also contaminated by industrial discharge, oil spills, and plastic waste, all of which are detrimental to marine life. Thus, inadequate waste management systems lead to excessive pollution from urban areas, tourism, and coastal industries (Doksil & KJ TAN, 2025). The limited use of digital solutions and smart technology presents another difficulty. Finally, there is a scarcity of oceanographers, marine engineers, and other qualified workers in the Blue Economy sectors. Furthermore, the innovation and growth have been hindered by inadequate training programs for fishermen, tourism operators, and coastal entrepreneurs.

The TOWS Matrix will be analysed and assessed using the Analytic Hierarchy Process (AHP). First, Saaty's comparison scale—a numerical metric with a range of 1 to 9—is used to compare the TOWS groups. Table 4 provides a summary of the comparisons' results. The TOWS matrix's elements are then examined, taking into account each of the TOWS categories as they are examined.

RESULTS OF TOWS-AHP

Table 5.0: Pairwise comparison of TOWS factors

TOWS Degree of TOWS Groups	**SO**	**ST**	**WO**	**WT**	**Importance**
Strengths-Opportunities (SO)	1.00	5.00	7.00	9.00	0.657
Strengths-Threats (ST)	0.20	1.00	3.00	5.00	0.203
Weaknesses-Opportunities (WO)	0.14	0.33	1.00	3.00	0.094
Weaknesses-Threats (WT) CR = 0.063	0.11	0.20	0.33	1.00	0.046

Table 6.0: Strengths – Opportunities (SO) Strategy Group

Strengths-Opportunities (SO)	SO1	SO2	SO3	SO4	Importance Degrees
(SO1)	1.00	4.00	6.00	9.00	0.611
(SO2)	0.25	1.00	4.00	7.00	0.255
(SO3)	0.17	0.25	1.00	3.00	0.092
(SO4)	0.11	0.14	0.33	1.00	0.042
CR = 0.071					

Table 7.0: Strengths – Threats (ST) Strategy Group

Strengths-Threats (ST)	ST1	ST2	ST3	Importance Degrees
(ST1)	1.00	4.00	9.00	0.708
(ST2)	0.25	1.00	5.00	0.231
(ST3)	0.11	0.20	1.00	0.060
CR = 0.074				

Table 8.0: Weaknesses – Opportunities (WO) Strategy Group

Weaknesses-Opportunities (WO)	WO1	WO2	WO3	Importance Degrees
(WO1)	1.00	6.00	8.00	0.761
(WO2)	0.17	1.00	3.00	0.166
(WO3)	0.12	0.33	1.00	0.073
CR = 0.077				

Table 9.0: Weaknesses – Threats (WT) Strategy Group

Weaknesses-Threats (WT)	WT1	WT2	WT3	Importance Degrees

(WT1)	1.00	4.00	9.00	0.708
(WT2)	0.25	1.00	5.00	0.231
(WT3)	0.11	0.20	1.00	0.060
CR = 0.074				

Ultimately, the comprehensive priority ratings for the TOWS aspects of coastal, maritime, inland, and ecotourism in Sabah have been computed. The table labelled Table 9 displays the main priorities comprehensively.

Table 10: The Overall Priority Scores of SWOT Factors

TOWS Group	Group Priority	TOWS Factors	Factor Priority within the Groups	Overall Priority of Factor
Strengths-Opportunities (SO)	0.657	**SO1: Leverage Sabah's rich biodiversity and marine ecotourism hotspots to attract the growing ecotourism market. (S1, S3, O1)**	**0.611**	**0.401**
		SO2: Utilize government support and community engagement to implement technology for better visitor experience. (S2, S4, O2)	0.255	0.168
		SO3: Expand adventure activities and capitalize on ecotourism markets to offer unique experiences beyond traditional nature-based tourism. (S5, S6, O3)	0.092	0.060
		SO4: Foster regional collaborations by showcasing strong community participation and diverse ecotourism offerings. (S4, S5, O4)	0.042	0.028
Strengths-Threats (ST)	0.203	**ST1: Utilize biodiversity and marine hotspots to promote conservation-focused tourism that counters environmental degradation and climate change. (S1, S3, T1, T2)**	**0.708**	**0.144**

		ST2: Engage communities in sustainable practices to mitigate environmental risks. (S4, T1, T2)	0.231	0.047
		ST3: Emphasize unique ecotourism offerings to differentiate Sabah from global competitors. (S5, T3)	0.060	0.012
Weaknesses-Opportunities (WO)	0.094	**WO1: Improve infrastructure and accessibility through embracing smart technologies. (W1, W4, O2)**	**0.761**	**0.072**
		WO2: Address skill shortages through regional training programs and knowledge sharing collaborations. (W2, O4)	0.166	0.016
		WO3: Reduce economic disparities by expanding ecotourism activities to include local entrepreneurship. (W3, O3)	0.073	0.006
Weaknesses-Threats (WT)	0.046	**WT1: Develop capacity-building programs to address skill gaps and prepare for global competition. (W2, T3)**	**0.708**	**0.033**
		WT2: Improve infrastructure to reduce vulnerability to environmental degradation and climate change. (W1, T1, T2)	0.231	0.011
		WT3: Increase local economic participation and enhance accessibility to reduce economic vulnerability. (W3, W4, T4)	0.060	0.002

By referring to the above results (Table 10), with the highest overall priority scores, it indicates that Sabah needs to leverage its rich biodiversity and marine ecotourism hotspots to attract the growing ecotourism market, which is significant for a tourism destination (0.401).

CONCLUSION

This paper uses the TOWS-AHP tool to identify the key strategic variables for ecotourism in Sabah. The results of the analysis have revealed the subsequent priority classification for each TOWS group: Strengths-Opportunities (SO) comprise 65.7%, Strengths-Threats (ST) comprise 20.3% of the total, Weaknesses-Opportunities (WO) represent 9.4%, and Weaknesses-Threats (WT) account for 4.6%. According to the TOWS-AHP results, the component that has the most significance is "Leverage Sabah's rich biodiversity and marine ecotourism hotspots to attract the growing ecotourism market." The crucial element is categorized within the SO1 (S1, S3, O1) group. This matter holds utmost significance, with an overall priority score of 0.401 (40.1%).

Other strengths to minimize the threats in the ecotourism industry in Sabah are by utilizing biodiversity and marine hotspots to promote conservation-focused tourism that counters environmental degradation and climate change (S1, S3, T1, T2), with a score of 14.4%. Additionally, there is a weakness that can be minimized through maximizing the opportunity for ecotourism in Sabah by improving infrastructure and accessibility through embracing smart technologies (W1, W4, O2) 7.2%. Nevertheless, to tackle the threats, Sabah needs to develop capacity-building programs to address skill gaps and prepare for global competition (W2, T3) with a score of 3.3 %.

Critical decisions or management strategies can be aided or supported by employing TOWS factor priorities that have been established. Furthermore, the findings of this study can be utilized to develop a range of suitable strategic options for the coastal, maritime, inland, and ecotourism sectors in Sabah. However, future research is still needed to identify any uncertainties.

REFERENCES

Arabadzhyan, A., Figini, P., García, C., González, M. M., Lam-González, Y. E., & León, C. J. (2020). Climate change, coastal tourism, and impact chains – a literature review. *Current Issues in Tourism*, *24*(16), 2233–2268. https://doi.org/10.1080/13683500.2020.1825351

BERNAMA. (2022, October 30). *Govt aims to brand Malaysia as world's best ecotourism destination*. Astro AWANI. Retrieved May 10, 2025, from https://international.astroawani.com/malaysia-news/govt-aims-brand-malaysia-worlds-best-ecotourism-destination-388525

BIMP-EAGA. (2024, February 1). Sabah tops 2023 tourism target, Sets more ambitious goal this year | BIMP-EAGA. Retrieved April 21, 2025, from https://bimp-eaga.asia/article/sabah-tops-2023-tourism-target-sets-more-ambitious-goal-year

Chong, F. J. ., Le, G. ., Abdul Aziz, N. A. ., Pengiran Bagul, A. H. B. P. B., & Saikim, F. H. . (2021). Community preparedness in ecotourism development and their role in maintaining the natural resources in Kadamaian area, Sabah. *Journal of Tropical Biology & Conservation (JTBC)*, *18*, 115–129. https://doi.org/10.51200/jtbc.v18i.3448

Doksil, M., & KJ TAN, I. T. (2025, February 15). Blue economy and development in Sabah and its challenges. Borneo Post Online. https://www.theborneopost.com/2025/02/15/blue-economy-and-development-in-sabah-and-its-challenges/

Görener, A., Toker, K., & Uluçay, K. (2012). Application of Combined SWOT and AHP: A Case Study for a Manufacturing Firm. Procedia - Social and Behavioral Sciences, 58, 1525–1534. https://doi.org/10.1016/j.sbspro.2012.09.1139

Hassanal Bahar, A., & Bagul, P. (2009). *Success of Ecotourism Sites and Local Community Participation in Sabah*. https://www.researchgate.net/publication/28800894

Kangas, J., 1992. Multiple-use planning of forest resources by using the analytic hierarchy process. Scandinavian Journal of Forest Research, 7, 259- 268.

Kunjuraman, V., & Hussin, R. (2020). Exploring potential ecotourism products in Sabah, Malaysia. Journal of Tourism, Hospitality & Culinary Arts, 12(1), 158-176.

Kurttila, M., Pesonen, M., Kangas, J., & Kajanus, M. (1999). Ž. Utilizing the analytic hierarchy process AHP in SWOT analysis a hybrid method and its application to a forest-certification case.

Lada, S.; Chekima, B.; Ansar, R.; Lim, M.F.; Bouteraa, M.; Abdul Adis, A.A.; Abd Karim, M.R.; Yong, K. Strategic alternatives for Muslim-friendly homestay in Sabah Malaysia: A SWOT/TOWS analysis. *J. Islam. Mark.* **2024**, *15*, 1534–1559.

Lee, S. (2019, November 28). Sabah to be more accessible for elderly tourists, tourists with disabilities. *The Star*. https://www.thestar.com.my/news/nation/2019/01/25/sabah-to-be-more-accessible-for-elderly-tourists-tourists-with-disabilities

Mary, M., Florence, K., Mary, M., & Christine, K. (2017). Using tows matrix as a strategic decision-making tool in managing KWS product portfolio. African Multidisciplinary Journal of Research, 2(1), 1–27

Mayan, S. N. 'Ain ., & Nor, R. M. . (2017). Prospects and Challenges of Ecotourism Sector and Poverty Eradication in Sabah: The Case of Orangutans and Mabul Island. *Global Journal of Social Sciences Studies*, *3*(1), 1–12. https://doi.org/10.20448/807.3.1.1.12

Namugenyi, C., Nimmagadda, S. L., & Reiners, T. (2019). Design of a SWOT analysis model and its evaluation in diverse digital business ecosystem contexts. Procedia Computer Science, 159, 1145–1154. https://doi.org/10.1016/j.procs.2019.09.283

Putra Aria Brand Awards. (n.d.). Putra Aria Brand Awards | Association of Accredited Advertising Agents Malaysia (4AS). https://www.ariaawards.my/

Saaty, R. W. (1987). THE ANALYTIC HIERARCHY PROCESS-WHAT IT IS AND HOW IT IS USED (Vol. 9, Issue 5).

Sabah Tourism Board. (n.d.). *Top water sports activities you can enjoy in Sabah | Sabah Tourism Board*. https://sabahtourism.com/article/top-water-sports-activities-you-can-enjoy-in-sabah/

Sabri, M. Y. B. (2024, November 26). *Sustainable tourism: How Malaysia is leading the charge for Eco-Friendly Travel*. Portal Berita. https://berita.rtm.gov.my/highlights/senarai-berita-highlights/senarai-artikel/sustainable-tourism-how-malaysia-is-leading-the-charge-for-eco-friendly-travel.

Saygin, S. D. (2018). Strategies to enhance sustainability of land resources in arid regions. Arid environments and sustainability. In H. Arman, & I. Yuksel (Eds.), Arid environments and sustainability (pp. 4–20). Rijeka: IntechOpen. https://doi.org/10.5772/intechopen.72492.

STB/KePKAS, T. (2019, October 30). *35pc of visitors in Sabah into ecotourism*. Ministry of Tourism, Culture and Environment Sabah (KePKAS). https://kepkas.sabah.gov.my/35pc-of-visitors-in-sabah-into-ecotourism/

STB/KePKAS, T. (2019, October 27). *Sabah as Asean eco-tourism hotspot*. Ministry of Tourism, Culture and Environment Sabah (KePKAS). https://kepkas.sabah.gov.my/sabah-as-asean-eco-tourism-hotspot/

Steiner, G.A., Cannon, W.M., 1966. Multinational Corporate Planning. MacMillan Publishing Co., Inc.

Stewart, R.F., 1963. A Framework for Business Planning (No. 162), Long Range Planning Service. Stanford Research Institute, Menlo Park, California.

Stewart, R.F., Doscher, M.O., 1963. The Corporate Development Plan (No. 183). Stanford Research Institute, Menlo Park, California.

Team FME. (n.d.). SWOT analysis. In www.free-management-ebooks.com. https://talentandculture.wvu.edu/files/d/6ed4bddf-91fe-4f08-9904-c13b8b30cbe8/swot-analysis-tool.pdf

Thomas L. Saaty. (1989). How to make a decision: The Analytic Hierarchy Process. European Journal of Operational Research.

UNEP. (n.d.). Facts about the nature crisis. UNEP - UN Environment Programme. https://www.unep.org/facts-about-nature-crisis

UN Tourism. (n.d.). Glossary of tourism terms | UNWTO. Retrieved April 26, 2025, from https://www.unwto.org/glossary-tourism-terms#T

Vargas, L., & St, C. (2022). The Analytic Hierarchy Process. http://www.springer.com/series/6161

Weihrich, H. (1982). *The TOWS Matrix A Tool for Situational Analysis* (Vol. 15, Issue 2).