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### Factors Affecting Ecotourism Development in Thung Nham, Ninh Binh Province

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#### Abstract

This study identifies and analyses the factors affecting ecotourism development in the Thung Nham Ecotourism Area, Ninh Binh Province, against the backdrop of a rapid recovery in provincial tourism demand and a new phase of destination investment. An explanatory case-study design is employed, combining documentary analysis, descriptive statistics based on official secondary data, and qualitative content analysis of 19 detailed public Tripadvisor reviews posted between 2024 and 2026. The integrated analytical framework comprises eight groups of factors: (i) natural resources and biodiversity; (ii) conservation capacity and environmental management; (iii) accessibility and infrastructure; (iv) service quality, interpretation and safety; (v) products, experiences and seasonality management; (vi) digital communication and destination image; (vii) community participation and benefit sharing; and (viii) governance, investment and stakeholder coordination. The

findings show that karst landscapes, wetlands and the natural bird garden constitute the destination's foundational advantages. However, the conversion of these resources into sustainable tourism value depends heavily on visitor-capacity control, noise and group-activity management, the quality of wayfinding and multilingual information, transport connectivity, the authenticity of the experience, community benefit-sharing mechanisms, and cumulative-impact monitoring of new investment. The study recommends carrying-capacity-based governance, quiet-zone zoning, small-scale birdwatching products, digital visitor-flow coordination, a conservation-economic-social indicator system, and public sustainability reporting. The findings offer practical implications for the management of Thung Nham and other ecotourism destinations located within or adjacent to heritage landscapes.

**Keywords:** Ecotourism, Sustainable Development, Thung Nham, Ninh Binh, Tourism Carrying Capacity, Destination Governance

#### 1. Introduction

Ecotourism development has become an important strategic direction for localities endowed with environmentally sensitive natural resources and high heritage value. Unlike mass tourism, ecotourism does not merely use landscapes as inputs for service provision; it must simultaneously create incentives for conservation, environmental education and the distribution of benefits to local communities. Vietnam's 2017 Law on Tourism conceptualises ecotourism as tourism based on nature and local cultural identity, associated with community participation and environmental-protection education. This approach is consistent with the definition adopted by The International Ecotourism Society, in which conservation, community well-being, and interpretation and education constitute three inseparable pillars (TIES, 2015)<sup>[9]</sup>.

Ninh Binh has been among the destinations experiencing a strong post-pandemic recovery. In 2024, the province received approximately 8.7 million visitors, including 1.5 million international arrivals, while tourism revenue exceeded VND 9.1 trillion. More than 2.028 million visitors used accommodation establishments, generating nearly 2.34 million visitor-days. These figures indicate a large market, but they also reveal a relatively short average length of stay and continued pressure to increase value per visitor (Ninh Binh Tourism Promotion Information Center, 2025). In this context, ecotourism destinations need to shift from a narrow objective of increasing visitor numbers towards the simultaneous optimisation of experience quality, visitor expenditure, length of stay and conservation capacity.

Thung Nham is located within the core area of the Trang An Landscape Complex, where UNESCO requires close monitoring, strict regulation and careful management in response to pressures arising from increasing visitor numbers and the expansion of

tourism services and infrastructure. The destination contains wetland ecosystems, limestone mountains, caves and a natural bird garden. Publications by the Ninh Binh Department of Tourism identify 46 bird species and approximately 5,000 nests, including rare species. This distinctive advantage also makes Thung Nham particularly sensitive to noise, concentrated visitor flows, construction, vehicles and visitor behaviour near nesting areas.

The timeliness of this study is further reinforced by the Ninh Binh Provincial People's Committee's adjustment of the Thung Nham Ecotourism Project in June 2026. The adjusted project has total investment capital of nearly VND 600 billion and a planned sightseeing capacity of approximately 600,000 visitors per year, alongside expanded accommodation, restaurant and recreation services. The project is subject to a maximum construction density of 5% and a maximum building height of three storeys. This creates opportunities to upgrade services, extend stays and increase expenditure; however, without carrying-capacity governance and cumulative-impact monitoring, investment expansion may erode the ecological values that underpin the destination's attractiveness.

Research on destination competitiveness commonly emphasises core resources, accessibility, services, governance and supporting conditions (Buhalis, 2000; Dwyer & Kim, 2003)<sup>[1, 2]</sup>. Sustainable-tourism research adds the roles of communities, perceived benefits, interpretive quality and conservation capacity (Tosun, 2000; Lee, 2013; Thuy *et al.*, 2020)<sup>[11, 3, 10]</sup>. In the case of Thung Nham, however, the available evidence remains dispersed across provincial tourism reports, conservation information, investment decisions and visitor feedback. Integrating these sources within a unified analytical framework therefore has both academic and managerial significance.

Accordingly, the study addresses three questions: (1) Which groups of factors determine the prospects for sustainable ecotourism development at Thung Nham? (2) How are the current strengths and bottlenecks of each factor group reflected in practical evidence? and (3) Which solutions should be prioritised to balance service growth, visitor experience, community benefits and ecosystem conservation? The study aims to construct an analytical framework, assess the current situation through data triangulation and propose a measurable set of solutions.

## 2. Theoretical Foundations and Analytical Framework

### 2.1 Ecotourism and sustainable destination development

In essence, ecotourism is a mechanism linking the consumption of nature-based experiences with reinvestment in conservation. A destination can only be regarded as developing ecotourism when tourism generates a net positive effect—or at minimum does not cause long-term deterioration of natural capital—while strengthening environmental awareness, creating meaningful economic benefits for local residents, and operating with infrastructure, scale and visitor behaviour compatible with the area's carrying capacity. An increase in revenue or visitor numbers is therefore a necessary economic condition, but not a sufficient criterion.

In this study, sustainable destination development is assessed across four dimensions: (i) economic efficiency and market viability; (ii) conservation of landscapes, biodiversity and environmental quality; (iii) community benefits, participation and acceptance; and (iv) visitor

experience quality, safety, learning, and intention to return or recommend. These dimensions may involve short-term trade-offs but can become mutually reinforcing over the long term when appropriately designed. For example, limiting visitor numbers during ecologically sensitive periods may reduce immediate ticket volume while improving birdwatching quality, reducing impacts and increasing willingness to pay.

### 2.2 Destination competitiveness and product components

Buhalis (2000)<sup>[1]</sup> conceptualises a destination as a bundle of products and experiences co-produced by multiple actors. The 6A framework—attractions, accessibility, amenities, available packages, activities and ancillary services—demonstrates that outstanding resources alone do not create a competitive advantage when connectivity, information, experience organisation and market coordination are weak. Dwyer and Kim (2003)<sup>[2]</sup> further emphasise endowed resources, created resources, supporting conditions, destination management, demand conditions and situational factors.

At Thung Nham, core resources include the bird garden, wetlands, limestone mountains, caves and garden landscapes. Created resources include boat routes, walking trails, observation points, accommodation, cuisine, interpretation and events. Supporting conditions include connections from Tam Coc and Trang An, signage, internal transport, staff capability and digital information. Governance determines zoning, activity limits, noise control, construction, sanitation, safety and benefit sharing.

### 2.3 Service quality, interpretation and ecological experience

Ecotourism service quality differs structurally from conventional tourism service quality. In addition to reliability, responsiveness and tangible elements, visitors assess quality through environmental authenticity, opportunities to engage with nature, guiding competence, scientific information, safety and the sense that their visit contributes to conservation. Research in Vietnam by Thuy *et al.* (2020)<sup>[10]</sup> shows that interaction and experience attributes can generate satisfaction and dissatisfaction in a non-linear manner: The absence of a basic attribute such as hygiene, safety or information may cause strong dissatisfaction, whereas a distinctive experience such as observing flocks of birds returning to their nests can create a powerful and memorable highlight.

Environmental interpretation extends beyond the provision of interpretive signs. It is the process of translating data on species, habitats, seasonality and codes of conduct into accessible narratives that encourage visitors to adjust their behaviour. At a destination experiencing rapid growth in international arrivals, multilingual information, clear maps, guidance on observation times and safety warnings become direct components of product quality.

### 2.4 Conservation, carrying capacity and impact governance

Tourism carrying capacity should not be understood simply as the maximum number of people who can enter an area. It encompasses physical, ecological, social and managerial capacities. Physical capacity relates to area, boat docks and pathways; ecological capacity concerns impact thresholds for birds, vegetation, water and noise; social capacity

reflects the degree of crowding accepted by visitors and residents; and managerial capacity refers to available staff, monitoring and response capability.

UNESCO notes that Trang An is a relatively small property receiving a large and growing number of visitors, and consequently requires long-term monitoring, strict regulation and careful management to avoid excessive tourism infrastructure, use and service development. At Thung Nham, carrying-capacity management must be spatially and temporally differentiated: Stricter limits are required in nesting areas and during the birds' return period; group activities need noise standards; vehicles must be coordinated; and routes should be opened or closed according to breeding seasons and ecological conditions.

## 2.5 Community participation and multi-stakeholder governance

Local communities provide labour, local knowledge, agricultural and craft products, while also bearing impacts related to traffic, land prices, the environment and livelihood change. Social exchange theory suggests that residents' support for sustainable tourism depends on their perceived

balance of benefits and costs (Lee, 2013) <sup>[3]</sup>. Tosun (2000) <sup>[11]</sup>, however, identifies operational, structural and cultural barriers that may confine 'participation' to labour provision rather than participation in decision-making and benefit sharing.

At a destination involving substantial private investment within a heritage landscape, multi-stakeholder governance must clearly define the roles of businesses, government, heritage-management authorities, communities, scientists, tour operators and visitors. Public disclosure of conservation data, consultation before investment, local-procurement targets and conservation funds are instruments that can shift coordination from an administrative exercise towards accountable co-governance.

## 2.6 Factor framework and analytical propositions

Based on the preceding review, the study proposes eight factor groups. Each factor may directly affect one or more dimensions of sustainable development and may also interact with other factors. The propositions guide the case analysis; they are not hypotheses tested through a quantitative model in this article.

**Table 1:** Framework of factors affecting ecotourism development at Thung Nham

| Code | Factor group                                        | Principal impact mechanism                                                                                                                              | Analytical proposition                                                                                                                   |
|------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Natural resources and biodiversity                  | Distinctiveness, authenticity, opportunities to observe species and landscapes, destination differentiation, and educational value motivate visitation. | <b>P1:</b> The quality and integrity of resources positively influence destination attractiveness and sustainable development potential. |
| 2    | Conservation and environmental management           | Zoning; control of noise, waste and water; biodiversity monitoring; and limits on access to sensitive areas.                                            | <b>P2:</b> Conservation capacity moderates the relationship between visitor growth and ecological quality.                               |
| 3    | Accessibility and infrastructure                    | External connectivity, internal transport, docks, pathways, wayfinding and accessibility for diverse visitor groups.                                    | <b>P3:</b> Convenient access and appropriate infrastructure increase satisfaction, length of stay and expenditure.                       |
| 4    | Service quality, interpretation and safety          | Staff capability, foreign-language skills, species information, maps, hygiene, rescue and risk management.                                              | <b>P4:</b> Service and interpretive quality increase perceived value, learning and responsible behaviour.                                |
| 5    | Products, experiences and seasonality management    | Birdwatching, boats, caves, walking, agriculture and accommodation, designed by time period and group size.                                             | <b>P5:</b> Product diversity that remains ecologically coherent reduces seasonality and extends stays.                                   |
| 6    | Digital communication and destination image         | Pre-trip information, booking, review management, transparency regarding observation conditions and conservation narratives.                            | <b>P6:</b> Accurate communication and digital interaction reduce the expectation–experience gap.                                         |
| 7    | Community participation and benefits                | Employment, local procurement, consultation, co-design of products and revenue sharing.                                                                 | <b>P7:</b> Equitable benefit distribution increases support and product authenticity.                                                    |
| 8    | Governance, investment and stakeholder coordination | Planning, impact assessment, construction monitoring, shared data and accountability.                                                                   | <b>P8:</b> Integrated governance determines whether investment can generate growth without degrading heritage values.                    |

**Source:** Compiled by the author from Buhalis (2000) <sup>[1]</sup>, Dwyer and Kim (2003) <sup>[2]</sup>, Tosun (2000) <sup>[11]</sup>, Lee (2013) <sup>[3]</sup>, TIES (2015) <sup>[9]</sup> and UNESCO <sup>[14]</sup>

### 3. Research Methods

#### 3.1 Research design

The study employs an explanatory case-study design, which is appropriate for in-depth analysis of a destination within a specific institutional, ecological and market context. The research logic is based on triangulation: Official statistical data, legal and planning documents, conservation information, investment decisions and publicly reported visitor experiences are compared. This approach supports the identification of impact mechanisms and bottlenecks, but it does not substitute for a representative survey or a causal model.

The spatial scope comprises the Thung Nham Ecotourism Area and its relationship with the wider Ninh Binh destination system, particularly the Trang An Landscape Complex. The practical evidence covers 2020–2026, with 2024 selected as a relatively stable benchmark before administrative-boundary changes and the new investment phase. Data collection was closed on 24 July 2026.

#### 3.2 Data sources and processing

**Table 2:** Data sources used in the study

| Data group                            | Source                                                           | Period                 | Purpose                                                                                                                      |
|---------------------------------------|------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Tourism statistics                    | Ninh Binh Department of Tourism                                  | 2020–2025              | Visitor arrivals, international arrivals, revenue, accommodation guests and visitor-days; calculation of derived indicators. |
| Thung Nham resources and conservation | Ninh Binh Department of Tourism                                  | 2025                   | Lake area, breeding season, number of species and nests, protection rules and ecological value.                              |
| Investment and service capacity       | Ninh Binh Provincial Portal; Decision No. 2238/QĐ-UBND           | 2026                   | Investment capital, planned capacity, land area, construction density and functional zoning.                                 |
| Heritage-protection framework         | UNESCO World Heritage Centre                                     | Updated access in 2026 | Monitoring requirements, regulation, infrastructure management and community support within the Trang An property.           |
| Visitor feedback                      | Tripadvisor                                                      | 02/2024–04/2026        | Purposive sample of 19 detailed reviews; multi-label coding of positive themes and bottlenecks.                              |
| Academic and policy literature        | International journal articles; Law on Tourism; tourism strategy | 2000–2026              | Development of the theoretical framework, analytical propositions and managerial implications.                               |

**Source:** Compiled by the author

Derived indicators were calculated from published data as follows: International-visitor share = international visitors/total visitors; accommodation-guest share = accommodation guests/total visitors; average length of stay = visitor-days/accommodation guests; and average revenue = tourism revenue/total visitors. The adjusted project's capacity of 600,000 visitors per year is compared with total

Ninh Binh arrivals in 2024 to illustrate relative scale; it is not interpreted as an actual market share.

#### 3.3 Content analysis of public reviews

At the time of access, Thung Nham's Tripadvisor page displayed 169 reviews. The study purposively selected 19 recent reviews containing sufficient descriptive detail to identify visitor experiences, covering February 2024 to April 2026. Reviews were used only in aggregate form, and user identities were not quoted.

The coding process comprised three steps: (i) open reading to identify themes; (ii) development of a codebook covering scenery and birds, diversity of activities, timing and seasonality, noise and crowding, access, wayfinding and transport, conservation, authenticity and commercialisation, perceived value, and safety; and (iii) two further reading rounds to assign codes. A review could receive multiple codes, so the total number of coded mentions exceeds the sample size. Coding frequencies indicate the prevalence of themes within the sample, not the satisfaction rate of the entire visitor population.

#### 3.4 Assessment criteria and methodological limitations

Each factor group was assessed using four criteria: Evidence of existing strengths, evidence of bottlenecks, sensitivity to growth and managerial tractability. The study did not assign statistical weights; instead, it applied the qualitative ratings 'very high', 'high' and 'moderate' according to the degree of convergence across sources.

Provincial data do not permit the direct separation of Thung Nham-specific revenue, visitor numbers and expenditure.

Online reviews are affected by self-selection, language bias and reviewer expectations; the 19-review sample is not statistically representative.

Several 2026 project indicators describe design or planned capacity rather than operating outcomes.

Publicly available quantitative data are lacking on community income, water quality, noise, emissions, longitudinal bird populations and ecological carrying capacity.

### 4. Results

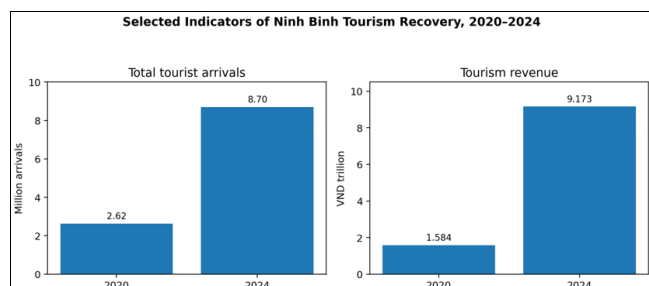
#### 4.1 Ninh Binh tourism growth and implications for Thung Nham

In 2024, Ninh Binh received 8.7 million visitors, approximately 30% more than in 2023 and 14% more than in 2019. International arrivals reached 1.5 million, equivalent to about 17.24% of total arrivals. Tourism revenue of more than VND 9.1 trillion corresponded to approximately VND 1.046 million per visitor. Guests using accommodation establishments represented only about 23.31% of total arrivals, and their average length of stay was approximately 1.15 days. These indicators show strong destination appeal, but a considerable proportion of visitors remain short-stay excursionists, placing pressure on infrastructure while leaving scope to deepen accommodation and consumption value.

Relative to 2020, total visitor arrivals in 2024 were approximately 3.32 times higher, while revenue was about 5.79 times higher when the figure of VND 9.173 trillion reported for 2024 in the 2020–2025 series is used. Revenue growth outpacing visitor growth is a positive signal of service value, but it also intensifies incentives for investment expansion. Thung Nham's challenge is to use

growing demand to extend stays and improve quality rather than increase visitor density in sensitive areas.

The adjusted project's planned sightseeing capacity of 600,000 visitors per year is equivalent to about 6.9% of total provincial arrivals in 2024. This is a substantial scale for a destination situated in the core of a World Heritage property. If evenly distributed, the capacity would correspond to more than 1,640 visitors per day; in practice, demand will concentrate on weekends, peak seasons and the period when birds return to their nests, producing much higher peak loads. An annual capacity figure therefore cannot substitute for carrying-capacity limits by hour, route and zone.



**Source:** Calculated by the author from Ninh Binh Department of Tourism data (2025a, 2025b) [5, 6]

**Fig 2:** Selected indicators of Ninh Binh tourism recovery, 2020–2024

**Table 3:** Practical indicators and implications for Thung Nham development

| Indicator                   | Value/estimate                                  | Managerial implication                                                                            |
|-----------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Total Ninh Binh arrivals    | 8.7 million                                     | Large demand base, requiring visitor-flow coordination and destination competitiveness.           |
| International visitors      | 1.5 million; 17.24%                             | Clear need for multilingual information, service standards and convenient payment.                |
| Tourism revenue             | More than VND 9.1 trillion                      | Opportunity to increase service value, but revenue should be linked to conservation reinvestment. |
| Guests using accommodation  | 2.0284 million; 23.31% of total visitors        | A low accommodation share; early-morning, evening and resort products may extend trips.           |
| Average length of stay      | Approximately 1.15 days per accommodation guest | Thung Nham should be linked with Tam Coc, Trang An and evening products in 2–3-day itineraries.   |
| Average tourism revenue     | Approximately VND 1.046 million per arrival     | Priority should be given to quality expenditure rather than merely increasing visitor numbers.    |
| Thung Nham project capacity | 600,000 visitors/year                           | Annual capacity should be converted into quotas by hour, route, boat dock and ecological zone.    |

**Source:** Author's calculations from Ninh Binh tourism data and 2026 project information. Rounded figures; project capacity is not actual visitor volume.

## 4.2 Natural resources: A foundational but highly sensitive advantage

Thung Nham possesses a complementary resource system: The lake and wetlands provide habitat; limestone mountains

and caves create a geomorphological landscape; the bird garden provides a dynamic wildlife experience; and the garden and agricultural system offers space for relaxation. Its location within the core area of Trang An strengthens brand value and route connectivity while imposing stricter conservation requirements than those applicable to an independent amusement attraction.

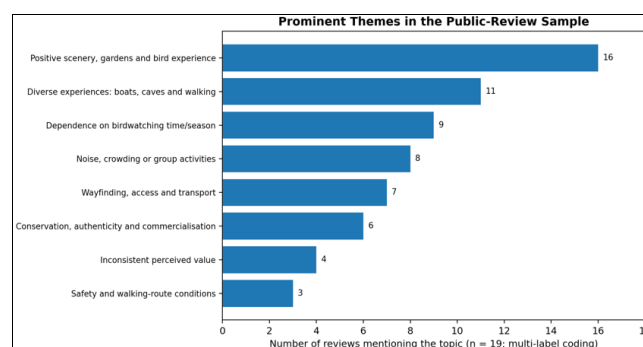
According to the Ninh Binh Department of Tourism, Tien Lake covers approximately 18 hectares, while the bird garden contains 46 species and around 5,000 nests. The main breeding season extends from the eighth to the fourth lunar month, and tens of thousands of individual birds have been recorded during peak periods. These characteristics indicate pronounced seasonality and timing in the birdwatching product. Experience quality depends not only on bird abundance but also on visit time, viewing position, weather, quietness and interpretive capability.

Bird resources generate a two-sided effect. When well managed, flocks returning at sunset create an iconic experience that strengthens memorability and word-of-mouth communication. When expectations are overstated or visitors arrive at unsuitable times, limited sightings may create a perception of poor value. Expectation management and real-time information are therefore as important as promotion.

Biodiversity value also increases the opportunity cost of noisy activities and construction. An event or vehicle route may generate short-term revenue while reducing sighting probability, altering bird behaviour and weakening the ecological image. Natural resources are therefore assessed as having a very high foundational influence, but this influence can only be realised when conservation and operational governance are sufficiently strong.

## 4.3 Visitor-experience analysis based on public reviews

Coding results show that 16 of 19 reviews positively mentioned the landscape, gardens or bird experience, while 11 of 19 noted the diversity of boats, caves, walking routes and observation points. Nonetheless, limitations appeared with meaningful frequency: 8 of 19 reviews mentioned noise, crowding or group activities; 7 of 19 identified wayfinding, transport or access issues; and 6 of 19 raised concerns about conservation, authenticity or commercialisation. Dependence on the timing of bird observation appeared in 9 of 19 reviews.



**Source:** Author's coding of 19 detailed Tripadvisor reviews, February 2024–April 2026. A review could be assigned to multiple themes

**Fig 3:** Frequency of themes in the public-review sample

**Table 4:** Coding results for visitor experience

| Theme                                       | Reviews    | Main expression                                                                                                             | Implication                                                                                                 |
|---------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Scenery, gardens and birds                  | 16 (84.2%) | Many reviews describe a green, clean and attractive environment; birds returning in the evening create a strong impression. | Maintain landscape quality and reliable viewing opportunities as the destination's "core promise".          |
| Diversity of activities                     | 11 (57.9%) | Boats, caves, walking routes, gardens and observation points add depth to the experience.                                   | Design routes by available time and physical ability; avoid adding activities inconsistent with ecotourism. |
| Observation timing/season                   | 9 (47.4%)  | Some days provide views of large flocks, while others offer only a few species; evenings are generally more prominent.      | Publish seasonal calendars, recommended time slots and daily observation conditions.                        |
| Noise/crowding/group activities             | 8 (42.1%)  | Performance preparation, school groups, team-building and equipment use reduce tranquillity.                                | Establish quiet zones and noise standards, and separate event space from bird areas.                        |
| Wayfinding, access and transport            | 7 (36.8%)  | Reviews mention maps, English information, ticket points, electric vehicles and difficulty arranging return transport.      | Redesign the end-to-end journey, provide multilingual maps and connect shuttle services.                    |
| Conservation/authenticity/commercialisation | 6 (31.6%)  | Some visitors are concerned about construction near habitats or feel that photo and event facilities overshadow nature.     | Assess cumulative impacts, reduce staged features and disclose conservation outcomes.                       |
| Perceived value                             | 4 (21.1%)  | Perceived value varies by nationality, expectations and the number of birds observed.                                       | Differentiate product packages and explain price components and conservation contributions.                 |
| Safety/walking routes                       | 3 (15.8%)  | Some paths, bridges or caves are perceived as difficult and in need of clearer warnings.                                    | Audit route safety, improve warnings, offer alternatives and support vulnerable groups.                     |

**Source:** Author. Percentages refer only to the coded sample (n = 19) and are not representative of all visitors

#### 4.4 Assessment of the eight influencing factors

**Table 5:** Integrated assessment of the influencing factors

| Factor                                    | Influence                                | Supporting evidence                                                                                          | Bottleneck/risk                                                                                          | Assessment                                                                       |
|-------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Natural resources and biodiversity        | Very high                                | Karst–wetland–cave–bird–garden system; distinctive evening bird experience.                                  | Season- and time-dependent; resources are sensitive to noise and excessive access.                       | The irreplaceable source of competitive advantage.                               |
| Conservation and environmental management | Very high                                | Rules prohibit hunting, nest access and aerial devices; project construction density is restricted.          | No publicly available time series on bird populations, water, noise or construction impacts.             | The most important moderator of long-term growth.                                |
| Accessibility and infrastructure          | High                                     | Close to the Tam Coc–Trang An cluster; walking, boats and electric vehicles are available.                   | Reported problems with signage, ticket locations, internal mobility and return transport.                | A direct bottleneck for satisfaction and length of stay.                         |
| Service, interpretation and safety        | High                                     | Boat guidance is available and the landscape is maintained.                                                  | Multilingual information, maps, ecological interpretation and safety warnings are uneven.                | Can be improved quickly at lower cost than new construction.                     |
| Products, experiences and seasonality     | High                                     | Multiple components: Birds, boats, caves, gardens, accommodation and food.                                   | Events and entertainment may dilute ecological positioning; bird-season expectations are weakly managed. | Shift from "many facilities" to coherent thematic experience chains.             |
| Digital communication and image           | Moderate–high                            | Bird-garden and landscape imagery has strong reach; positive reviews provide social proof.                   | Information on timing, routes, observation probability and quiet rules is inconsistent.                  | Reduces the expectation–experience gap and disperses visitor flows.              |
| Community participation and benefits      | High in importance; low current evidence | Potential for local employment, boat operators, agriculture, food and local supply.                          | No public data on the local-labour share, procurement or revenue sharing.                                | A governance gap that requires measurement and disclosure.                       |
| Governance, investment and coordination   | Very high                                | The new project specifies capital, capacity and construction limits; multiple departments provide oversight. | Capacity-growth objectives may override ecological capacity; data responsibilities are fragmented.       | Determines whether service expansion can be balanced with heritage conservation. |

**Source:** Author's synthesis. Influence levels are qualitative assessments derived from data triangulation, not statistical coefficients.

#### 4.5 Interactions and strategic trade-offs

The results show that the factors do not operate independently. Resources increase attractiveness; attractiveness generates visitor flows and revenue; and revenue creates investment capacity. At the same time, investment and visitor flows place pressure on resources. This feedback loop can become positive when part of the generated value is reinvested in conservation, data and communities. Conversely, it can become a cycle of decline when increased capacity produces noise, construction, poorer experiences and reduced authenticity.

Four principal trade-offs emerge. The first concerns capacity

versus birdwatching quality: High peak loads reduce tranquillity and ecological access. The second concerns service diversity versus positioning consistency: Restaurants and accommodation can extend stays, but staged attractions or group activities near habitats weaken the ecological image. The third concerns convenience versus impact: Electric vehicles, roads and structures improve access but require limits on speed, noise and construction footprints. The fourth concerns business revenue versus community benefits: When supply chains are closed, local spillovers may remain limited even as destination revenue increases.

A major finding is that information moderates many of these relationships. When visitors understand bird-return times, walking requirements, cave conditions, vehicle routes and quiet-zone rules, expectations are calibrated and responsible behaviour improves. 'Soft infrastructure'—data, signage, interpretation and coordination—can therefore deliver rapid benefits and reduce pressure for expansion of hard infrastructure.

## 5. Discussion

### 5.1 Resources are necessary; governance is sufficient

The findings are consistent with Dwyer and Kim's (2003)<sup>[2]</sup> destination-competitiveness model: Endowed resources create comparative advantage, while competitive advantage depends on created resources and governance. Thung Nham has stronger natural inputs than many artificial attractions, yet feedback concerning wayfinding, noise, transport and observation expectations demonstrates that experience quality is ultimately determined at operational touchpoints. The results also reinforce the TIES principle that conservation, communities and interpretation are not auxiliary activities added after profitability has been achieved; they are product components. Without interpretation, visitors may judge the bird experience primarily by the number of visible species. Without visible contributions to conservation, ticket prices may be compared with 'free nature'. When communities are weakly represented in the product, local character and social acceptance decline.

### 5.2 From design capacity to adaptive carrying capacity

The capacity of 600,000 visitors per year is a business and infrastructure indicator, whereas ecological carrying capacity varies by season, hour, water level, breeding activity and monitoring capability. Management should therefore move from a single aggregate figure to a carrying-capacity matrix: Maximum visitors per time slot; numbers and spacing of boats in the bird garden; numbers of groups and noise thresholds; cave capacity; parking and electric-vehicle capacity; and 'trigger points' for load reduction or route closure.

This adaptive approach is consistent with UNESCO's recommendations on close monitoring and strict regulation. Noise sensors, visitor counting, non-invasive cameras, species logs and visitor feedback can be integrated on a daily basis. Carrying capacity does not need to remain permanently fixed; it can be adjusted when new ecological evidence becomes available.

### 5.3 Ecological quality depends on authenticity and learning

Public reviews indicate that visitors distinguish between a 'well-maintained green space' and an 'authentic nature experience'. Decorative, photographic or performance facilities may serve the mass market, but if they overwhelm natural landscapes and soundscapes they create a positioning conflict. Thung Nham should treat tranquillity, species observation and ecological knowledge as premium products rather than as empty space that must be filled with entertainment.

This suggests shifting the focus from the number of attractions to the depth of interpretation: Migration routes, breeding cycles, wetland functions, local agricultural practices and connections with the Trang An karst system.

When visitors understand why distance and silence matter, operational restrictions become part of the experience's value rather than an inconvenience.

## 5.4 The largest gap: Community and conservation-effectiveness data

Available materials describe employment for boat operators and responsibilities for bird protection, but they are insufficient to assess economic spillovers. Public data are unavailable on the proportion of workers residing locally, income, purchases from households, the number of local businesses or households participating in supply chains, contributions to community funds, and residents' voice in investment decisions. As Tosun (2000)<sup>[11]</sup> argues, a lack of participatory mechanisms can limit community involvement to operational roles.

Similarly, information on the number of species and nests provides a useful snapshot but does not constitute a monitoring system. Sustainable development requires time series on seasonal nest changes, breeding success, disturbance incidents, water quality, waste, noise and habitat area. Public disclosure of these indicators can demonstrate conservation effectiveness, build trust and provide a basis for carrying-capacity adjustments.

## 6. Managerial Implications and Solutions

### 6.1 Establish carrying-capacity governance and quiet-zone zoning

Thung Nham should prepare an ecological-sensitivity map containing at least four zones: Strict protection; controlled observation; low-intensity ecological services; and concentrated services. The bird garden, nesting areas and connecting waterways should fall within the two highest protection levels. Amplified sound, events, team-building and motorised transport should be relocated outside the birds' acoustic-impact zone.

The ticketing system should use time slots for the bird-garden route, require advance booking for groups, limit group size and regulate boat-departure intervals. Operational limits must be based on peak load, not only daily totals. When noise, boat density or bird-behaviour indicators exceed thresholds, the system should automatically reduce admissions or adjust routes.

During the 2026–2027 construction phase, environmental and heritage impacts should be assessed cumulatively rather than only by individual project component. Construction timing, material transport, lighting and noise must avoid breeding seasons and movement corridors. The maximum construction density of 5% should be treated as a legal ceiling rather than a target to be fully used.

### 6.2 Upgrade access journeys, information and safety

The entire journey should be redesigned from pre-visit planning to post-visit communication. The official information platform should provide maps, prices, duration, walking difficulty, bird-return times, weather conditions, options for children and older people, pick-up and drop-off points, and ride-hailing availability. On site, 'You are here' maps, route colour systems, multilingual signs and QR codes should be standardised.

A scheduled shuttle linking Tam Coc–Bich Dong–Thung Nham should be piloted during peak periods in coordination with accommodation providers and tour operators. Internal transport requires clear routes, marked stops and integrated

tickets to avoid the perception of additional charges without usable service.

Periodic safety audits should cover caves, bridges, trails and boat docks. Routes should be classified by physical difficulty, with environmentally appropriate lighting, handrails, slip warnings and first-aid arrangements. Front-line staff should receive functional foreign-language training, ecological-interpretation training and incident-response training.

### 6.3 Develop products based on ecological value rather than mass expansion

Small-group dawn and sunset birdwatching packages should be developed with trained guides, shared binoculars, species logs and a quiet-conduct commitment. Prices may exceed general admission when the conservation contribution is transparently disclosed. Such packages can disperse visitors away from mass-tourism time slots and extend stays.

An experience chain linking ‘wetlands–karst–agriculture’ should combine interpreted walking, birdwatching, native-plant experiences, seasonal food and local products. Photography and decorative activities should support the natural narrative rather than transform the site into a theme park.

Thung Nham should be linked with Tam Coc, Bich Dong, Trang An and local accommodation in 2–3-day itineraries, while maintaining a clear role: Thung Nham should represent quiet nature and ecological education. Evening products should prioritise low-light nature observation, interpretation, food and culture, while avoiding high-volume sound.

### 6.4 Strengthen community participation and benefit sharing

A Destination Advisory Council should be established with representatives of residents, businesses, government, heritage management, scientists and tour operators. The

council should review operating plans, carrying-capacity data, complaints, investment projects and the allocation of conservation and community funds.

Minimum targets should be set for local labour, procurement of local agricultural products, food and services, and the share of revenue allocated to conservation and communities. These indicators should be measured annually and publicly disclosed. Households should be supported to develop standardised products such as local guiding, cuisine, crafts, experiential agriculture, small-scale transport and linked homestays.

Training should extend beyond service skills to household financial management, digital commerce, environmental standards, foreign languages and experience co-design. When residents become storytellers and co-owners of value, authenticity and support for conservation increase.

### 6.5 Digital transformation for visitor-flow coordination and reputation management

A near-real-time operational dashboard should integrate visitor numbers by zone, boat numbers, parking density, noise, feedback and bird-observation conditions. Visitors should be able to view crowd levels, available time slots and recommendations before purchasing tickets.

Multilingual online-review analysis should be used for early problem detection. The themes coded in this study can become a monthly monitoring taxonomy. Management responses should explain corrective actions rather than provide generic expressions of thanks.

Communication should be candid about seasonality and observation probability. Instead of implying that numerous species are always visible, content should explain natural variability and provide weekly updates. This approach reduces disappointment while educating visitors about ecological characteristics.

### 6.6 Sustainable-development monitoring indicators

**Table 6:** Proposed monitoring indicators for Thung Nham

| Dimension               | Suggested indicator                                                                                                               | Frequency         | Responsible entity                                                |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------|
| Conservation            | Species and nest counts by season; breeding-success rate; disturbance incidents; noise levels in bird zones; water quality.       | Monthly/seasonal  | Management board, environmental authority and scientific partners |
| Visitor flows           | Visitors by hour/route; waiting time; boat density; advance-booking rate; threshold exceedances.                                  | Daily             | Operator and destination-management authority                     |
| Experience              | Satisfaction score; NPS; complaint rates for wayfinding, noise and safety; proportion of visitors learning conservation messages. | Monthly/quarterly | Service and market-research teams                                 |
| Economic                | Revenue per visitor; accommodation share; length of stay; guided ecotourism package uptake.                                       | Monthly/quarterly | Businesses and tourism authority                                  |
| Community               | Local-employment share; value of local procurement; participating households; additional income; community fund.                  | Quarterly/annual  | Businesses, government and community council                      |
| Operational environment | Waste per visitor; water and electricity per visitor; reuse rate; low-emission transport; construction violations.                | Monthly/quarterly | Businesses and supervisory authorities                            |
| Information and access  | Share of multilingual signs meeting standards; digital-map use; shuttle punctuality; safety incidents.                            | Monthly           | Businesses and transport providers                                |
| Governance              | Consultation meetings; share of recommendations addressed; public impact reports; independent audits.                             | Quarterly/annual  | Provincial authority, heritage management and stakeholders        |

**Source:** Proposed by the author based on ecotourism and sustainable destination-governance principles

## 6.7 Priority implementation roadmap

**Table 7:** Priority implementation roadmap

| Stage        | Priority tasks                                                                                                                                                                                           | Expected outcome                                                              |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 0–6 months   | Standardise maps, signage and multilingual information; survey noise and visitor flows; establish quiet-zone rules; pilot a shuttle timetable; introduce an online-review monitoring codebook.           | Immediately reduce experience bottlenecks and establish baseline data.        |
| 6–18 months  | Introduce time-slot booking; limit groups and boats; launch small-group birdwatching products; train guides; set local-labour and procurement targets; publish the first sustainability report.          | Shift from reactive management to carrying-capacity-based management.         |
| 18–36 months | Assess cumulative post-investment impacts; adapt carrying capacity; conduct independent biodiversity audits; establish conservation–community funds; pursue an appropriate sustainability certification. | Institutionalise the balance between growth, conservation and local benefits. |

**Source:** Proposed by the author

## 7. Conclusion and Directions for Further Research

The study confirms that ecotourism development at Thung Nham is influenced by an interconnected system of factors in which natural resources provide the foundation, while conservation and governance are decisive conditions. Karst landscapes, wetlands, caves and the bird garden create a strong distinctive advantage; however, visitor-experience evidence indicates that noise, group loads, information and wayfinding, transport, safety, authenticity and seasonal expectations may reduce perceived value.

Ninh Binh's rapid growth and the investment project of nearly VND 600 billion create opportunities to upgrade accommodation, cuisine and service quality. Nevertheless, the planned capacity of 600,000 visitors per year must be managed through carrying limits by hour, route and habitat. The 5% construction-density limit should be accompanied by cumulative-impact monitoring, quiet-zone zoning and continuous biodiversity data. Service expansion is sustainable only when it does not undermine the core experience of tranquillity, nature observation and learning. From a managerial perspective, short-term priorities concern soft infrastructure: Multilingual information, maps, transport coordination, observation schedules, noise rules and interpretation training. In the medium term, time-slot ticketing, small-group products, community targets and data dashboards should be implemented. In the long term, co-governance, independent conservation audits and public sustainability reporting should be institutionalised.

The study's principal limitations are the absence of destination-level microdata and the small, non-representative sample of online reviews. Future research should survey visitors, residents and businesses and apply SEM or PLS-SEM to test the eight factor groups; combine transaction and spatiotemporal data to estimate carrying capacity; measure willingness to pay for conservation products; and establish ecological time series before, during and after the 2026–2027 investment phase. These steps would transform the current analytical framework into a causal and predictive evidence system for decision-making.

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## 9. References

1. Buhalis D. Marketing the competitive destination of the future. *Tourism Management*. 2000; 21(1):97-116. Doi: [https://doi.org/10.1016/S0261-5177\(99\)00095-3](https://doi.org/10.1016/S0261-5177(99)00095-3)
2. Dwyer L, Kim C. Destination competitiveness: Determinants and indicators. *Current Issues in Tourism*. 2003; 6(5):369-414. Doi: <https://doi.org/10.1080/13683500308667962>
3. Lee TH. Influence analysis of community resident support for sustainable tourism development. *Tourism Management*. 2013; 34:37-46. Doi: <https://doi.org/10.1016/j.tourman.2012.03.007>
4. National Assembly of Vietnam. Law on Tourism No. 09/2017/QH14 (adopted June 19, 2017; effective January 1, 2018), 2017. <https://vanban.chinhphu.vn/?pageid=27160&docid=190290>
5. Ninh Binh Tourism Promotion Information Center. Ninh Binh welcomes more than 8.7 million tourist arrivals in 2024 [in Vietnamese], January 8, 2025a. <https://dulichninhbinh.com.vn/item/2896>
6. Ninh Binh Department of Tourism. Ninh Binh province tourism growth index in the period 2020–2025, June 23, 2025b. <https://sodulich.ninhbinh.gov.vn/en/news-events/ninh-binh-province-tourism-growth-index-in-the-period-2020-2025-2262.html>
7. Ninh Binh Department of Tourism. Exploring the land of birds in the heart of the heritage landscape [in Vietnamese], September 4, 2025c. <https://sodulich.ninhbinh.gov.vn/vi/tin-tuc-su-kien/kham-pha-xu-so-cua-cac-loai-chim-giua-long-di-san-2364.html>
8. Prime Minister of Vietnam. Decision No. 147/QĐ-TTg approving the Vietnam tourism development strategy to 2030 [in Vietnamese], January 22, 2020. <https://vanban.chinhphu.vn/?pageid=27160&docid=198927>
9. The International Ecotourism Society. What is ecotourism, 2015? <https://ecotourism.org/what-is-ecotourism/>
10. Thuy VTN, Tuu HH, Llosa S, Thao HDP. An application of Tetraclass model for evaluating ecotourism service quality in Vietnam. *Tourism and Hospitality Research*. 2020; 20(3):300-316. Doi: <https://doi.org/10.1177/1467358419867741>
11. Tosun C. Limits to community participation in the tourism development process in developing countries. *Tourism Management*. 2000; 21(6):613-633. Doi: [https://doi.org/10.1016/S0261-5177\(00\)00009-1](https://doi.org/10.1016/S0261-5177(00)00009-1)
12. Tripadvisor. Thung Nham Ecotourism Zone – Ninh Binh: Traveller reviews, 2026. Retrieved July 24, 2026, from: [https://www.tripadvisor.com/Attraction\\_Review-g12866457-d13516214-Reviews-Thung\\_Nham\\_Ecotourism\\_Zone\\_Ninh\\_Binh-Ninh\\_Hai\\_Hoa\\_Lu\\_District\\_Ninh\\_Binh\\_Provin.html](https://www.tripadvisor.com/Attraction_Review-g12866457-d13516214-Reviews-Thung_Nham_Ecotourism_Zone_Ninh_Binh-Ninh_Hai_Hoa_Lu_District_Ninh_Binh_Provin.html)

13. Ninh Binh Provincial People's Committee. Ninh Binh adjusts the Thung Nham Ecotourism Project with investment of nearly VND 600 billion [Decision No. 2238/QĐ-UBND, June 19, 2026; in Vietnamese], June 22, 2026. <https://ninhbinh.gov.vn/thong-tin-chi-dao-dieu-hanh/ninh-binh-dieu-chinh-du-an-sinh-thai-thung-nham-gan-600-ty-dong-nang-cao-chat-luong-dich-vu-gan--382307>
14. UNESCO World Heritage Centre. Trang An Landscape Complex (World Heritage List No. 1438), n.d. Retrieved July 24, 2026, from: <https://whc.unesco.org/en/list/1438/>