Advances in Consumer Research
https://acr-journal.com/
Volume-3 | Issue-3 | March 2026
Original Researcher Article

An Integrated Risk-Based Approach to Sustainable Tourism Development: Empirical Evidence from Ha Long, Vietnam

Dinh Hong Linh[1]; Vu Quyet Tien[2]*
[1] Thai Nguyen University of Economics and Business Administration, Vietnam
[2] PhD Candidate of Economics Management, Thai Nguyen University of Economics and Business Administration, Viet Nam
Corresponding author:
Email: 1dhlinh@tueba.edu.vn, 2*vqtienqn@gmail.com
Orcid ID: 1https://orcid.org/0000-0002-7016-2940; 2https://orcid.org/0009-0004-8123-5246

Received: 16/10/2025
Revised: 19/12/2025
Accepted: 1/02/2026
Published: 24/03/2026

ABSTRACT
This study examines the role of risk in sustainable tourism development through an integrated approach, in which risk is conceptualized as a mediating variable transmitting impacts on the economic, social, and environmental outcomes of the destination of Ha Long Bay. Data were collected from 398 valid survey questionnaires using a five-point Likert scale and analyzed with advanced quantitative techniques, including Cronbach's Alpha, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). The empirical results indicate that management, planning, and legal risks exert the strongest influence on aggregated risk, followed by environmental pressure and tourism overcrowding. In addition, natural disaster and climate change risks as well as socio-economic risks, although exhibiting relatively weaker effects, remain statistically significant, highlighting the multidimensional and interconnected nature of risk at the destination. These findings underscore the critical importance of integrated risk management in enhancing the long-term sustainability of tourism development, particularly in coastal and heritage destinations experiencing rapid tourism growth..
Keywords: Tourism, Risk, Sustainable, Sustainable Development, Ha Long, Vietnam...

INTRODUCTION:

Sustainable tourism development has become a key strategic orientation for many countries and destinations worldwide, particularly in areas of high ecological and heritage value. The concept of sustainable development was formally articulated in the Brundtland Report (WCED, 1987), which defines it as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In the tourism sector, the World Tourism Organization (UNWTO, 2005) emphasizes that sustainable tourism must balance three core pillars: economic growth, social equity, and environmental protection.

However, practical experience at many destinations indicates that rapid tourism growth is often accompanied by the accumulation of structural risks. According to Hall, Prayag, and Amore (2018), tourism risk should not be understood merely as isolated crisis events (such as natural disasters or pandemics), but rather as long-term systemic pressures that can erode destination resilience and sustainability. This perspective suggests the need to conceptualize risk as an intermediary mechanism linking development pressures to sustainable development outcomes.

Ha Long - the tourism center of Quang Ninh Province and home to the World Natural Heritage Site of Ha Long Bay represents a paradigmatic case of these challenges. Following the sharp downturn caused by the COVID-19 pandemic (2020–2021), tourism in Quang Ninh rebounded strongly. The province welcomed over 15 million visitors in 2023, more than 19 million in 2024, and over 21 million in 2025, generating an estimated tourism revenue of approximately VND 57 trillion. In the first quarter of 2025 alone, Ha Long City received nearly 2.3 million visitors, including around 720,000 international tourists. These figures highlight tourism's role as a major driver of local economic growth, while simultaneously revealing emerging risks associated with rapid expansion. First, environmental pressure and tourism overcrowding have intensified. High densities of cruise vessels, coastal urban development, and increasing volumes of solid waste have placed significant stress on water quality, marine ecosystems, and the unique karst landscape of Ha Long Bay. Recent studies suggest that rising tourist numbers can heighten the risk of biodiversity loss and ecosystem degradation at environmentally sensitive destinations (Xu et al., 2025), threatening the long-term resource base that underpins Ha Long's tourism attractiveness. Second, management, planning, and legal risks have become increasingly salient amid the rapid development of infrastructure, resorts, and coastal real estate. UNESCO has expressed concern that poorly regulated urban and tourism development could undermine the Outstanding Universal Value of Ha Long Bay. In the absence of effective governance mechanisms and multi-stakeholder coordination, short-term growth objectives may conflict with long-term conservation imperatives. Third, socio-economic risks arise from the growing dependence of the local economy on tourism. The COVID-19 pandemic starkly demonstrated the vulnerability of tourism-

dependent destinations to external shocks, with severe consequences for employment and household income. Moreover, rising living costs, housing pressure, and transformations in local culture may exacerbate inequality if tourism benefits are not equitably distributed. Fourth, safety, service quality, and destination reputation risks warrant increasing attention. Tourism accidents or environmental incidents can rapidly circulate through international media, severely damaging destination image. In an increasingly competitive regional market, ensuring service quality and tourist safety is therefore a prerequisite for sustaining long-term competitiveness. Beyond these risk categories, natural hazards and extreme weather conditions are becoming increasingly influential in shaping sustainable tourism development at Ha Long Bay. Northern coastal Vietnam is frequently exposed to typhoons, tropical depressions, prolonged heavy rainfall, dense fog, and sea-level rise. These phenomena disrupt tourism activities particularly cruise tourism while heightening safety risks for tourists and workers. Weather-related suspensions or restrictions result in short-term economic losses and undermine destination reliability in tourists' perceptions.

Over the long term, climate change is projected to intensify the frequency and severity of extreme weather events, increasing risks of coastal erosion, marine ecosystem degradation, and landscape deterioration the core assets of Ha Long's tourism value. Such impacts pose serious challenges to heritage conservation, especially as UNESCO increasingly calls for the proactive integration of climate change adaptation into World Heritage management strategies. Without effective preventive and adaptive measures, climate-related risks may amplify environmental, socio-economic, and governance risks, thereby undermining the achievement of sustainable tourism development goals.

Although numerous studies have examined sustainable tourism development in Vietnam, most focus on individual dimensions (environmental or economic) rather than adopting an integrated systemic risk perspective. To address this gap, the present study proposes an analytical framework in which risk in sustainable tourism development is conceptualized as a mediating variable, reflecting the accumulation of multiple risk pressures and their transmission to the overall sustainability outcomes of the destination.

2. LITTERATURE REVIEW

2.1. Theoretical foundations of sustainable development and risk in tourism

The concept of sustainable development was formally articulated in the Brundtland Report (WCED, 1987), which defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This approach provides the foundation for the triple bottom line model, emphasizing the balance among economic growth, social equity, and environmental protection. In the tourism context, the World Tourism Organization (UNWTO, 2005) asserts that sustainable tourism should maximize long-term economic benefits, respect the socio-cultural identity of host communities, and minimize negative impacts on the natural environment. However, recent studies suggest that maintaining this balance has become increasingly challenging amid rapid tourism growth and intensified globalization. Sharpley (2020) argues that sustainable tourism is confronted with a "growth paradox," whereby objectives related to increasing visitor numbers and revenues often conflict with the preservation of resources and the maintenance of social integrity. As a result, many destinations experience structural imbalances in which short-term economic gains prevail over long-term sustainability goals.

Within this context, the theoretical framework of destination risk has attracted growing scholarly attention. Hall, Prayag, and Amore (2017) contend that tourism risk should not be limited to sudden events such as natural disasters, epidemics, or terrorism, but should also encompass cumulative and systemic pressures, including environmental degradation, social conflicts of interest, governance deficiencies, and economic dependence. If left unmanaged, these pressures can erode destination resilience and increase vulnerability.

Destination resilience is increasingly regarded as a core component of contemporary sustainable tourism development. According to Biggs, Hall, and Stoeckl (2012), resilience reflects the capacity of tourism systems to absorb shocks, adapt, and reorganize while maintaining essential functions. When environmental, economic, and governance-related risks accumulate beyond the system's tolerance threshold, destinations may enter a decline phase, as conceptualized in McKercher's (2005) destination life cycle model.

Recent literature further emphasizes the multidimensional and interconnected nature of tourism risk. Gössling, Scott, and Hall (2020) demonstrate that climate change and global crises, such as the COVID-19 pandemic, have exposed the vulnerability of destinations heavily dependent on international tourism. Similarly, Adger et al. (2018) argue that highly interconnected social–ecological systems are particularly susceptible to cascading risks, whereby an initial disturbance can trigger a chain of secondary risks.

From a governance perspective, both the World Tourism Organization (2021) and the Organisation for Economic Co-operation and Development (OECD, 2020) emphasize the necessity of an integrated risk management approach to identify structural vulnerabilities early and mitigate long-term impacts. This is especially critical for heritage destinations, where resource values are irreplaceable and of global significance.

From a theoretical standpoint, conceptualizing risk in sustainable tourism development as a mediating variable is well grounded. Environmental pressures, governance risks, socio-economic instability, and safety and service issues do not exert direct, linear effects on sustainability outcomes; rather, they increase the level of systemic risk within the destination. As risk accumulates, the capacity to maintain balance among the three pillars of sustainability diminishes. Accordingly, risk functions as a key mechanism linking structural pressures to sustainable development outcomes.

This perspective aligns with social–ecological systems theory, which posits that sustainability depends on the system's ability to regulate negative feedback loops (Folke et al., 2016). When risks are inadequately managed, negative feedbacks may intensify and push the system toward tipping points, resulting in fundamental shifts in system states.

In summary, integrating sustainable development theory with risk and resilience frameworks extends traditional approaches in sustainable tourism research. Rather than focusing solely on the attainment of the three sustainability pillars, research should examine the accumulation of risk as a critical mediating factor shaping the long-term development trajectory of tourism destinations.

2.2. Risk Groups in Sustainable Tourism Development

2.2.1. Environmental Pressure and Overtourism (ENV)

The rapid increase in tourist arrivals in recent years has raised growing concerns about the phenomenon of overtourism. According to the World Tourism Organization (UNWTO, 2018), overtourism refers to a situation in which the number of visitors exceeds a destination's carrying capacity, resulting in negative impacts on the natural environment, residents' quality of life, and tourists' experiences. In environmentally sensitive ecosystems such as coastal areas and natural heritage sites, environmental pressure is commonly manifested through water quality degradation, coastal erosion, waste pollution, biodiversity loss, and ecosystem imbalance (Gössling, Scott & Hall, 2020). Recent studies indicate that increasing tourist density is directly associated with higher ecological risks and resource depletion (Lenzen et al., 2018). Notably, Xu et al. (2025) demonstrate that international tourism can substantially increase biodiversity risks in sensitive destinations in the absence of effective management mechanisms.

From a social–ecological systems perspective, environmental pressures not only generate direct adverse impacts but also undermine the adaptive capacity of destination systems (Folke et al., 2016). When exploitation levels exceed ecological thresholds, destinations may approach critical tipping points beyond which changes become difficult or irreversible. Therefore, environmental pressure and overtourism are regarded as key drivers of systemic risk in sustainable tourism development. Accordingly, the following hypothesis is proposed:

H1: Environmental pressure and overtourism have a positive effect on risks in sustainable tourism development.

2.2.2. Management, Planning, and Legal Risks (MAN)

Destination governance is widely recognized as a decisive factor in coordinating stakeholder interests and maintaining a balance between development and conservation. According to Bramwell (2015), sustainable tourism governance requires multi-level coordination and meaningful participation of local communities. However, in practice, many destinations face governance-related risks, including overlapping planning frameworks, inconsistent policy implementation, vested interests, and short-term growth-oriented development strategies (Dredge & Jamal, 2015). The Organisation for Economic Co-operation and Development (OECD, 2020) emphasizes that the absence of integrated governance mechanisms can significantly increase destinations' vulnerability to economic and environmental shocks.

Recent studies further suggest that limited transparency and weak managerial capacity may lead to excessive resource exploitation and intensified social conflicts (Farmaki, 2018). In the context of heritage destinations, governance deficiencies may erode Outstanding Universal Value and threaten heritage integrity. Hall et al. (2017) argue that governance risks constitute a foundational risk category, as they shape the capacity to manage other risks, including environmental, social, and market-related risks. Consequently, governance, planning, and legal risks play a critical role in amplifying overall risk levels in sustainable tourism development.

H2: Governance, planning, and legal risks have a positive effect on risks in sustainable tourism development.

2.2.3. Socio-economic Risks (SOC)

Tourism is often regarded as a major driver of local economic growth. Nevertheless, excessive dependence on tourism may increase structural vulnerability. Gössling et al. (2020) highlight that the COVID-19 pandemic exposed the high-risk profile of destinations heavily reliant on international tourism markets. Moreover, rapid tourism development may lead to rising living costs, unequal benefit distribution, and transformations in socio-cultural structures (Sharpley, 2020). Nunkoo and Smith (2013) emphasize that when local communities perceive tourism benefits as unfairly distributed, their support for tourism development declines, thereby undermining social sustainability.

According to Social Exchange Theory, residents' attitudes toward tourism depend on their perceived balance between benefits and costs (Ap, 1992). When socio-economic costs outweigh perceived benefits, social conflict risks intensify and threaten the stability of the tourism system. Therefore, socio-economic risks not only affect local communities directly but also contribute to systemic risk in sustainable tourism development.

H3: Socio-economic risks have a positive effect on risks in sustainable tourism development.

*2.2.4. Safety, Service Quality, and Destination Reputation Risks (*SAF)

Tourism safety and service quality are fundamental determinants of destination competitiveness. According to the World Economic Forum (2019), safety and security constitute one of the core pillars of tourism competitiveness. Safety incidents, accidents, or media crises can severely damage destination image and reputation (Avraham, 2015). In the digital media era, negative information spreads rapidly, increasing reputational risk. Prayag (2018) argues that effective crisis management is essential for sustaining destination resilience.

Inconsistent service quality and inadequate safety standards may reduce tourist satisfaction and revisit

intentions (Su et al., 2016), indirectly affecting long-term economic performance and sustainable growth potential. Accordingly, safety and service-related risks are considered a critical component contributing to elevated risks in sustainable tourism development.

H4: Safety and service-related risks have a positive effect on risks in sustainable tourism development.

2.2.5. Natural Disaster and Climate Change Risks (NAT)

Climate change and natural disasters are increasingly recognized as among the most significant challenges to global sustainable development. According to Scott et al (2024), global warming has intensified both the frequency and severity of extreme weather events, including storms, floods, droughts, and prolonged heatwaves. These changes not only disrupt ecosystems but also directly affect natural resource–dependent sectors, particularly tourism.

Within the tourism context, climate vulnerability is considered a structural risk, especially for coastal, island, and mountainous destinations (Scott, Hall & Gössling, 2019). Sea-level rise, coastal erosion, ecosystem degradation, and seasonal variability may reduce destination attractiveness, increase infrastructure investment costs, and disrupt tourism supply chains (Pörtner et al, 2022), thereby elevating overall sustainability risks.

Moreover, natural disasters are often viewed as "external shocks" capable of severely disrupting tourism activities. The United Nations World Tourism Organization (2018) notes that natural hazards can cause sharp declines in tourist arrivals, negatively affecting employment and local livelihoods. Insufficient preparedness and limited adaptive capacity further exacerbate destination vulnerability to climate-related risks (Gössling & Scott, 2018). Beyond environmental and infrastructural damage, climate change also intensifies socio-economic risks by disrupting tourism-dependent livelihoods, increasing living costs, and deepening social inequalities (Dogru et al., 2020).

Hall et al. (2021) emphasize that climate risks are long-term and systemic, as they simultaneously affect environmental, economic, and social dimensions. In the absence of effective adaptation strategies, climate change may erode the resource base of tourism, thereby amplifying risks in sustainable tourism development.

H5: Natural disaster and climate change risks have a positive effect on risks in sustainable tourism development.

2.2.6. The Mediating Role of Risk in Sustainable Tourism Development (SUS)

Building on the foundations of sustainable development established in the Brundtland Report (WCED, 1987), sustainable development is defined as a process that meets the needs of the present without compromising the ability of future generations to meet their own needs. In the tourism context, the World Tourism Organization (UNWTO, 2005) emphasizes that sustainable tourism must ensure a balanced integration of the three core pillars of economic viability, social equity, and environmental protection. However, in practice, tourism destinations are frequently confronted with multiple forms of accumulated risks, including environmental risks, governance risks, market-related risks, and safety-related risks. According to Hall, Prayag, and Amore (2017), risks in tourism should not be understood merely as unexpected or isolated events, but rather as long-term structural pressures capable of eroding the developmental foundations of destinations. This perspective suggests that risk does not affect sustainability outcomes in a direct and linear manner; instead, it operates through mechanisms of systemic accumulation. As accumulated risk levels increase, a destination's capacity to maintain balance among the three pillars of sustainability progressively declines.

From the perspective of resilience theory, tourism systems are conceptualized as social–ecological systems with adaptive and self-regulating capacities (Folke et al., 2016). When accumulated risks exceed the system's tolerance thresholds, its ability to absorb shocks and recover weakens, thereby increasing the likelihood of a transition toward less sustainable system states (Biggs, Schlüter & Schoon, 2015). Recent studies further indicate that destinations characterized by high risk levels tend to experience declines in long-term economic performance, social trust, and environmental quality (Prayag, 2018; Scott, Hall & Gössling, 2019). Consequently, conceptualizing risk as a mediating variable that captures the degree of accumulated systemic pressure is theoretically and empirically justified. This approach enables a clearer explanation of the mechanisms through which environmental, governance, socio-economic, and safety–service factors influence sustainable tourism development outcomes. Accordingly, the following hypothesis is proposed:

H6: Risk in sustainable tourism development has a negative effect on sustainable tourism development.

3. RESEARCH METHODOLOGY

This study adopts a quantitative research approach, employing a structured questionnaire survey administered to tourists in Ha Long. Data collection was conducted using convenience sampling, combined with on-site surveys at major tourist attractions, tourism areas, and accommodation facilities with high tourist density. Respondents were tourists who had participated or were currently participating in tourism activities in Ha Long, thereby ensuring that they possessed sufficient firsthand experience to evaluate the survey items. Prior to the official survey, participants were briefly informed of the research objectives and assured of anonymity and voluntary participation in providing information, with the aim of minimizing response bias.

A total of 400 questionnaires were distributed, of which 398 valid responses were collected; two questionnaires were excluded due to incomplete information or failure to meet the requirements for analysis. The valid questionnaires were carefully screened to identify responses exhibiting logical inconsistencies, excessive missing answers, or signs of inattentive or acquiescent responding. The data were subsequently coded, entered,

and cleaned to ensure accuracy, consistency, and readiness for further analysis.

The observed variables in the study were measured using a five-point Likert scale, ranging from 1 = "Strongly disagree" to 5 = "Strongly agree." The measurement scales were adapted and refined from previous studies, with adjustments to wording and content to suit the tourism context of Ha Long, thereby enhancing clarity and respondents' ability to provide accurate evaluations.

After data cleaning, the dataset was analyzed using IBM SPSS Statistics to perform descriptive statistics and assess the reliability of the measurement scales through Cronbach's Alpha coefficients. Observed variables with item - total correlation coefficients below 0.3 were removed from the model. Subsequently, Exploratory Factor Analysis (EFA) was conducted to examine the factor structure, with the conditions of KMO ≥ 0.5 and a statistically significant Bartlett's test of sphericity (Sig. < 0.05).

Following EFA, Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were carried out using AMOS software. Model fit was evaluated based on commonly used indices, including the chi-square/df ratio, Comparative Fit Index (CFI), Tucker - Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). The research hypotheses were tested on the basis of standardized estimation coefficients and their corresponding levels of statistical significance.

The study is based on two fundamental equations as follows:

Equation 1 (Mediator):

$$RIS = \beta 1ENV + \beta 2MAN + \beta 3SOC + \beta 4CLI + \beta 5SAF + \varepsilon 1$$

Equation 2 (Outcome):

$$SUS = \beta 6ENV + \beta 7MAN + \beta 8SOC + \beta 9CLI + \beta 10SAF + \beta 11RIS + \varepsilon 2$$

Where,

1. ENV - Environmental Pressure and Overtourism, measured by the following items:

Code	Statement
ENV1	The current number of tourists exceeds the carrying capacity of the destination.
ENV2	Tourism activities exert substantial pressure on natural resources (water, landscapes, ecosystems).
ENV3	Environmental pollution has increased as a result of tourism development.
ENV4	Existing infrastructure is insufficient to accommodate the growing number of tourists.

2. MAN - Management, Planning, and Legal Risks, measured by the following items:

Code	Statement
MAN1	Tourism planning does not adequately balance development and conservation.
MAN2	Legal regulations related to tourism are not effectively enforced.
MAN3	Coordination among stakeholders in tourism management remains limited.
MAN4	Tourism development tends to be short-term rather than oriented toward long-term strategies.
MAN5	Monitoring and control of tourism impacts are not sufficiently effective.

3. SOC - Socioeconomic Risks, measured by the following items:

Code	Statement
SOC1	The local economy is overly dependent on tourism.
SOC2	Tourism development increases the cost of living for local residents.
SOC3	The benefits derived from tourism are not equitably distributed within the community.
SOC4	In times of crisis, the local tourism sector is highly vulnerable.

4. SAF - Safety and Service Risks, measured by the following items:

Code	Statement
SAF1	Safety standards in tourism activities are not fully ensured.
SAF2	Tourism-related accidents or incidents may occur due to inadequate control.
SAF3	The quality of tourism services is unstable.
SAF4	Tourism incidents can negatively affect the destination's image.

5. CLI - Climate Change and Disaster Risks, measured by the following items:

Code	Statement
CLI1	Climate change is increasing risks to local tourism activities.
CLI2	Extreme weather events (storms, floods, prolonged heatwaves, etc.) adversely affect tourism.
CLI3	Tourism infrastructure is vulnerable to natural disasters.
CLI4	Climate-related risks may disrupt tourism activities in the future.

6. RIS - Risks in Sustainable Tourism Development, measured by the following items:

Code	Statement
RIS1	The destination is facing the risk of long-term resource depletion.
RIS2	The imbalance between economic development and conservation is increasing.
RIS3	Current risks may adversely affect sustainability in the future.
RIS4	The destination is becoming more vulnerable to external shocks.

7. SUS - Sustainable Tourism Development, measured by the following items:

Code	Statement
SUS1	Tourism contributes positively and sustainably to the local economy.
SUS2	Local communities benefit equitably from tourism.
SUS3	Tourism is developed in a long-term and responsible manner.
SUS4	The destination is able to maintain its attractiveness in the future.

4. Research Results

Table 1: Item - Total Statistics

	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
SAF: Cronbach's Alpha = 0.901		
SAF1	.835	.852
SAF2	.774	.874
SAF3	.776	.874
SAF4	.733	.889
MAN: Cronbach's Alpha = 0.888		
MAN1	.685	.874
MAN2	.760	.857
MAN3	.735	.862
MAN4	.777	.853
MAN5	.689	.873
NAT: Cronbach's Alpha = 0.897		
NAT1	.778	.865
NAT2	.744	.877
NAT3	.703	.892
NAT4	.863	.832
ENV: Cronbach's Alpha = 0.906		
ENV1	.808	.871
ENV2	.787	.879
ENV3	.715	.904
ENV4	.845	.858
SOC: Cronbach's Alpha = 0.898		
SOC1	.761	.873
SOC2	.784	.865
SOC3	.771	.870
SOC4	.780	.866
RIS: Cronbach's Alpha = 0.861		
RIS1	.674	.837
RIS2	.783	.791
RIS3	.675	.836
RIS4	.704	.826
SUS: Cronbach's Alpha = 0.870		
SUS1	.687	.848
SUS2	.764	.817
SUS3	.660	.858
SUS4	.782	.810

Source: SPSS Results

The results of the reliability analysis indicate that all groups of variables achieved high Cronbach's Alpha coefficients (ranging from 0.861 to 0.906), exceeding the acceptable threshold of 0.7. This demonstrates very good internal consistency and reliability of the measurement scales employed in the research model.

Specifically, the Corrected Item - Total Correlation coefficients for all observed variables were greater than 0.6, indicating strong correlations with their respective total scales and confirming that each item contributes positively to the measurement of the underlying latent constructs. No items exhibited low item - total correlations that would warrant consideration for removal.

In addition, the values of "Cronbach's Alpha if Item Deleted" for all items were lower than or approximately equal to the overall Cronbach's Alpha of each corresponding scale. This suggests that removing any individual item would not lead to a meaningful improvement in scale reliability. Accordingly, all observed variables SAF, MAN, NAT, ENV, SOC, RIS, and SUS were retained for subsequent analyses, including Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM).

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.902
Bartlett's Test of Sphericity	Approx. Chi-Square	7585.497
	df	406
	Sig.	.000

Source: SPSS Results

The results of the KMO and Bartlett's tests indicate that the research data are fully suitable for conducting Exploratory Factor Analysis (EFA). Specifically, the Kaiser–Meyer–Olkin (KMO) measure reached 0.902, far exceeding the minimum threshold of 0.5 and falling within the "very good" range, which reflects a high degree of intercorrelation among the observed variables and an adequate sample size for factor analysis.

In addition, Bartlett's Test of Sphericity yielded a Chi-square value of 7,585.497 with 406 degrees of freedom and a significance level of Sig. = 0.000 (< 0.05), indicating that the correlation matrix is statistically different from an identity matrix. This result confirms that the observed variables are linearly correlated and satisfy the necessary conditions for the extraction of latent factors

.

Table 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	9.261	31.934	31.934	9.261	31.934	31.934	5.610
2	3.260	11.242	43.176	3.260	11.242	43.176	5.807
3	2.595	8.947	52.123	2.595	8.947	52.123	4.373
4	2.105	7.258	59.382	2.105	7.258	59.382	4.417
5	1.800	6.208	65.589	1.800	6.208	65.589	6.001
6	1.543	5.322	70.911	1.543	5.322	70.911	5.064
7	1.147	3.955	74.866	1.147	3.955	74.866	5.246
8	.578	1.994	76.860				
9	.560	1.932	78.792				
10	.530	1.827	80.619				
11	.466	1.605	82.224				
12	.440	1.517	83.741				
13	.425	1.466	85.207				
14	.407	1.405	86.612				
15	.386	1.332	87.944				
16	.356	1.227	89.170				
17	.321	1.108	90.278				

18	.318	1.096	91.374				
19	.302	1.042	92.416				
20	.289	.998	93.415				
21	.271	.934	94.349				
22	.257	.887	95.236				
23	.236	.814	96.050				
24	.217	.747	96.797				
25	.214	.739	97.535				
26	.194	.669	98.204				
27	.191	.660	98.864				
28	.179	.616	99.481				
29	.151	.519	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: SPSS Results

The results of the Total Variance Explained analysis show that the EFA model extracted seven factors with eigenvalues greater than 1, which is consistent with Kaiser's criterion and the initial theoretical framework of the study. The first factor exhibits the largest eigenvalue (9.261), accounting for 31.93% of the total variance, thereby indicating its dominant role in the measurement structure.

The cumulative variance explained by the seven extracted factors reaches 74.87%, exceeding the commonly recommended threshold of 50–60%. This suggests that the extracted factors capture the majority of the variability in the dataset and that the model provides a strong representation of the original information. The remaining factors (from Factor 2 to Factor 7) contribute additional variance ranging from 3.96% to 11.24%, reflecting a reasonable and balanced distribution of explanatory power among the factors.

Table 4: Rotated Component Matrixa

	Component						
	1	2	3	4	5	6	7
MAN2	.872						
MAN4	.856						
MAN3	.853						
MAN5	.821						
MAN1	.744						
ENV4		.879					
ENV2		.879					
ENV1		.858					
ENV3		.742					

SOC3			.899				
SOC4			.883				
SOC2			.882				
SOC1			.833				
NAT4				.946			
NAT3				.866			
NAT1				.852			
NAT2				.827			
SAF1					.919		
SAF2					.847		
SAF4					.845		
SAF3					.844		
SUS4						.956	
SUS2						.929	
SUS1						.717	
SUS3						.692	
RIS2							.914
RIS1							.872
RIS4							.784
RIS3							.764

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Source: SPSS Results

The results of the rotated factor matrix (Varimax) indicate a clear factor structure that is consistent with the proposed theoretical model. All observed variables exhibit high factor loadings, ranging from 0.692 to 0.956, exceeding the acceptable threshold of 0.5. This confirms strong convergent validity of the measurement scales.

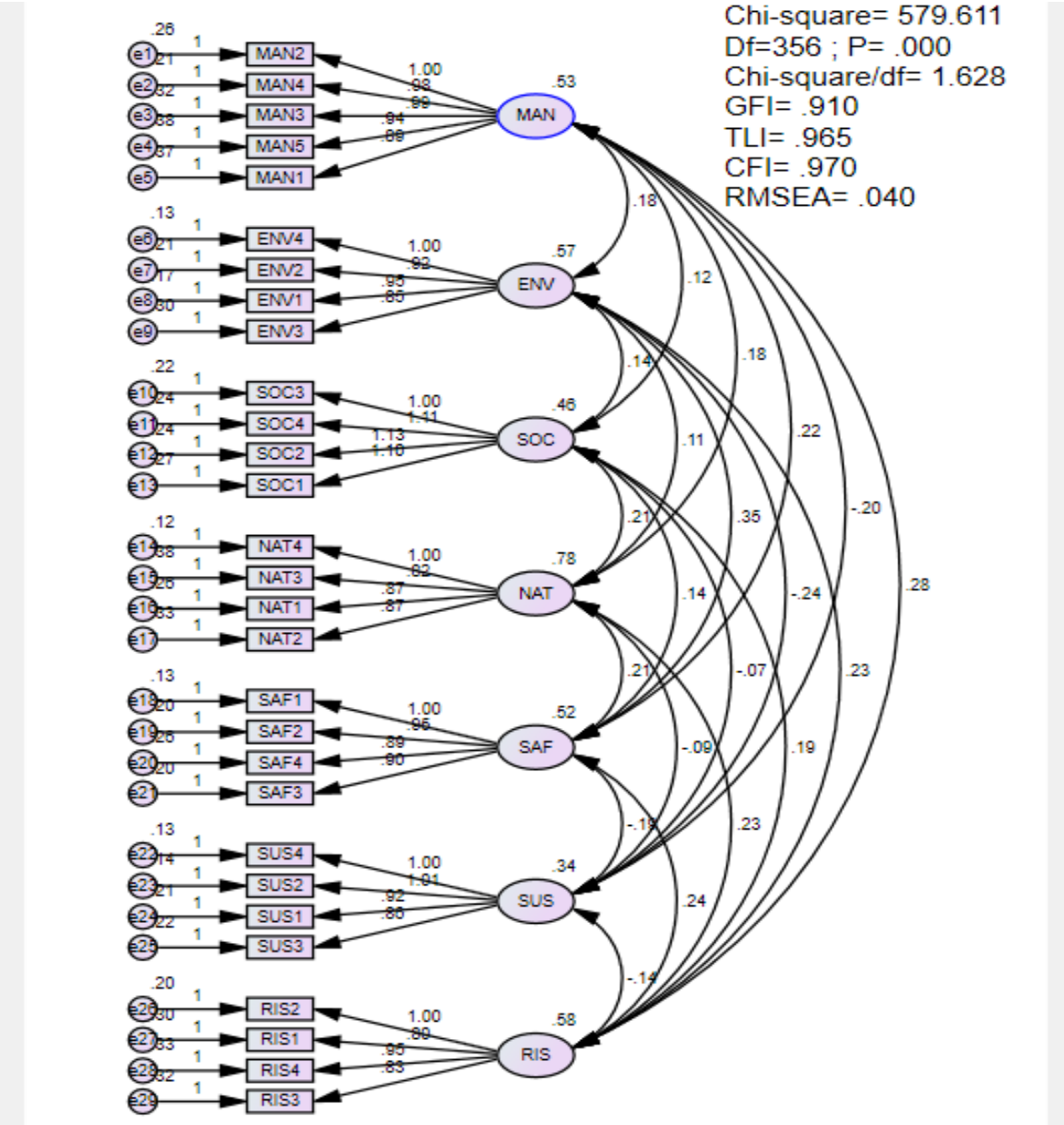

Figure 1: Confirmatory Factor Analysis from Research Result

Source: Results from AMOS

The results of the Confirmatory Factor Analysis (CFA) indicate that the measurement model demonstrates a good fit with the empirical data. Specifically, all model fit indices meet the recommended thresholds: Chi-square/df = 1.628 (< 3), GFI = 0.910, TLI = 0.965, CFI = 0.970 (> 0.9), and RMSEA = 0.040 (< 0.05). These results confirm a high level of overall model fit.

Regarding convergent validity, all observed variables exhibit high standardized factor loadings (most exceeding 0.7) and are statistically significant, indicating that the measurement items adequately represent the latent constructs, including MAN, ENV, SOC, NAT, SAF, RIS, and SUS. No items show low factor loadings that would require elimination.

With respect to discriminant validity, the correlation coefficients among the latent constructs are moderate and remain below 1, suggesting the absence of serious multicollinearity. This finding indicates that, while the latent constructs are related, they remain conceptually distinct, consistent with the proposed theoretical framework.

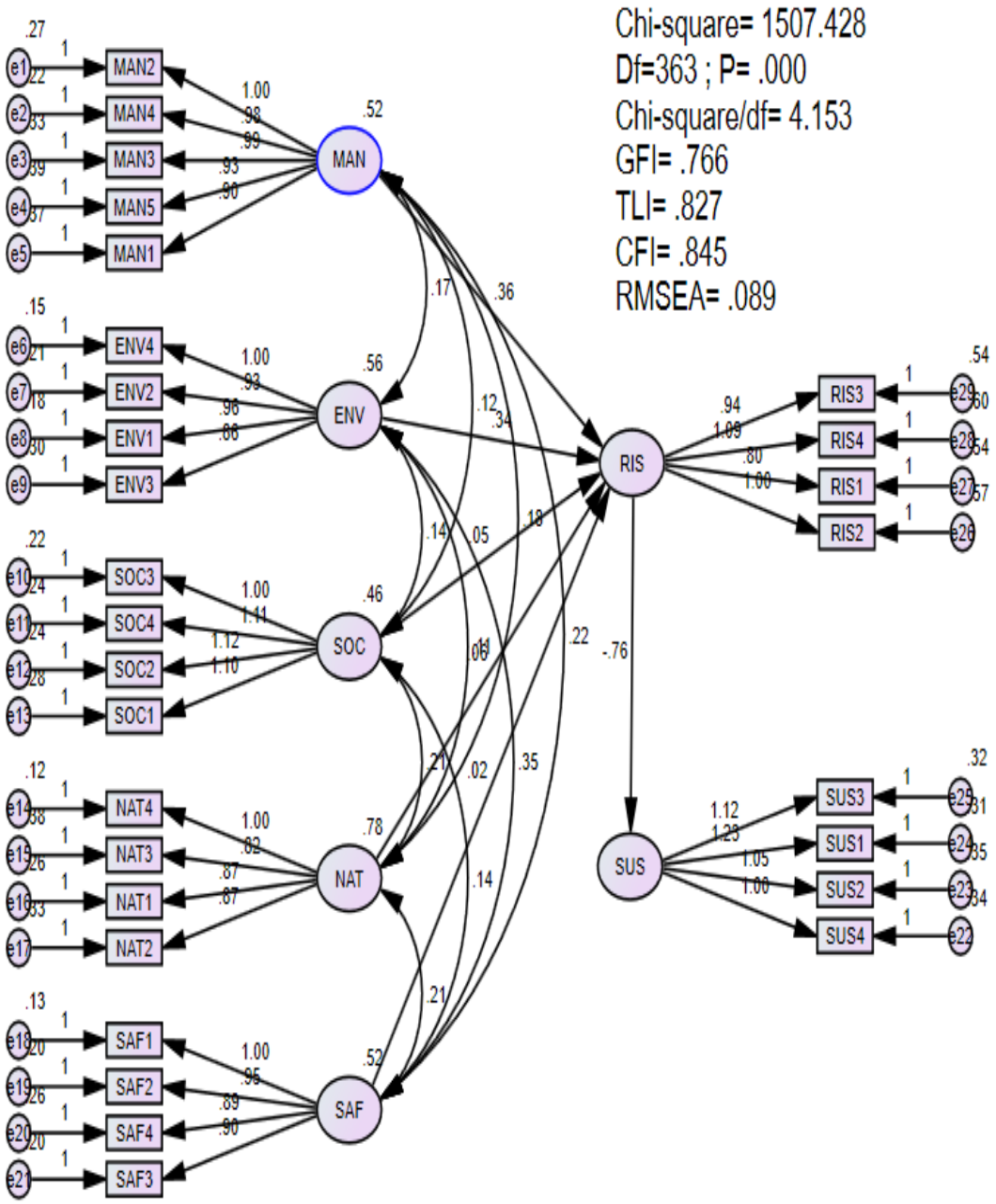

Figure 2: Structural Equation Modeling from

Research Result

Source: Results from AMOS

The results of the Structural Equation Modeling (SEM) estimation indicate that the model achieves an acceptable level of overall fit and meets the necessary conditions for interpreting causal relationships. Specifically, the Chi-square/df value of 4.153 falls within the acceptable range for SEM models with complex structures, while the RMSEA value of 0.089 is below the threshold of 0.10, suggesting that the degree of model misspecification relative to the empirical data remains within permissible limits.

In addition, the goodness-of-fit indices GFI = 0.766, TLI = 0.827, and CFI = 0.845 all exceed the minimum recommended threshold of 0.8, indicating a relatively good overall model fit and that the proposed theoretical structure is generally supported by the data. Therefore, although the model does not achieve an optimal level of fit, the estimation results demonstrate that the SEM model is statistically adequate and sufficiently reliable to proceed with further analysis and discussion of the research findings in subsequent sections.

Table 5: Regression Weights

			Estimate	S.E.	C.R.	P	Label
RIS	<---	MAN	.360	.039	9.105	***	Accepted
RIS	<---	ENV	.344	.040	8.563	***	Accepted
RIS	<---	SOC	.051	.025	2.000	.045	Accepted
RIS	<---	NAT	.056	.020	2.814	.005	Accepted
RIS	<---	SAF	.017	.031	.549	.583	Rejected
SUS	<---	RIS	-.762	.093	-8.217	***	Accepted

Source: Results from AMOS

The estimation results of the SEM model reveal that the causal relationships among variables exhibit different levels of statistical significance, thereby clarifying the roles and magnitudes of influence of each risk group. Specifically, management-related risks (MAN) and environmental risks (ENV) both exert positive, strong, and highly statistically significant effects on overall risk (RIS) ($p < 0.001$). In addition, socioeconomic risks (SOC) also influence RIS, although this effect is significant only at the 5% level ($p = 0.045$). Similarly, natural and disaster-related risks (NAT) show a positive and relatively strong statistically significant impact ($p = 0.005$), reflecting the stable role of natural and climatic factors in increasing overall risk at the destination. In contrast, safety and service risks (SAF) do not demonstrate a statistically significant effect on RIS ($p = 0.583$), implying that, within the research context, this risk group is not a decisive factor in shaping overall risk or may have been relatively well controlled.

Notably, overall risk (RIS) exerts a very strong and highly statistically significant negative effect on sustainable tourism development (SUS) ($p < 0.001$). This finding confirms that increases in risk levels substantially undermine sustainable development outcomes, thereby reinforcing the role of RIS as a central mediating variable linking component risk groups to the destination's sustainable development objectives.

5. DISCUSSION

The research findings provide empirical evidence that management, planning, and legal risks constitute the most influential group affecting risks in sustainable tourism development in Ha Long, with the highest regression coefficient ($\beta = 0.360$). This finding is consistent with theoretical approaches to destination governance, which emphasize that the effectiveness of public management, the coherence of planning, and the adequacy of legal frameworks play a foundational role in controlling risks arising from rapid and complex tourism development. In the context of Ha Long as a World Heritage destination, shortcomings in institutional coordination, overlapping plans, or weak law enforcement can exacerbate conflicts between short-term economic growth objectives and long-term conservation requirements, thereby increasing overall risk. This result also aligns with warnings issued by UNESCO regarding the potential degradation of Outstanding Universal Value at World Heritage Sites in the absence of effective and integrated governance mechanisms.

In addition, environmental pressure and overtourism are identified as the second most influential risk group affecting risks in sustainable tourism development in Ha Long ($\beta = 0.344$). This finding reinforces arguments in international studies on overtourism, which suggest that rapid growth in visitor numbers, high tourism intensity, and resource exploitation beyond environmental carrying capacity can lead to ecosystem degradation, diminished visitor experience, and erosion of the long-term development base of destinations (UNWTO, 2018; Gössling et al., 2020). For Ha Long, where marine ecosystems and unique karst landscapes are central to tourism attractiveness, the results indicate that insufficient control of carrying capacity, waste management, and environmental protection may become serious barriers to achieving long-term sustainable tourism goals.

Beyond these dominant risk groups, natural disaster and climate change risks are also confirmed to have a positive effect on risks in sustainable tourism development in Ha Long ($\beta = 0.056$). Although the magnitude of this effect is relatively modest, the finding highlights the growing importance of natural and climatic factors in shaping overall risk levels at coastal destinations. Recent studies indicate that climate change increases the frequency and intensity of extreme weather events, thereby affecting tourism safety, infrastructure, and business stability (Scott et al., 2019). Accordingly, the results emphasize the need to integrate climate adaptation and risk mitigation measures into Ha Long's sustainable tourism development strategies, rather than relying solely on traditional management solutions.

At the same time, socioeconomic risks are found to exert a positive and statistically significant effect on risks in sustainable tourism development ($\beta = 0.051$). This reflects the vulnerability of destinations that are highly dependent on tourism, where community livelihoods are closely tied to fluctuations in tourism markets. Shocks such as the COVID-19 pandemic have clearly demonstrated the risks of mono-sector dependence, leading to unemployment, income loss, and increased social inequality (OECD, 2020). In the context of Ha Long, issues such as rising living costs, housing pressure, and changes in local

cultural values may weaken community support for tourism, thereby indirectly increasing overall risk. This implies that sustainable tourism development is not only an environmental or managerial issue but is also closely linked to social equity and sustainable local livelihoods.

Finally, the results confirm that risks in sustainable tourism development have a very strong negative effect on sustainable development outcomes, with a regression coefficient of $\beta = -0.762$. This finding indicates that as risks accumulate and intensify, the economic, social, and environmental outcomes of sustainable development deteriorate significantly. It reinforces the perspective that risk functions as a central mediating variable, reflecting the simultaneous accumulation of multiple risk groups and transmitting their negative effects to sustainable development outcomes. From an academic perspective, this result contributes to extending sustainable tourism research through an integrated systemic risk approach. From a practical standpoint, the study underscores that proactive identification, governance, and mitigation of risks are not merely supportive measures but essential prerequisites for ensuring and promoting the long-term sustainable tourism development of Ha Long.

6. CONCLUSION

This study approaches sustainable tourism development from an integrated risk perspective, in which risk is conceptualized as a mediating variable that reflects the simultaneous accumulation of multiple risk groups and transmits their impacts to the sustainable development outcomes of a destination. By applying a combination of advanced quantitative techniques Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) the study successfully develops and empirically validates an analytical model of risks in sustainable tourism development in Ha Long.

The empirical results indicate that management, planning, and legal risks exert the strongest influence on overall risk, followed by environmental pressure and overtourism. These findings confirm the fundamental role of destination governance, planning consistency, and effective law enforcement in controlling risks arising from rapid and complex tourism development processes. At the same time, the study reveals that other risk groups, such as climate change–related and natural disaster risks as well as socioeconomic risks, although having relatively smaller effect sizes, remain statistically significant. This highlights the multidimensional nature and strong interconnections of risks in the context of tourism development at coastal and heritage destinations. Notably, the structural model results confirm that risks in sustainable tourism development have a very strong negative effect on sustainable development outcomes, indicating that as risks increase, the economic, social, and environmental benefits of tourism development decline substantially. This finding underscores that risk is not merely a by-product of development but a decisive factor directly shaping the long-term achievement of sustainable development goals.

From an academic perspective, the study contributes by extending sustainable tourism research from fragmented analyses toward a systemic risk framework, emphasizing the mediating role of overall risk. From a practical perspective, the findings suggest that sustainable tourism development in Ha Long should shift from a “post-risk response” mindset toward proactive risk governance. This includes strengthening institutions and planning, controlling tourism carrying capacity, protecting ecological environments, enhancing climate change adaptation, and ensuring sustainable livelihoods for local communities.

Despite certain limitations related to research scope and data, the study provides important empirical evidence that can inform future research and policy formulation. Future studies may extend this line of inquiry through comparative analyses across destinations, the integration of time-series data, or the combination of quantitative and qualitative methods to further elucidate the role of risk in sustainable tourism development

REFERENCES

1. Adger, W. N., Brown, I., & Surminski, S. (2018). Advances in risk assessment for climate change adaptation policy. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 376(2121), 20180106.
2. Ap, J. (1992). Residents' perceptions on tourism impacts. Annals of Tourism Research, 19(4), 665–690.
3. Avraham, E. (2015). Destination image repair during crisis: Attracting tourism during the Arab Spring uprisings. Tourism Management, 47, 224–232.
4. Biggs, D., Hall, C. M., & Stoeckl, N. (2012). The resilience of formal and informal tourism enterprises to disasters: Reef tourism in Phuket, Thailand. Journal of Sustainable Tourism, 20(5), 645–665.
5. Bramwell, B. (2015). Theoretical activity in sustainable tourism research. Annals of Tourism Research, 54, 204–218.
6. Dogru, T., Bulut, U., Kocak, E., Isik, C., Suess, C., & Sirakaya-Turk, E. (2020). The nexus between tourism, economic growth, renewable energy consumption, and carbon dioxide emissions: Contemporary evidence from OECD countries. Environmental Science and Pollution Research, 27(32), 40930–40948.
7. Dredge, D., & Jamal, T. (2015). Progress in tourism planning and policy: A post-structural perspective on knowledge production. Tourism Management, 51, 285–297.
8. Farmaki, A. (2017). The tourism and peace nexus. Tourism Management, 59, 528–540.
9. Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. Ecology and Society, 21(3).
10. Gössling, S., & Scott, D. (2018). The decarbonisation impasse: Global tourism leaders’ views

on climate change mitigation. Journal of Sustainable Tourism, 26(12), 2071–2086.
11. Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: A rapid assessment of COVID-19. Journal of Sustainable Tourism, 29(1), 1–20.
12. Hall, C. M., Prayag, G., & Amore, A. (2017). Tourism and resilience: Individual, organisational and destination perspectives (Vol. 5). Channel View Publications.
13. Hall, C. M., Scott, D., & Gössling, S. (2021). Pandemics, transformations and tourism: Be careful what you wish for. In Global tourism and COVID-19 (pp. 123–144). Routledge.
14. Lenzen, M., Sun, Y. Y., Faturay, F., Ting, Y. P., Geschke, A., & Malik, A. (2018). The carbon footprint of global tourism. Nature Climate Change, 8(6), 522–528.
15. McKercher, B. (2005). Destinations as products? A reflection on Butler's life cycle. Tourism Recreation Research, 30(3), 97–102.
16. Nunkoo, R., & Smith, S. L. (2013). Political economy of tourism: Trust in government actors, political support, and their determinants. Tourism Management, 36, 120–132.
17. OECD. (2020). Tourism Policy Responses to the Coronavirus (COVID-19). OECD Publishing.
18. Pörtner, H. O., Roberts, D. C., Adams, H., Adler, C., Aldunce, P., Ali, E., … Birkmann, J. (2022). Climate change 2022: Impacts, adaptation and vulnerability.
19. Prayag, G. (2018). Symbiotic relationship or not? Understanding resilience and crisis management in tourism. Tourism Management Perspectives, 25, 133–135.
20. Scott, D., Hall, C. M., & Gössling, S. (2019). Global tourism vulnerability to climate change. Annals of Tourism Research, 77, 49–61.
21. Scott, D., Hall, C. M., Rushton, B., & Gössling, S. (2024). A review of the IPCC Sixth Assessment and implications for tourism development and sectoral climate action. Journal of Sustainable Tourism, 32(9), 1725–1742.
22. Sharpley, R. (2020). Tourism, sustainable development and the theoretical divide: 20 years on. Journal of Sustainable Tourism, 28(11), 1932–1946.
23. Su, L., Swanson, S. R., & Chen, X. (2016). The effects of perceived service quality on repurchase intentions and subjective well-being of Chinese tourists: The mediating role of relationship quality. Tourism Management, 52, 82–95.
24. United Nations World Tourism Organization. (2018). Tourism and Climate Change Report.
25. WCED. (1987). Our Common Future. Oxford University Press.
26. UNWTO. (2005). Making Tourism More Sustainable: A Guide for Policy Makers.
27. UNWTO. (2018). 'Overtourism'? Understanding and managing urban tourism growth beyond perceptions. World Tourism Organization.
28. Xu, J., Shi, P. H., & Chen, X. (2025). Exploring digital innovation in smart tourism destinations: Insights from 31 premier tourist cities in digital China. Tourism Review. 80(3), 681–709