PRIORITIZING TOURISM DEVELOPMENT STRATEGY THROUGH SWOT-AHP-TOPSIS INTEGRATION

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ABSTRACT

The study aims to prioritize the tourism development strategy of Quang Ngai province after the merger period. In the context of multidimensional tourism development, while facing many challenges in infrastructure, human resources and finance, choosing suitable and feasible strategies is an urgent requirement to promote the sustainable development of the local tourism industry. The research method combines three analytical tools: a SWOT analysis helps identify the strengths, weaknesses, opportunities, and challenges of the Quang Ngai tourism industry; the AHP is used to allocate weights to SWOT criteria to show the relative importance of each factor; and TOPSIS is applied to rank development strategies based on the evaluation scores of experts, helping to select the optimal strategy based on the degree of closeness to the ideal solution. Data collected from tourism and management experts were systematically aggregated and analyzed using the integrated SWOT–AHP–TOPSIS framework to ensure consistency and reliability in the evaluation process. The research results show that the top priority strategies focus on developing transport infrastructure, socializing investment resources, and improving the quality of accommodation facilities. At the same time, the development of green, environmentally friendly tourism models and enhancing tourism brand promotion are also highly appreciated. These strategies reflect the consensus between internal and external factors and are consistent with the goal of sustainable development of the local tourism industry. The research contributes by providing a scientific basis for policymaking and orientation for tourism development in Quang Ngai in the new period and at the same time serves as a reference model for localities with similar conditions.

Keywords: tourism development; SWOT; AHP; TOPSIS; Vietnam; strategic priorities

1. Introduction

The recent mergers of provinces and cities in Vietnam is a strategic step in the process of administrative reform and restructuring of the national development space. Beginning in July 2025, the number of provincial-level administrative units in Vietnam was reduced from 63 to 34, with the aim of streamlining the apparatus, improving management efficiency, and reallocating resources reasonably (Nguyen et al., 2025). This process not only helps to significantly reduce the number of commune and district-level administrative units but also creates conditions for restructuring the government structure towards a two-tier, streamlined, and efficient direction.

In the context of administrative restructuring, the merger of Quang Ngai and Kon Tum provinces in Vietnam to form the new Quang Ngai province has created both opportunities and threats for socio-economic development in general and the tourism industry in particular. The change in administrative boundaries not only alters the tourism resource map but also requires a comprehensive review and reassessment of development orientations in order to build a comprehensive tourism strategy suitable for the new conditions and to promote interregional potential. In that context, determining priority strategies for tourism development becomes urgent, serving the planning work, attracting investment, preserving culture, and promoting sustainable development. Tourism, as a comprehensive economic sector, is deeply influenced by geographical, cultural, and social factors (Piras & Pedes, 2025; Zayım, 2024).

Tourism development strategy is a specific branch in the industry development strategy system (Ngoc & Trang, 2021), playing an important role in shaping the vision, goals, product orientation, market, and organizational solutions to optimally exploit tourism potential, while ensuring sustainable development in terms of economy, society, and environment. Tourism development strategy is often built on the basis of comprehensive analysis, including (i) assessment of tourism resource potential (Gamidullaeva et al., 2022); (ii) analysis of the current status and development trends of the industry (Filipiak et al., 2023); (iii) analysis of the external environment, such as policies, markets, competition, and technology; and (iv) the internal environment, that is, the internal capacity of the locality, such as infrastructure, human resources, and culture (Fan et al., 2023).

The change in administrative space creates potential intersections, which are places to integrate natural, historical-cultural, and ecological tourism resources between previously independent areas in development. However, this is accompanied by increased uncertainty, policy overlap, and lack of synchronization in planning. Re-planning tourism development strategies in the post-merger context therefore needs to go beyond a linear or unidimensional approach and instead adopt a multi-criteria, integrated approach that is capable of quantifying the priority of strategic options.

Strategic decision-making in tourism development is often influenced by many complex and closely interrelated factors (Tao et al., 2025). Therefore, traditional qualitative analysis methods are often not strong enough to provide a comprehensive, in-depth, and scientifically sound view. To address this issue, the study chose to integrate three methods, SWOT analysis, the AHP, and TOPSIS, with each method filling a certain role and supporting each other to improve the reliability of the analysis results. Specifically, SWOT analysis helps identify endogenous factors (strengths, weaknesses) and exogenous factors (opportunities, threats) in tourism development (Ionescu et al., 2022); the AHP method is used to determine the relative weight of criteria through hierarchical quantitative assessment (Tuyen, 2024); meanwhile, TOPSIS supports ranking and selecting the most optimal strategic options based on their closeness to the ideal solution (Han et al., 2025).

Integrating these three methods not only helps overcome the limitations of each individual tool but also creates a systematic, logical, and objective analytical framework. Therefore, the research results are not only scientific but also highly practical, directly serving the process of building provincial tourism development policies in the new context. In particular, with Quang Ngai province having just expanded its boundaries, re-establishing the tourism strategy on the basis of systematic analysis will help strengthen regional connectivity, optimally exploit natural resources

along with diverse cultures, and enhance the competitiveness of destinations on the national and regional tourism map.

From the above analysis, this study aims to identify and prioritize key tourism development strategies for the new Quang Ngai province in Vietnam through the integrated application of three tools: SWOT analysis, the AHP, and TOPSIS. The research results are expected to provide practical policy implications for local authorities while contributing to the academic treasure of applying multi-criteria decision-making methods in the field of tourism planning and management.

This study aims to identify and prioritize tourism development strategies for Quang Ngai province in the post-merger context using an integrated SWOT–AHP–TOPSIS approach. Specifically, the study seeks to (i) systematically identify internal and external factors affecting tourism development, (ii) determine the relative importance of these factors using the AHP method, and (iii) rank strategic alternatives based on their closeness to the ideal solution using the TOPSIS technique.

The novelty of this study lies in the integration of SWOT, AHP, and TOPSIS into a unified analytical framework to support strategic decision-making in a newly restructured administrative context. Unlike previous studies that often apply these methods separately or in limited combinations, this research provides a comprehensive and systematic approach to prioritizing tourism development strategies under conditions of institutional and spatial transformation.

2. Literature review

The SWOT (Strengths, Weaknesses, Opportunities, Threats) model has long been recognized as a useful strategic analysis tool. By clearly identifying internal and external factors affecting an organization or project, SWOT provides a comprehensive view to help managers identify strengths to promote and weaknesses to overcome, as well as opportunities and threats in the operating environment. Due to its simplicity but effectiveness in supporting decision-making, this model has been widely applied. Das et al. (2022) used SWOT analysis to develop strategies related to clean and sustainable agriculture. Pouresmaieli et al. (2023) applied SWOT to develop strategies for the mining industry. Safitri et al. (2023) used SWOT as an effective tool to develop strategies for start-up businesses. Juharni et al. (2023) have formulated strategies in the public service sector using SWOT analysis, whereas Gepner et al. (2022) have applied SWOT for formulating business strategies in the real estate sector. While SWOT provides a useful qualitative framework for identifying key strategic factors, it lacks the ability to quantify the relative importance of these factors. Therefore, complementary methods are often required to support more rigorous decision-making.

The Analytic Hierarchy Process has become a popular and effective tool in supporting decision-making in many different contexts, especially in situations where multiple alternatives need to be prioritized. Jurík et al. (2022) used the AHP as an effective method for prioritizing projects in the context of sustainable development. Nguyen and Tuyen (2025) applied the AHP to prioritize business strategies of packaging companies. Van et al. (2025) applied the AHP to prioritize risks in production activities. Nguyen and Tuyen (2024) prioritized the selection of tour guides by applying the AHP. Jamal Mahdi and Esztergár-Kiss (2024) used the AHP to study tourists' optimal

destination selection. Although the AHP is effective in determining the relative importance of criteria, it does not directly provide a ranking of strategic alternatives. To address this limitation, it is often integrated with other multi-criteria decision-making methods such as TOPSIS.

TOPSIS is one of the multi-criteria decision-making techniques that is also commonly used in selecting and ranking priority options. Based on the principle that the optimal choice is the one closest to the ideal solution and farthest from the worst solution, TOPSIS allows for the simultaneous comparison of multiple opposing criteria in an objective and efficient manner. Bah and Tulkinov (2022) used TOPSIS in evaluating supplier selection. Naser and Khaleel (2024) used TOPSIS for the purpose of selecting the optimal airport for developing transport infrastructure. Aldino et al. (2023) applied TOPSIS as an effective method in selecting the best graduates. Gherdan et al. (2025) applied TOPSIS to evaluate the priorities of agrotourism development strategies. Nguyen (2022) selected a package tour service provider by applying the TOPSIS method. Given the complementary strengths of SWOT, AHP, and TOPSIS, integrating these methods can provide a more comprehensive and systematic approach to strategic decision-making.

Combining the SWOT model with the AHP method provides a logical and systematic approach to the decision-making process. Kaymaz et al. (2022) assessed the sustainable development goals of Erzurum province through the combination of AHP-SWOT. Bayraktar et al. (2023) used the combination of the AHP-SWOT for the selection of alternative biofuels. Meanwhile, Cacal et al. (2023) proposed a water resources management strategy through the combined use of the AHP and SWOT analysis. Meanwhile, the combination of the AHP and TOPSIS focuses on improving the accuracy and objectivity in the evaluation and ranking of options. First, the AHP is used to weight the criteria based on their relative importance, which is useful in multi-criteria decision-making situations where there are many options and complex evaluation criteria. Nguyen and Tuyen (2025) used the combination of AHP-TOPSIS for the selection of accounting staff. Amiri et al. (2024) used AHP-TOPSIS for the selection of renewable energy sources. Menon and Ravi (2022) selected sustainable suppliers in the electronics supply chain by applying the combination of AHP-TOPSIS.

Combining the AHP, SWOT, and TOPSIS methods in decision-making provides a comprehensive approach, taking advantage of the benefits of each analytical tool. Several studies have used this trio of methods. Xu and Wen (2021) used a combination of the SWOT-AHP-TOPSIS methods for decision analysis in the military field. Aji et al. (2023) applied SWOT-AHP-TOPSIS to analyze how to recover suppliers quickly. Meanwhile, Akbar and Putri (2021) selected strategies to increase sales by using a combination of three SWOT-AHP-TOPSIS methods.

Despite the growing application of these methods, there is still a need for integrated frameworks that combine qualitative strategic analysis with quantitative prioritization techniques, particularly in the context of tourism development in newly restructured administrative regions. This study integrates SWOT–AHP–TOPSIS to prioritize tourism development strategies. Specifically, the SWOT model is used to comprehensively identify the strategic context, including the strengths, weaknesses, opportunities, and threats of the tourism industry in the new socio-geographical conditions. On that basis, the AHP helps quantify the importance of factors through the pairwise comparison method in order to determine the weight for each criterion in a consistent and transparent manner. Finally, TOPSIS is applied to rank tourism development strategies based on their proximity to the ideal option. The combination of these three tools not only allows for

multidimensional and systematic assessment but also enhances the reliability in selecting priority strategies that are suitable for the practical conditions and sustainable development orientation of Quang Ngai province after the merger.

Despite the growing application of SWOT, AHP, and TOPSIS in strategic decision-making, most previous studies have applied these methods either independently or in partial combinations, with limited integration into a unified analytical framework. In addition, there is a lack of studies applying such integrated approaches in the context of tourism development under administrative restructuring.

To address this gap, this study proposes a combined SWOT–AHP–TOPSIS framework that integrates qualitative and quantitative analyses to support more comprehensive and systematic decision-making. This integrated approach not only enhances the reliability of strategy prioritization but also provides practical insights for tourism planning in newly restructured administrative regions.

This contribution is particularly relevant in emerging contexts where traditional planning approaches may not adequately capture the complexity of structural changes.

Table 1
Summary of related studies and research gaps

Study	**Method**	**Research context**	**Key contribution**	**Limitation**
Xu & Wen (2021)	SWOT–AHP–TOPSIS	Military decision-making	Integrated MCDM framework	Limited practical tourism application
Aji et al. (2023)	SWOT–AHP–TOPSIS	Supplier recovery	Rapid decision analysis	Not applied in tourism context
Akbar & Putri (2021)	SWOT–AHP–TOPSIS	Sales strategy	Strategy prioritization	Limited methodological explanation
Kaymaz et al. (2022)	SWOT–AHP	Regional development	Weighting strategic factors	No ranking of alternatives
This study	SWOT–AHP–TOPSIS	Tourism (post-merger Quang Ngai)	Integrated qualitative–quantitative framework; strategy prioritization in restructuring context	(Optional: expert-based limitation)

As shown in Table 1, previous studies have not fully integrated SWOT, AHP, and TOPSIS in the context of tourism development under administrative restructuring, which highlights the contribution of this study.

3. Methodology

3.1 Research process

In order to identify and prioritize tourism development strategies suitable for the new context of Quang Ngai province after the merger, the study chose an integrated approach between SWOT analysis, the AHP method, and the TOPSIS technique. This approach allows for the combination of qualitative and quantitative analysis, thereby enhancing objectivity and reliability in the decision-making process. The research implementation process is summarized through the main steps as shown in Figure 1.

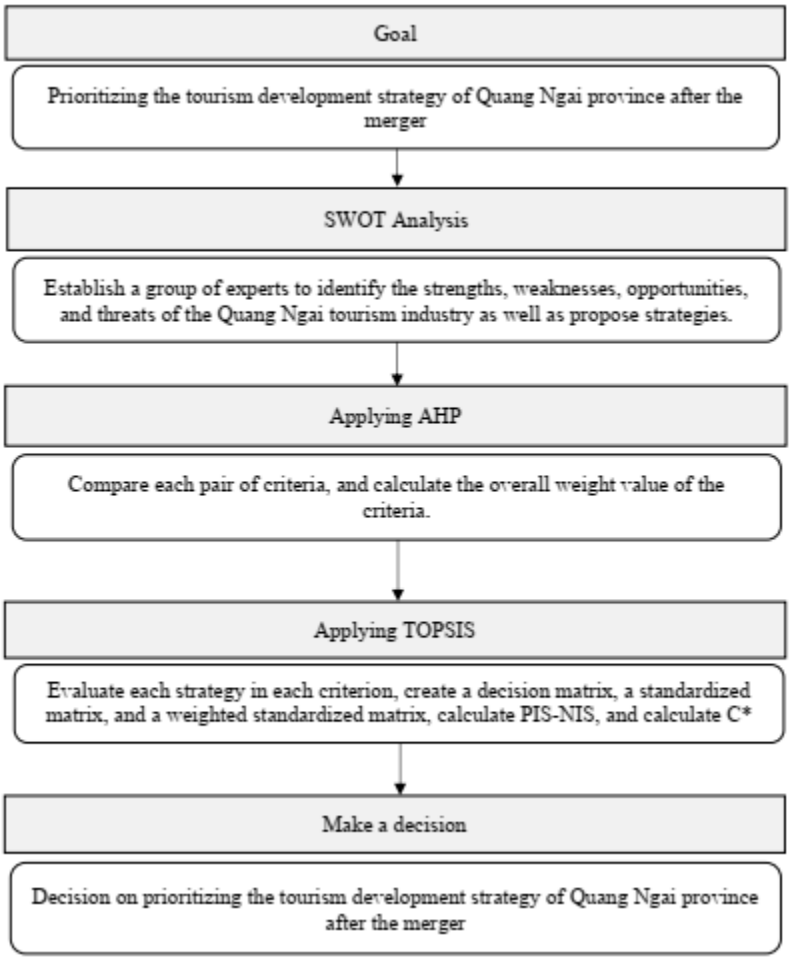

Figure 1 Research framework

3.2 SWOT analysis

SWOT analysis was selected in this study due to its ability to simultaneously assess internal factors (strengths and weaknesses) and external factors (opportunities and threats), providing a comprehensive view of the strategic environment. Compared to other analytical tools such as PESTEL or Porter's Five Forces, SWOT offers greater flexibility and is more suitable for integration with multi-criteria decision-making methods such as AHP and TOPSIS.

In addition, SWOT is particularly appropriate for expert-based evaluation, as it allows qualitative judgments to be systematically structured and later quantified through AHP and TOPSIS. This makes it a suitable approach for analyzing tourism development strategies in the context of administrative restructuring.

SWOT analysis is a commonly used method in strategic management to identify and comprehensively evaluate internal and external factors that can affect the development of a business (Dalton, 2018). This tool helps businesses determine their current position in the market, thereby building appropriate strategies to achieve business goals.

SWOT is a basic strategic analysis model, including four core elements: strengths, weaknesses, opportunities, and threats. Specifically, strengths reflect the positive internal factors that a business possesses, creating a competitive advantage in the process of implementing strategic goals. Conversely, weaknesses are internal limitations that can reduce operational efficiency or affect the competitiveness of a business. Meanwhile, opportunities are external factors that offer the potential for growth, expanding market share, or improving market position. Finally, threats refer to risks or fluctuations from the external environment that can negatively impact business operations and the long-term stability of the organization (Mardiyana et al., 2022).

SWOT acts as a tool to identify key factors, in which internal factors (strengths and weaknesses) are within the control of the enterprise, while external factors (opportunities and threats) depend on the external business environment (Tikhonov & Zelentsova, 2021). SWOT is not only useful in assessing overall strategy but can also be flexibly combined with other models and analytical tools to increase decision-making effectiveness (Palazzo & Micozzi, 2024).

In addition, according to Wiranti and Ali (2025), the SWOT matrix helps guide strategies through four specific groups of solutions:

SO (Strengths – Opportunities) strategy: Leveraging strengths to exploit opportunities.
ST (Strengths – Threats) strategy: Using strengths to minimize or avoid risks.
WO (Weaknesses–Opportunities) Strategy: Overcoming weaknesses to take advantage of opportunities.
WT (Weaknesses–Threats) strategy: Limiting weaknesses to prevent or minimize the impact of threats.

In this study, the SWOT analysis was conducted first. A list of potential experts was built based on the criteria of having in-depth expertise in tourism, regional economics, and development planning and having practical experience in local tourism management. After review and evaluation, fifteen experts were invited to participate in the study to ensure multidimensionality and representation of

many related fields. A focus group discussion was held to exploit expert opinions on the strengths, weaknesses, potentials, and challenges of tourism development in Quang Ngai province after the merger. The collected information was synthesized, analyzed in content, and standardized to build a SWOT matrix including the criteria groups: Strengths (S), Weaknesses (W), Opportunities (O), and Threats (T) in a complete and realistic manner. Figure 2 shows the SWOT matrix.

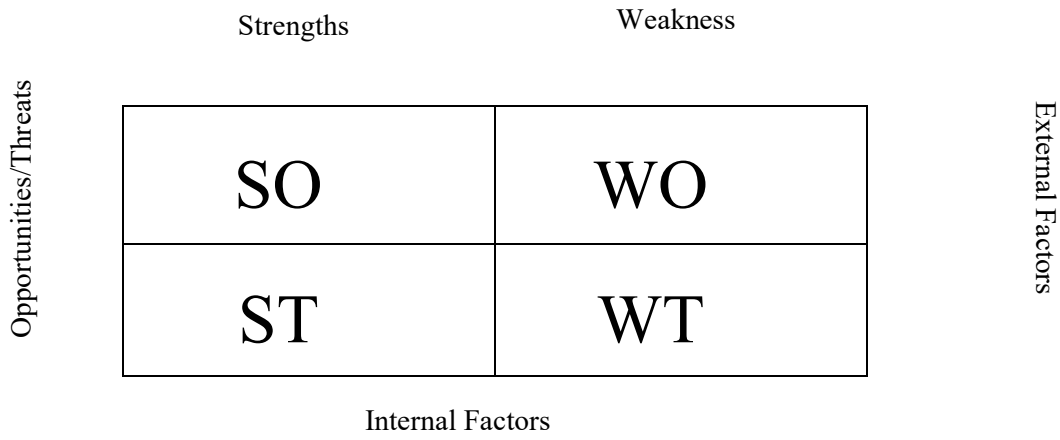

Figure 2 SWOT matrix

3.3 Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP) method is a well-structured multi-criteria decision-making (MCDM) tool that is widely used in many fields (Siekelova et al., 2021). The core strength of the AHP lies in its ability to transform subjective, often qualitative, assessments into quantitative values through pairwise comparison techniques, thereby helping decision makers determine the priority level between factors in a hierarchically structured system (Bugingo et al., 2024). One of the outstanding advantages of the AHP is its ability to handle complex problems in which the criteria are of different natures and difficult to quantify directly (Tavana et al., 2023). The AHP operates on three basic principles: (i) hierarchically classifying the problem into clear levels from objectives, criteria groups to options; (ii) perform pairwise comparisons between factors within the same tier to assess the relative importance of each factor; and (iii) synthesize the assessments through mathematical calculations to determine the weights and consistency of the assessment system.

In this study, after completing the SWOT analysis, the AHP method was used next. Experts were asked to make a pairwise comparison assessment between the criteria groups (S), (W), (O), and (T) and sub-criteria in each group (S), (W), (O), and (T) according to the Saaty scale (2008), presented in Table 2. The collected data were used to build pairwise comparison matrices, calculate the relative weight for each criterion, and test the level of CR consistency. Assessment tables that do not meet the consistency standard will be required to be adjusted or eliminated to ensure the reliability of the results.

Table 2
Importance comparison scale with AHP (Saaty, 2008)

Definition of importance	**Explanation**	**Intensity**
Extreme importance	An activity is overwhelmingly favored over another	9
Very, very strong		8
Very strong	An activity is favored very strongly over another	7
Strong plus		6
Strong importance	Experience and judgement strongly favor one activity	5
Moderate plus		4
Moderate importance	Experience and judgement slightly favor one activity	3
Weak or slight		2
Equal importance	Two activities contribute equally to the objective	1

To ensure reliability and consistency in data processing and calculation, the research team used Microsoft Excel software as a calculation support tool. The calculated value is only accepted when the consistency ratio is CR≤10% (0.1); with CI, CR calculated according to the following formula:

CR consistency ratio: CR=CI/RI.

In which RI is the random consistency index (presented in Table 3); CI is the consistency index, CI = (λ max - n)/(n - 1); and λ max is the eigenvalue of the matrix, λ max= $\sum_{i=1}^{n} wi \times \sum_{j=1}^{n} aij$.

Table 3
RI parameter (Saaty, 1984)

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

3.4 TOPSIS method

TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) is a widely used technique due to its intuitiveness, efficiency, and ability to handle complex situations with multiple options and different evaluation criteria (Pandey et al., 2023). TOPSIS is based on the core principle that the optimal choice is the one that is the shortest distance from the ideal option and the furthest from the anti-ideal option (Roszkowska et al., 2024). This principle reflects a practical and rational

decision-making mindset: no option is absolutely perfect, but the best relative option can be determined by measuring the degree of approximation to the desired state. The outstanding advantage of TOPSIS is the ability to produce clear, easy-to-understand results while not requiring too many complex assumptions about the data (Madanchian & Taherdoost, 2023). In addition, TOPSIS allows for the assessment of the relative effectiveness of each option, rather than simply providing a binary choice (true/false or select/not select). This makes TOPSIS a useful tool in strategic choice problems, especially when the number of options is large and many aspects need to be considered at the same time.

According to Dabić-Miletić and Raković (2023), the TOPSIS process consists of the following basic steps: first, a decision matrix is constructed, in which the rows are the options to be evaluated and the columns are the relevant criteria. Next, the matrix is normalized to bring the criteria to the same scale to ensure uniformity in comparison. Then, each column is multiplied by the corresponding weight of each criterion. The weighted matrix is used to determine two benchmarks: the ideal PIS (including the best values according to each criterion) and the anti-ideal NIS (including the worst values). The distance from each option to these two benchmarks is calculated, and from there the approximation index (C*) is determined. The larger the value of (C*), the closer the option is to the ideal. The ranking of the options is done based on this index.

In this study, the TOPSIS method was implemented in the final stage to rank tourism development strategies based on their closest level to the ideal option. Specifically, the strategies were evaluated based on their level of response to each criterion, in which the criteria were assigned corresponding weights through the previous AHP analysis results. The evaluation was performed by experts, following the principle of independence to ensure objectivity and avoid mutual influence in the scoring process. Each expert was asked to evaluate each strategy according to each criterion on a 100-point scale, in which 0 points represented a level of non-response or very poor response, and 100 points reflected the optimal level of response according to the corresponding criterion. This scale allows for detailed and flexible expression of the evaluation level while effectively supporting the standardization of the decision matrix in the next processing steps of TOPSIS. The results from TOPSIS provide a quantitative basis for ranking tourism development strategies in order of priority, with the strategic option with a larger C* value being given priority.

4. Results

This section presents the main findings of the study based on the integrated SWOT–AHP–TOPSIS approach. Figure 3 illustrates the geographical scope of the newly merged Quang Ngai province, providing spatial context for the subsequent analysis.

Figure 3 Map of Quang Ngai province after merger

4.1 Expert characteristics

Within the framework of the research, the author conducted a survey and interviewed fifteen potential experts based on the following criteria: having in-depth expertise in tourism, regional economics, and development planning, and having practical experience in local tourism management. The experts were selected by a purposive sampling method, including department-level tourism managers, tourism planning and development specialists, and representatives from reputable travel and hotel businesses. All experts have ten years or more of experience and have a clear understanding of the local and regional tourism development context. The expert consultation was conducted through three main stages: (1) assessing the relative importance of SWOT factors using the AHP method, (2) determining the priority of development strategies using the AHP-TOPSIS integrated model, and (3) experts scored the developed tourism development strategies, and the TOPSIS method was applied to synthesize the assessments, helping to rank and select the most optimal strategic option among the feasible options. The continuous and in-depth participation of experts in all three stages not only ensured the objectivity and reliability of the data but also contributed to enhancing the practical applicability of research results in planning and implementing tourism development policies.

4.2 SWOT analysis results

The list of criteria groups strengths (S), weaknesses (W), opportunities (O), threats (T), and tourism development strategies in Quang Ngai are presented in Table 4 and Table 5, respectively.

Table 4
SWOT matrix of Quang Ngai tourism industry

Strengths (S)	**Weakness (W)**
(S1) Many beaches have wild, undiscovered beauty.	(W1) Transport infrastructure is still weak and limited.
(S2) Many historical relics, cultural relics, and cultural heritages of national and international significance.	(W2) Accommodation infrastructure is not yet able to meet the needs of tourists.
(S3) Quang Ngai cuisine has its own unique features with many specialties, diverse thanks to the natural conditions of mountains, forests, sea, islands, and rivers.	(W3) Human resources serving the tourism industry are limited in both quantity and quality.
	(W4) Tourism promotion work has not received due attention and is not professional.
	(W5) Limited budget for travel.
Opportunity (O)	**Threats (T)**
(O1) Adjacent to tourist development areas such as Da Nang, adjacent to Laos and Cambodia, Indochina crossroads, located in the East-West economic corridor.	(T1) Competition in attracting tourists from other provinces and cities.
(O2) The number of international tourists coming to Vietnam is increasing, and so is Quang Ngai.	(T2) Climate change and environmental pollution increase.

Table 5
List of tourism development strategies in Quang Ngai

SO strategy	Strengthen local linkages in the tourism industry through tours connecting domestic and foreign localities.
ST1 strategy	Build a distinct tourism brand for Quang Ngai.
ST2 strategy	Develop a spiritual tourism model.
WO1 strategy	Strengthen tourism promotion activities of Quang Ngai at home and abroad.
WO2 strategy	Plan to build road, air, and waterway traffic infrastructure to shorten travel time between tourist destinations inside and outside the province.
WO3 strategy	Renovate and build new hotel and restaurant facilities to international standards.
WO4 strategy	Attract tourism human resources in localities that already have tourism brands, and at the same time strengthen tourism human resource training at Quang Ngai universities.
WT1 strategy	Develop green, environmentally friendly tourism models.
WT2 strategy	Socialize the tourism industry, calling for strong investment from the private economic sector and large enterprises inside and outside the province.

4.3 Results of the weights of the criteria are calculated according to AHP

The results of the pairwise comparison matrices and the corresponding weight calculations for criteria groups and sub-criteria are presented in Tables 6 to 11.

Table 6
Comparison matrix of criteria groups S, T, W, and O

	S	W	O	T	Priority Vector
S	1	1/4	1/3	1/2	0.0960
W	4	1	2	3	0.4658
O	3	1/2	1	2	0.2771
T	2	1/3	1/2	1	0.1611
RI=0.9; λ max= 4.039; CI= 0.013; CR= 0.0146<0.1					

Table 7
Comparison matrix of group S criteria

	S1	S2	S3	Priority Vector
S1	1	2	1/2	0.2973
S2	1/2	1	1/3	0.1638
S3	2	3	1	0.5390
RI=0.58; λ max= 3.0111; CI= 0.0056; CR= 0.0096<0.1				

Table 8
Comparison matrix of group W criteria

	W1	W2	W3	W4	W5	Priority Vector
W1	1	2	3	5	7	0.4529
W2	1/2	1	4	2	3	0.2462
W3	1/3	1/4	1	1/3	1/2	0.0732
W4	1/5	1/2	3	1	2	0.1413
W5	1/7	1/3	2	1/2	1	0.0864
RI=1.12; λ max= 5.3568; CI= 0.0891; CR= 0.0796 <0.1						

Table 9
Comparison matrix of group O criteria

	O1	O2	Priority Vector
O1	1	2	0.6667
O2	1/2	1	0.3333
With n=2, the decision is definitely consistent			

Table 10
Comparison matrix of group T criteria

	T1	T2	Priority Vector
T1	1	3	0.7500
T2	1/3	1	0.2500
With n=2, the decision is definitely consistent			

The overall weight will be equal to the product of the group weight and the internal weight. The overall weight results of the criteria are presented in Table 11.

Table 11
Overall weighting results of the criteria

Criteria	Global weight	Local weight	Overall weight
S1	0.0960	0.2973	0.0285
S2	0.0960	0.1638	0.0157
S3	0.0960	0.5390	0.0517
W1	0.4658	0.4529	0.2110
W2	0.4658	0.2462	0.1147
W3	0.4658	0.0732	0.0341
W4	0.4658	0.1413	0.0658
W5	0.4658	0.0864	0.0402
O1	0.2771	0.6667	0.1848
O2	0.2771	0.3333	0.0924
T1	0.1611	0.7500	0.1208
T2	0.1611	0.2500	0.0403

The results of calculating the overall weights for the SWOT criteria shown in Table 11 reflect the relative influence of each criterion. Overall, the criteria in the weakness group (W) account for a significant proportion, with a total weight of up to 0.4658, showing that experts assess that internal limitations are currently the biggest barrier to local tourism development. Of which, (W1) Transport infrastructure is still weak and limited, with the highest weight of 0.2110, standing out as the factor with the greatest negative impact on tourism development. This is a result that clearly reflects the reality in Quang Ngai, where the transport system connecting destinations lacks continuity, making it difficult to access and attract tourists. In addition, criteria (W2) Accommodation infrastructure does not meet requirements, with a weight of 0.1147, and (W4) Unprofessional promotion with a weight of 0.0658 are also assessed as a factors that hinder the competitiveness of the tourism industry. Meanwhile, weaknesses such as (W5) Limited budget with a weight of 0.0402 and (W3) Weak tourism human resources with a weight of 0.0341, although having lower weights, still show that they need to be improved synchronously to enhance the effectiveness of strategy implementation.

On the other hand, the opportunity group (O) has a relatively high total weight of 0.2772, showing that the potential for tourism development in Quang Ngai is very significant if properly exploited. Notably, criterion (O1), Strategic geographical location, close to major tourist centers and the east-west economic corridor, has a weight of 0.1848, ranking second in the table, showing the extremely important role of regional connectivity and strategic location in the development strategy. This also implies that investing in connecting infrastructure not only overcomes weaknesses (W1) but is also a way to make good use of opportunities (O1), creating a resonance effect in tourism development. Meanwhile, the criterion (O2) Increasing number of international visitors has a weight of 0.0924, reflecting that although the general trend is positive, the direct impact of this factor in Quang Ngai

is still not strong, possibly because this destination has not really become a popular choice for international tourists.

For the threats group (T), the total weight is 0.1611, showing that although negative external factors are noteworthy, they are not the main dominant factors. In particular, criterion (T1) Competition from other localities with a weight of 0.1208 is considered the biggest threat in this group, reflecting the increasingly fierce competition in the tourism industry, especially when compared with neighboring localities that have developed strongly, such as Da Nang or Gia Lai. Criterion (T2) Climate change and environmental pollution with a weight of 0.0403 is lower but should not be taken lightly because the long-term and irreversible nature of this problem can have a sustainable impact on the ability to develop ecotourism and sea and island tourism, which are the strengths of Quang Ngai.

Regarding strengths (S), the total weight is 0.0959, significantly lower than the remaining groups. This reflects an important fact; although Quang Ngai possesses many unique natural and cultural tourism resources, experts assess that these strengths have not yet been truly effective in enhancing the local tourism competitiveness. In particular, criterion (S3), Rich and unique local cuisine with a weight of 0.0517, is rated highest in the group of strengths, showing that the potential for developing culinary tourism is a direction that can be better exploited in the future. The remaining factors, such as criterion (S1) Pristine sea with weight 0.0285 and criterion (S2) Historical and cultural relics with weight 0.0157, have low weights, suggesting that these resources have not been properly exploited or have not been invested in adequately to become a real competitive advantage.

The weighted analysis results clearly reflect the great opportunities and threats of the Quang Ngai tourism industry and at the same time indicate that the development strategy needs to focus on overcoming internal weaknesses, making good use of geographical location, such as inter-regional opportunities, or exploiting unique advantages, such as local cuisine.

4.4 Calculation results by the TOPSIS method and priority ranking of strategies

The expert evaluation scores for each strategy on each criterion were collected and aggregated using the arithmetic mean to reflect the collective judgment. These average values were then rounded to the nearest integer. The results of the TOPSIS calculation and the final priority rankings are presented in Tables 12 to 17, respectively.

Table 12
Decision matrix

	S1	S2	S3	W1	W2	W3	W4	W5	O1	O2	T1	T2
SO	60	65	70	45	50	55	50	45	85	80	60	50
ST1	90	80	85	40	30	50	30	40	60	70	80	65
ST2	45	90	70	55	60	50	60	65	70	80	65	80
WO1	85	85	90	50	45	50	90	50	75	85	80	70
WO2	80	80	60	95	65	65	50	50	85	90	85	75
WO3	85	70	60	65	60	50	55	45	80	85	85	70
WO4	40	75	55	50	55	85	80	55	80	80	55	45
WT1	80	85	60	55	65	50	70	50	65	70	85	90
WT2	75	75	70	80	85	60	75	90	70	85	75	70

Table 13
Standardized decision matrix

	S1	S2	S3	W1	W2	W3	W4	W5	O1	O2	T1	T2
SO	0.27	0.28	0.33	0.24	0.29	0.31	0.26	0.27	0.38	0.33	0.27	0.24
ST1	0.41	0.34	0.41	0.22	0.18	0.29	0.15	0.24	0.27	0.29	0.35	0.31
ST2	0.20	0.38	0.33	0.30	0.35	0.29	0.31	0.39	0.31	0.33	0.29	0.38
WO1	0.39	0.36	0.43	0.27	0.27	0.29	0.46	0.30	0.33	0.35	0.35	0.34
WO2	0.36	0.34	0.29	0.51	0.38	0.37	0.26	0.30	0.38	0.37	0.38	0.36
WO3	0.39	0.30	0.29	0.35	0.35	0.29	0.28	0.27	0.36	0.35	0.38	0.34
WO4	0.18	0.32	0.26	0.27	0.32	0.49	0.41	0.33	0.36	0.33	0.24	0.22
WT1	0.36	0.36	0.29	0.30	0.38	0.29	0.36	0.30	0.29	0.29	0.38	0.43
WT2	0.34	0.32	0.33	0.43	0.50	0.34	0.39	0.53	0.31	0.35	0.33	0.34

Table 14
Weighted normalized decision matrix

	S1	S2	S3	W1	W2	W3	W4	W5	O1	O2	T1	T2
SO	0.008	0.004	0.017	0.051	0.034	0.011	0.017	0.011	0.070	0.030	0.032	0.010
ST1	0.012	0.005	0.021	0.046	0.020	0.010	0.010	0.010	0.049	0.027	0.043	0.013
ST2	0.006	0.006	0.017	0.063	0.041	0.010	0.020	0.015	0.058	0.030	0.035	0.015
WO1	0.011	0.006	0.022	0.057	0.030	0.010	0.031	0.012	0.062	0.032	0.043	0.014
WO2	0.010	0.005	0.015	0.108	0.044	0.013	0.017	0.012	0.070	0.034	0.045	0.014
WO3	0.011	0.005	0.015	0.074	0.041	0.010	0.019	0.011	0.066	0.032	0.045	0.014
WO4	0.005	0.005	0.014	0.057	0.037	0.017	0.027	0.013	0.066	0.030	0.029	0.009
WT1	0.010	0.006	0.015	0.063	0.044	0.010	0.024	0.012	0.053	0.027	0.045	0.017
WT2	0.010	0.005	0.017	0.091	0.057	0.012	0.025	0.021	0.058	0.032	0.040	0.014

Table 15
PIS and NIS

	S1	S2	S3	W1	W2	W3	W4	W5	O1	O2	T1	T2
PIS	0.012	0.006	0.022	0.108	0.057	0.017	0.031	0.021	0.070	0.034	0.045	0.017
NIS	0.005	0.004	0.014	0.046	0.020	0.010	0.010	0.010	0.049	0.027	0.029	0.009

Table 16
Distance results of each strategic option compared to PIS and NIS

	$\sum S^+$	$\sum S^-$
SO	0.067	0.027
ST1	0.080	0.017
ST2	0.054	0.032
WO1	0.060	0.034
WO2	0.023	0.073
WO3	0.043	0.044
WO4	0.060	0.032
WT1	0.053	0.038
WT2	0.024	0.064

Table 17
The result of the similarity coefficient compared to the ideal solution of each strategic option C^*

	C^*	Rank
SO	0.289	8
ST1	0.176	9
ST2	0.372	5
WO1	0.362	6
WO2	0.759	1
WO3	0.504	3
WO4	0.350	7
WT1	0.415	4
WT2	0.729	2

The results of the C* value and ranking of strategies in Table 17 show that strategy (WO2) Planning to build diverse transport infrastructure to shorten travel time (C* = 0.759) is ranked number 1, reflecting the top priority in overcoming the core weakness of transport infrastructure (W1) with a weight of 0.2110 identified through the AHP as the most influential factor. This shows that experts and analytical models agree that upgrading infrastructure is a key strategy, creating an effective connection platform to exploit the natural and cultural tourism potential of Quang Ngai. Closely followed is strategy (WT2) Socializing the tourism industry, attracting investment from the private economy (C* = 0.729, ranked 2), and demonstrating the importance of financial resources and the participation of enterprises in industry development. The weight of factor W5 (limited budget) is not the largest but has a significant impact, and this strategy is considered a feasible solution to supplement capital sources and improve tourism exploitation efficiency. Strategy (WO3) Renovating and upgrading accommodation facilities to international standards (C* = 0.504, ranked 3) is in the next highest position, consistent with the significant weight of factor W2 (accommodation infrastructure does not meet the weight with a weight of 0.1147). Focusing on

developing facilities not only improves customer experience but also increases Quang Ngai's competitiveness compared to neighboring destinations.

Strategy (WT1) Developing green, environmentally friendly tourism (C* = 0.415, ranked 4) demonstrates concern for long-term strategic environmental challenges. The priority for green tourism is also consistent with the global trend of sustainable development and the province's rich ecological potential. The strategies (ST2) Developing spiritual tourism (C* = 0.372, rank 5) and (WO1) Strengthening tourism promotion (C* = 0.362, rank 6) also received positive assessments, reflecting the exploitation of the potential strengths of culture and relics and the need to enhance brand recognition. Although the strength (S) has a lower weight than other factors, these are important complementary strategies, helping to expand influence and attract more tourists. At the bottom of the rankings, strategies (WO4) Attracting and training human resources (C* = 0.350, ranked 7) and (SO) Strengthening local links through tours (C* = 0.289, ranked 8) received lower scores, indicating that although meaningful, immediate effectiveness may not be high due to internal weaknesses in human resources and infrastructure that have not been thoroughly resolved. Strategy (ST1) Building a distinct tourism brand (C* = 0.176, ranked 9) ranked last, indicating that while creating a new brand is important, it can only be successful when other fundamental factors have been improved. This result reflects the logic and consistency with the SWOT criteria weights analyzed earlier. Prioritizing strategies that focus on overcoming internal weaknesses (especially infrastructure and resources) before promoting strengths and exploiting opportunities shows practicality and effectiveness in strategic planning. At the same time, highly ranked strategies have the potential to create positive and sustainable transformation for the Quang Ngai tourism industry in the near future.

5. Conclusions, recommendations, and limitations

5.1 Conclusions

This study on prioritizing tourism development strategies through the integration of SWOT-AHP-TOPSIS has provided a comprehensive and scientific analysis process to identify appropriate tourism development strategies for Quang Ngai province after the merger. The integration of SWOT, AHP, and TOPSIS methods not only helps quantify the impact of internal and external factors but also facilitates the evaluation, comparison, and ranking of strategies based on objective and scientific data. The research results show that internal weaknesses in transport and accommodation infrastructure, along with limitations in financial and human resources, are the main challenges affecting the development of the tourism industry in Quang Ngai. At the same time, the potential of strategic geographical location, natural resources, and local culture has not been optimally exploited. Thereby, the top priority strategies focus on upgrading and developing diversified transport infrastructure, socializing investment from the private economic sector, and improving international standard accommodation facilities. These strategies create an important foundation to overcome weaknesses, take advantage of opportunities, and promote sustainable development of the local tourism industry.

The integrated SWOT-AHP-TOPSIS approach has proven effective in supporting strategic decision-making for tourism development at the provincial level after the merger, helping managers and policy makers to prioritize resources in a reasonable and timely manner. The research results not only have practical significance for Quang Ngai but can also be applied as a reference for other

provinces and regions with similar characteristics in the process of restructuring and developing the tourism industry.

5.2 Recommendations

Based on the results of the analysis of priority tourism development strategies in Quang Ngai after the merger through the integration of SWOT-AHP-TOPSIS, the study proposes a number of recommendations to promote sustainable and effective development of the local tourism industry as follows:

1. **Prioritize investment in developing diverse and synchronous transport infrastructure.**
The planning and upgrading of road, air, and waterway transport systems should be considered the top priority. This is the decisive factor in the ability to connect tourist destinations and shorten travel time, thereby creating favorable conditions for tourists and investors to access tourism products in Quang Ngai.

2. **Enhance socialization and attract investment from the private economy.**
Limited public budget requires the province to build flexible and attractive policy mechanisms to attract financial resources from private enterprises and large investors inside and outside the province. Participation of the private sector will help improve investment capacity, diversify products and services, and enhance the competitiveness of the tourism industry.

3. **Synchronously develop high-quality accommodation and service facilities.**
Renovating, building new, and upgrading the system of restaurants and hotels to international standards not only meets the increasing demand of tourists but also contributes to raising the brand of Quang Ngai tourism in the domestic and international markets.

4. **Promote training and attract quality tourism human resources.**
The province needs to focus on developing human resources through cooperation with universities and training to improve tourism service and management capacity. At the same time, attract human resources from localities with developed tourism to compensate for the shortage in both quantity and quality of labor.

5. **Strengthen promotion and build a unique tourism brand.**
Quang Ngai needs to carry out professional promotion activities, diversifying domestic and international communication forms to raise awareness and attract tourists. Building a unique tourism brand and exploiting the strengths of pristine natural landscapes and unique culture will help the province build a competitive position in the market.

6. **Encourage the development of sustainable, environmentally friendly tourism models.**
In order to respond to the challenges of climate change and environmental pollution, Quang Ngai needs to prioritize the development of green tourism, ecotourism, and community tourism to protect natural resources while enhancing the value of the experience for tourists.

These recommendations need to be implemented synchronously and flexibly in the post-merger development phase in order to fully exploit the internal potential while addressing existing

limitations, thereby orienting the development of Quang Ngai province's tourism industry effectively and sustainably.

5.3 Limitations

This study mainly relies on assessments from local experts, so the results may be influenced by subjective views and the limited scope of participating experts. In addition, the use of qualitative data combined with quantitative methods such as SWOT-AHP-TOPSIS may not fully reflect external factors or rapid changes in the tourism market. In addition, the scope of the study focuses on Quang Ngai province after the merger, so the results and recommendations may not be completely applicable directly to areas with different characteristics. This study does not compare the TOPSIS results with other MCDM methods such as SAW or CoCoSo, which may limit the robustness of the findings.

Data Availability: The data used to support the findings of this study are available from the corresponding author upon request.

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