

REVIEW

Research on the Resilience Evaluation and Enhancement Mechanism of Sustainable Development in Cultural Tourism under Environmental Regulatory Pressure

Qiming Wang

School of Fine Arts, Anshan Normal University, Anshan 114000, China

ABSTRACT

The pressure from environmental regulations is emerging as an effective and constant factor that is developing the sustainable development of cultural tourism destinations. The review is a synthesis of studies on the process of resilience evaluation and improvement of cultural tourism systems that are increasingly subject to governance by the environment of very high standards. The article combines separate literatures on tourism sustainability, environmental regulation, and adaptive governance based on the resilience theory and coupled socio-ecological-economic systems perspective to explain how regulatory pressure influences resilience processes. The review indicates that regulation has dual and context-specific effects, including compliance costs, capacity constraints, and uncertainty in operations, which can undermine short-term absorptive capacity. Credible and well-coordinated regulatory regimes can boost green innovation, resource-use efficiency, product upgrading, and institutional learning, and enhance adaptive and transformative resilience. Methodologically, the current resilience measurements are dependent on composite indicator systems in terms of the environmental, economic, social, cultural, and institutional facets, but they are constrained by the lack of dynamism in measurements, the lack of uniformity in the selection of indicators, and a deficit of multi-scale interactions. The mechanism-oriented evidence focuses on four interacting channels: constraint, incentive, structural adjustment, and governance mediation channels, in which the regulation determines destination pathways. The review also reveals intervention strategies for resilience enhancement that focus on policy alignment, technology-driven visitor and environmental management, low-impact

*CORRESPONDING AUTHOR:

Qiming Wang, School of Fine Arts, Anshan Normal University, Anshan 114000, China; Email: wqm12345679@163.com

ARTICLE INFO

Received: 26 February 2026 | Revised: 21 April 2026 | Accepted: 24 April 2026 | Published Online: 9 June 2026

DOI: <https://doi.org/10.30564/jees.v8i6.13243>

CITATION

Wang, Q., 2026. Research on the Resilience Evaluation and Enhancement Mechanism of Sustainable Development in Cultural Tourism under Environmental Regulatory Pressure. *Journal of Environmental & Earth Sciences*. 8(6): 50–69. DOI: <https://doi.org/10.30564/jees.v8i6.13243>

COPYRIGHT

Copyright © 2026 by the author(s). Published by Bilingual Publishing Group. This is an open access article under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License (<https://creativecommons.org/licenses/by-nc/4.0/>).

cultural experiences, industrial diversification, inclusive community involvement, and adaptive and data-driven governance. Dynamic assessment schemes, causal findings, and distribution-sensitive studies should be developed in the future to enable sustainable transformation under the influence of a regulation.

Keywords: Cultural Tourism; Environmental Regulation; Resilience Evaluation; Sustainable Development; Adaptive Governance

1. Introduction

Cultural tourism has gained a new and significant aspect of the global tourism industry and is a key factor in the economic development of the region, cultural evidence, and social advancement^[1,2]. Cultural tourism can promote economic diversification by integrating cultural heritage resources, creative industries, and tourism services, which are crucial for preserving cultural identity and fostering intercultural exchange. Nevertheless, the rapid growth of cultural tourism has also placed strains on the natural environment, cultural landscapes, and surrounding communities, and this is becoming a major concern for the long-term sustainability of cultural tourism. With increasing challenges posed by the effects of environmental degradation, depletion of resources, and climate change, the sustainable development of the cultural tourism system is confronted at a greater level than ever before^[3–6].

Governments of all countries around the world have reinforced environmental regulatory systems in response to mounting environmental issues as a way of curbing environmental degradation and steering economic activities towards more sustainable developmental processes^[7]. The pressure of environmental regulations, in the form of stricter environmental standards, enforcement of regulations, and policy tools, is becoming a more significant external factor limiting tourism development. Although the objectives of environmental regulation are to safeguard ecosystems and guarantee intergenerational fairness, compliance expenses, shifts in industrial organization, and new development patterns in tourist-reliant areas, there are also possible environmental regulation effects. In the case of cultural tourism, where the environment is a delicate ecosystem and the cultural heritage assets are usually non-renewable, environmental control is both a limitation and a possible source of change. It is thus necessary to understand how the cultural tourism systems react and adjust to such regulatory pressure to attain sustainable

development objectives^[8].

In this respect, resilience has become a potent tool of analysis to investigate the ability of complex systems to survive shocks, respond to the fluctuations of conditions, and maintain the necessary functions over time. Initially based on the ecological theory, resilience has been broadly used in systems of socio-ecology, urban systems, and economic systems, and more recently in tourism studies. Tourism resilience is typically the capacity of tourism systems to withstand any shock, recover from a crisis, and restructure in a manner that supports or improves sustainability. In the case of cultural tourism systems, resilience includes the restoration of economic activity and protection of the environment in addition to the maintenance of cultural values, social integration, and institutional performance. In this sense, resilience offers a comprehensive approach to assessing sustainable development results where there is uncertainty and external pressure^[9–11].

Although the literature on the topic of tourism resilience is increasing, there are still some gaps in the literature. First, there is a large body of research on exogenous shocks (e.g., natural disasters, the occurrence of a pandemic, or an economic slowdown), but minimal work has been done on institutional restrictions (e.g., environmental regulation). The difference between environmental regulatory pressure and sudden shocks lies in the fact that the latter is a continuous, policy-based influence capable of refreezing incentives, restrictions, and behavior in the long term. Second, existing studies tend to focus on environmental regulation or governmental tourism resiliency in isolation, without a combined approach that takes a specific view of explicitly connecting regulatory pressure to resilience in cultural tourism systems. This division restricts our knowledge of the interplay between regulation-driven constraints and incentives on system adaptiveness and sustainability^[12–14].

Furthermore, the literature on sustainability in cultural tourism is rather inclined toward stressing the stationary

measures of performance, like the quality of the environment or the amount of the economy, instead of system performance. Sustainable development is a long-term, adaptive process, and it demands that systems change according to changing environmental, economic, and social circumstances. Resilience-based assessment changes the analytic emphasis of efficiency in the short term to long-term adaptability and ability to transform. Nonetheless, the frameworks of resilience assessment that are specifically oriented at cultural tourism, in the context of environmental control pressure, are not yet fully developed. Consensus on the right indicators, assessment procedures, and analytical frameworks that can reflect the multidimensional and dynamic resilience is lacking in this case^[15,16].

The other problematic area is the two-sided impact of environmental regulatory pressure on the development of cultural tourism. On the one hand, strict environmental laws can raise the cost of operation, limit resource consumption, and limit tourism growth, which may undermine economic resilience in the short run. Conversely, regulatory pressure can drive technological change, better environmental management, and upgrading of tourism products and industrial structures, which will increase long-term resilience and sustainability. This duality indicates the multifaceted relationship of regulation, innovation, and adaptation of the system, which has not been well researched in the literature of cultural tourism. It is important to explain the processes under which environmental regulation influences resilience, and thus it is essential in designing effective policy interventions^[17–19].

Moreover, there is great spatial heterogeneity and situational specificity in cultural tourism systems. Heterogeneous response to regulatory pressure is caused by differences in cultural resource endowments, environmental carrying capacity, system of governance, and development phases. Other areas can effectively use environmental regulation as a green transformation and resilience-boosting opportunity, and others can find it difficult to cope with the challenge because of insufficient institutional capacity or economic reliance on resource-intensive tourism patterns. The current literature tends to ignore such heterogeneity and therefore makes generalized conclusions that might not be applicable across the board. A systematic review representing syntheses of various empirical results as well as theoretical orientations

can assist in finding general patterns, contextual variations, and transferable information^[20,21].

It is against this backdrop that the article seeks to present a critical review of studies on the mechanisms of resilience assessment and improvement of sustainable development in cultural tourism when subjected to environmental regulation pressure. Through the methodical analysis of the conceptual background, assessment frameworks, extent of impact, and improvement lines underlined in the current literature, this research aims to offer a solution to the gap between environmental regulation research and tourism resilience research. The review takes an integrative approach in the sense that cultural tourism is viewed as a socio-ecological-economic system where environmental protection, economic viability, cultural preservation, and institutional governance are interrelated^[3,12,22].

More precisely, the following major questions are discussed in this article:

- (1) What is the conceptualization and operationalization of resilience concerning cultural tourism sustainable development?
- (2) What have been the approaches and regulatory indicator systems that have been employed to assess cultural tourism resiliency in the context of environmental regulatory pressure?
- (3) How do environmental regulation processes affect the resiliency of cultural tourism systems?
- (4) What are some of the strategies and avenues suggested or put in place to increase resilience and encourage sustainable development in this regard?

The answers to these questions that the study will provide will not only clarify the theoretical aspects of the subject, but they will also offer practical advice to policy makers, destination managers, and researchers.

The input of this review is tripled. To start with, it integrates the strands of research that are disjointed into a coherent analytical system that directly connects environmental regulatory pressure with cultural tourism resilience. Second, it is a critical critique of existing methods of resilience assessment, outlining the strengths and weaknesses of the methods, and directions on how these methods can be improved in the future. Third, it provides important resilience-strengthening processes and policy recommendations, which may include information on how environmental regulations

could be streamlined to support sustainable cultural tourism development goals. By so doing, the article is added to the larger discussion on sustainable development, resilience governance, and green transformation in tourism-based areas^[3,23–26].

The rest of this paper is structured in the following way. Section 2 expounds on the theoretical sense of cultural tourism resilience and how it interacts with environmental regulation. Section 3 compiles the key approaches and indicators for measuring resilience when faced with regulatory pressure. Section 4 examines how environmental regulation impacts cultural tourism resilience. Section 5 explains the opportunities and avenues for increasing resilience and sustainable development. Section 6 is the conclusion of the article and gives the future directions of research.

2. Conceptual Framework: Resilience of Cultural Tourism Systems under Environmental Regulatory Pressure

The sustainable development of cultural tourism takes place under an even more complicated and restricted institutional and ecological environment. The cultural tourism systems are designed by how the natural ecosystems, cultural heritage resources, economic operations, and government systems interact with environmental enforcing influence. To support the analysis of the way such systems react to long-term regulatory constraints with sustainability goals in mind, there is a need to have a coherent conceptual framework based on the resilience theory. This part explains the essential ideas of resilience in cultural tourism, investigates the systemic nature of cultural tourism as a coupled socio-ecological-economic environment, and clarifies the theoretical interconnections between environmental regulation and resilience processes^[3,25,27].

2.1. Resilience Theory and Its Application to Cultural Tourism

The theory of resilience began in the ecological sciences to refer to the ability of an ecosystem to withstand

disturbances and restructure without necessary regime shifts. With time, the concept has been expanded to social, economic, and socio-ecological systems, with the focus on adaptability, learning, and change in the face of uncertainty. Unlike the conventional methods that consider equilibrium, resilience theory emphasizes nonlinear dynamics, feedback, and the co-occurrence of stability and change. These features make resilience theory especially applicable when it is applied to the analysis of cultural tourism systems, which in turn are dynamic and have to face a variety of interacting pressures^[28,29].

The general concept of resilience in tourism research is the capacity of destinations or tourism systems to endure shocks, rebound from turbulence, and adjust to structural changes without failing to perform key functions and identities. When resilience is applied to cultural tourism, it is not only focused on economic performance, but also on the preservation of cultural heritage, the preservation of social cohesion, and the sustainability of ecological settings. Cultural tourism resilience is therefore a complex ability that has dimensions of economic sustainability, environmental flexibility, cultural endurance, and institutional strength. This holistic approach is quite in line with the main ideals of sustainable development that underline the harmonious nature of the combination of environmental, economic, and social goals^[30].

Significantly, the concept of resilience in cultural tourism is not to be regarded as the opposition to change. To elucidate the conceptual demarcation applied in this review and to minimize the level of interdisciplinary definitional ambiguity, **Table 1** condenses fundamental terminology and widely used operationalizations of resilience, sustainability, and environmental regulatory pressure^[31,32]. In environmental regulatory pressure circumstances, resilience progressively suggests the capacity to experience proactive change, including embracing more environmentally-friendly technologies, reorganizing tourist products, and reimagining development directions. In this view, resilience is a dynamic process instead of being a fixed attribute, and long-term adaptability and the ability to innovate are identified as the most important factors of sustainable cultural tourism development^[33].

Table 1. Core Concepts and Definitions Related to Resilience, Sustainability, and Environmental Regulatory Pressure.

Concept	Representative Definition (Review-Oriented)	Emphasis in the Cultural Tourism Context	Typical Operationalization in Studies
Sustainable development	Development that meets present needs without compromising future generations	Balancing heritage conservation, community welfare, and ecological protection with tourism growth	Triple-bottom-line or multi-dimensional sustainability indices
Resilience (general)	The capacity of a system to absorb disturbance, adapt, and maintain core functions	Continuity of tourism functions while protecting cultural values and ecosystems	Composite resilience indices; shock-response and recovery metrics
Tourism resilience	Ability of tourism destinations/industries to resist, recover, and reorganize after disturbances	Sustaining destination competitiveness and governance under stress	Recovery time, stability of arrivals/revenue, adaptive governance measures
Cultural tourism resilience	Multidimensional capacity to sustain cultural continuity, ecological integrity, and economic viability	Protecting cultural authenticity and heritage integrity under development pressure	Indicators spanning culture, environment, economy, institutions, and community
Environmental regulatory pressure	Stringency and enforcement intensity of environmental rules affecting economic activities	Compliance constraints and innovation incentives affecting destination pathways	Proxy measures (stringency indices, enforcement intensity, investment in pollution control)
Adaptive governance	Governance approach emphasizing learning, participation, and adjustment under uncertainty	Cross-sector coordination for environment–heritage–tourism integration	Stakeholder participation, policy coordination, and monitoring systems

2.2. Cultural Tourism as a Coupled Socio-Ecological-Economic System

The main concept of cultural tourism systems entails coupled socio-ecological-economic systems in which human activities, natural environments, and institutional arrangements are closely intertwined. Cultural tourism is also based on tangible and intangible cultural resources, which include places of historical significance, traditional ways, cultural landscapes, and creative expressions. These resources are located in a particular ecological environment and are also very sensitive to environmental pollution and excesses. Concurrently, cultural tourism has an economic advantage by creating employment, generating income, and developing regions that connect cultural and environmental resources to the larger economies^[34–36].

The fact that cultural tourism systems are coupled means that any change in a certain subsystem has the potential of causing a cascading effect on the other subsystems. Environmental regulatory pressure in terms of protecting ecosystems can have direct and indirect impacts on tourism activities by restricting the use of resources or regulating them to a higher standard, as well as having an indirect effect on cultural practices, the livelihoods of a community, and investment choices. On the other hand, the ecological resilience can be boosted by adaptive responses in the tourism industry, such as product innovation or better management of the environment, which may be used in the conservation of

the cultural heritage. These two-way interactions highlight the significance of using the systems approach to assessing resilience and sustainability^[30,37,38].

Moreover, cultural tourism systems have multi-spatial and multi-temporal operations. Communities of places, regional economies, national regulation systems, and international tourism markets interrelate in the transactions that determine development outcomes. The destination level may also rely on the higher levels of institutional support and policy coherence, in addition to the local adaptive capacity, in order to be resilient. These multi-scale interactions need to be identified to know the ways environmental regulatory pressure can impact the resilience trajectories of various cultural tourism settings^[39]. The overall conceptual framework that is embraced in this review was in the form of a synthesis, as shown in **Figure 1**, which places environmental regulatory pressure as a recurrent institutional force that makes a difference in the absorptive, adaptive, and transformative capacities of cultural systems of tourism and, finally, sustainable development outcomes^[3,40].

2.3. Environmental Regulatory Pressure and Institutional Dynamics

Environmental regulatory pressure can be defined as the rigor and strictness of policies, regulations, and enforcement systems to manage environmental implications and enhance sustainable utilization of resources. This pressure

may be critical in different forms, which include compulsory environmental norms, statutes on the control of pollution, limitations on land use, market-based controls, and government voluntary measures. Environmental regulation in the context of cultural tourism has a dual role as a limiting element towards development, as well as a motivating factor for behavior change^[41].

Institutionally, the pressure of environmental regulations modifies the institutions to which the tourism stakehold-

ers are subjected. There can be more compliance requirements that can raise short-term costs and decrease flexibility in operations, especially for small and medium-sized tourism enterprises. Nonetheless, regulatory pressure may also promote innovation, the use of cleaner technologies, and the more efficient use of resources. Regulation has a net impact on resilience, and changes in regulating strength to enabling one, coupled with the adaptive capacity of the tourism systems, influence this^[42].

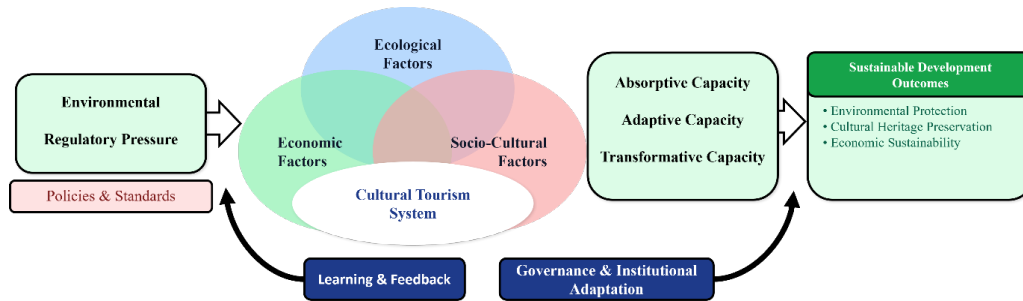


Figure 1. Integrated Conceptual Framework of Cultural Tourism Resilience under Environmental Regulatory Pressure.

There is also an interplay between regulation and resilience through institutional forces. The quality of governance, the consistency of policies, the involvement of stakeholders, and the effectiveness of enforcement are some of the factors affecting the impact of regulatory pressure on perception and response by tourism actors. In the presence of a well-governing context, environmental regulation can support the organization of action and learning, and resilience in the long run. Conversely, vulnerable populations can be further increased under vulnerable institutions or fragmented administration, resulting in maladaptive consequences. Here, the mentioned considerations show the need to incorporate environmental regulation into a larger institutional framework that facilitates adaptive governance and sustainable cultural tourism development.

2.4. Integrating Resilience and Environmental Regulation in Sustainable Development Analysis

The combination of the resilience theory and the environmental regulation analysis is a potent model of sustainable development in the context of cultural tourism. Instead of viewing regulation as an exogenous binding force, the integrated view sees environmental regulatory pressure as an

endogenous force affecting the evolution of the system. Regulation is known to affect resilience in both direct effects on the tourism undertakings and indirectly on innovation direction, governance systems, and developmental trends over time^[43].

In this cohesive system, resilience assessment is the ability of cultural tourism systems to respond to regulatory pressure while conserving ecological integrity, economic vitality, and cultural continuity. In turn, the enhancement of resilience implies reinforcing the adaptive capabilities through coordination of policies, institutional learning, technological innovation, and engagement of stakeholders. This is a way to go beyond short-term trade-off analyses and focus on long-term sustainability and change. This framework offers a conceptual position that allows defining cultural tourism as a coupled socio-ecological-economic system functioning under the pressure of environmental regulation in the further analysis of assessment approaches, impact processes, and improvement strategies. It also provides a point of comparison for research in other regions and at different stages of development, and, therefore, a better understanding of how resilience could be encouraged within the cultural tourism systems that experience an ever-tighter environmental limitation^[44].

3. Methods and Indicator Systems for Evaluating Resilience in Cultural Tourism under Environmental Regulatory Pressure

The complexity of the interactions between cultural tourism systems and environmental regulatory pressure necessitates the use of methodological approaches that can depict the multidimensional interactions, dynamic processes of adaptation, and the long-term sustainability consequences. Contrary to traditional performance assessment, resilience assessment is based on the capacity of the system, not the efficiency within the next short time, but on the ability to react, recover, and learn when the system is put into a narrow situation by an externality. The available literature has used diverse qualitative and quantitative techniques to define resilience in tourism settings, but the research assessment of cultural tourism resilience during regulatory stress is methodologically disjointed. The section provides a review of the key assessment methods, the system of indicator construction, and methodological issues found in the literature^[3,45,46].

3.1. Conceptual Approaches to Resilience Evaluation in Cultural Tourism

The notion of cultural tourism as a complex adaptive system is the basis of resilience evaluation within cultural tourism. International research in the early years had tended to use fixed sustainability indicators to monitor environmental or economic performance; they implicitly assumed a linear relationship between inputs and outputs. Nevertheless, these methods cannot be used to measure resilience, which is dynamic and context-specific. Still, more recent studies have moved in the direction of resilience-based models, which place more emphasis on adaptive capacity, system diversity, and learning processes.

The general difference in the conceptual approaches to resilience evaluation is that absorptive, adaptive, and transformative capacities are distinguished. Absorptive capacity is the measure of the capacity of cultural tourism systems to endure regulatory restraints without much functional loss, including attracting visitor flows within a tighter environmental policy. Adaptive capacity is an indicator of incremental adjustments, such as adjustments in management or product

designs. Transformative capacity entails the reconfiguration of development patterns, including mass tourism to experience tourism with low impact. These dimensions will have an analytical foundation on how cultural tourism systems are responding to environmental regulatory pressure in the long term^[3,25,47].

Moreover, there is a trend towards a systems approach to resilience evaluation, which is an understanding of interdependence between ecological integrity and cultural heritage protection, economic stability, and good governance. This view advocates comprehensive evaluation systems that go beyond sector-based pointers and cross-functional interactions. Nevertheless, such an abundance of concepts in measurement is a main concern in how to convert them into quantifiable assessment instruments.

3.2. Indicator System Construction for Cultural Tourism Resilience

The empirical basis of resilience evaluation is an indicator system, a linkage between abstract theories and system aspects. Under the influence of environmental regulation of cultural tourism, the multidimensionality of the concept of resilience is usually considered in the form of the construction of indicators, which are influenced by the particular regulatory environment in which tourism systems operate. Based on this multidimensional rationale, **Table 2** is offered with a condensed indicator architecture that is regularly applied in assessing the cultural tourism resilience amid environmental regulatory stress, along with the explanation of each dimension and common measurement implications. The existing literature tends to consist of indicators that are structured according to environmental, economic, social, cultural, and institutional dimensions, but the proportion of each of these seems to differ depending on the research setting^[45].

The goals of environmental regulation often use environmental indicators, which are usually based on ecological carrying capacity, efficiency in the use of resources, control of pollution, and the capacity to restore the ecosystem. The stability and diversity of tourism revenues, the resilience of employment, and the absorption of regulatory costs are captured by economic indicators. The cultural indicators focus on safeguarding and renewing cultural heritage, cultural practices continuity, as well as the incorporation of culture in tourism products. Social indicators deal with the

involvement of the community, equity in society, and cooperation between stakeholders, whereas institutional indicators

are connected with the quality of governance, the ability to comply with regulations, and policy integration^[48–50].

Table 2. Indicator System for Evaluating Cultural Tourism Resilience under Environmental Regulatory Pressure.

Dimension	Typical Indicators	Relevance under Environmental Regulatory Pressure	Notes on Measurement Issues
Environmental–ecological	Resource-use efficiency, waste/wastewater treatment rate, emissions intensity, ecological restoration capacity, and carrying capacity pressure	Captures compliance outcomes and ecological buffering ability	Data often available at the city/region level; site-level data may be limited
Economic–industrial	Tourism revenue stability, enterprise survival rate, employment stability, diversification, and value-added per visitor	Reflects the ability to absorb compliance costs and maintain viability	Vulnerable to shocks unrelated to regulation; needs control variables
Cultural heritage	Heritage conservation investment, integrity/condition indices, cultural participation, authenticity perception	Ensures “resilience” includes cultural continuity, not only economic recovery	Many indicators are qualitative or proxy-based; standardization is difficult
Social–community	Community participation, benefit-sharing, resident satisfaction, social equity, conflict incidence	Mediates legitimacy of regulation and supports collective action	Survey-based measures vary; comparability across regions is limited
Institutional–governance	Enforcement capacity, policy coordination, transparency, monitoring coverage, and emergency response capacity	Determines whether regulation becomes enabling or destabilizing	Governance quality is hard to quantify; composite proxies are common
Innovation—digital	Green technology adoption, environmental management systems, digital visitor management, smart monitoring	Key channel translating pressure into upgrading and transformation	Often measured indirectly (investment, patents, platform use, pilots)

Indicator systems under the pressure of environmental regulations are gradually including indicators of innovation and adaptation, including the adoption of green technology, environmental management systems, and transformation into digital systems. Such signs demonstrate the increased awareness that the improvement of resiliency is intimately connected with the innovation-based reactions to regulation.

However, variations in the availability of data, the spatial scale, and the institutional context tend to create disparate indicator selection, which limits the comparability of the research. **Figure 2** is a synthesized resilience evaluation structure and indicator architecture that is usually used in cultural tourism research in the context of regulatory pressure.

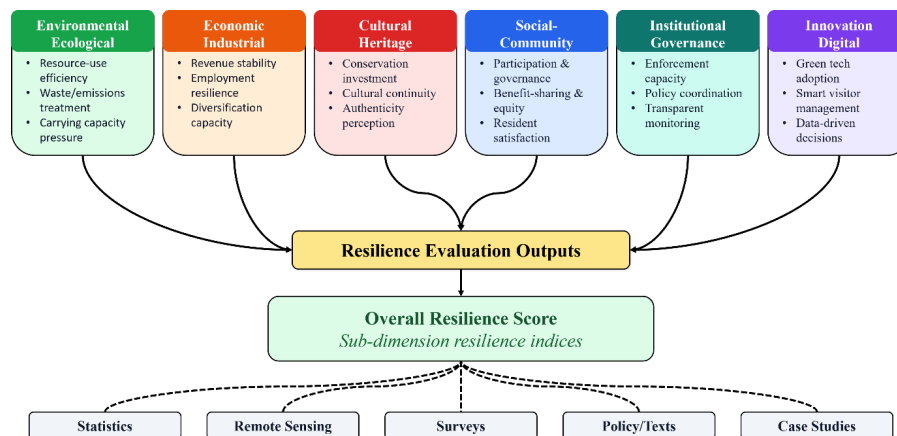


Figure 2. Resilience Evaluation Framework and Indicator Architecture for Cultural Tourism under Environmental Regulatory Pressure.

3.3. Quantitative and Qualitative Evaluation Methods

Quantitative and qualitative methods have been utilized to assess the resilience of cultural tourism in a very wide

range. Empirical research is dominated by quantitative methods, especially when the research aims at analysing a region or a nation. They are known as composite index methods, the way of aggregating several indicators into one resilience score, with weighting methods, including entropy methods,

analytic hierarchy processes, or principal component analysis. The approaches make comparative evaluations across regions or time, but they might obscure underlying structural processes.

The association between tourism resilience and environmental regulatory pressure has also been studied using econometric and spatial analysis techniques. Such approaches give information on causation and heterogeneous effects by modeling regulation as an explanatory variable. Nevertheless, they frequently use simplified models of resilience and can fail to reflect the nonlinear adaptation mechanisms.

Case studies, interviews, and policy analysis are qualitative techniques that are complementary as they reveal

contextual issues, stakeholder expectations, and institutional complexity that can be hard to measure. Qualitative methods have been found to be useful in cultural tourism studies, especially in the study of cultural values, governance, and community-based adaptation strategies. Mixed-method designs that combine quantitative measurement with qualitative explanation are becoming increasingly promoted as a source of deepening analysis and making policy matters relevant. To emphasize the advantages, limitations, and most suitable applications of the key methods employed in the sphere, **Table 3** contrasts major resilience assessment strategies and explains the situations in which each of them is most informative^[25,51].

Table 3. Comparison of Major Methods for Evaluating Cultural Tourism Resilience under Environmental Regulatory Pressure.

Method Family	Typical Techniques	What it Does Well	Main Limitations in This Topic	Best-Fit Research Use
Composite Index Evaluation	Entropy Weighting, AHP, PCA/FA, TOPSIS	Produces comparable resilience scores across regions/time	Often static; weighting sensitivity; may mask causal structure	Benchmarking, spatial comparison, monitoring trends
Econometric modeling	Panel regression, spatial econometrics, mediation/moderation, threshold models	Tests regulation–resilience relationships; heterogeneity	Endogeneity and measurement error; resilience may be oversimplified	Identifying drivers, policy effect estimation
Causal/quasi-experimental	DID, IV, RDD, synthetic control	Stronger causal inference for policy impacts	Requires policy shocks/data; limited in multi-dimensional culture measures	Evaluating regulatory reforms or enforcement changes
System dynamics / complexity	System dynamics, agent-based models, network analysis	Captures feedback loops and nonlinear adaptation	Parameterization difficulty; validation challenges	Mechanism exploration and scenario simulation
Qualitative case-based	Case study, interviews, policy/process tracing	Reveals governance, cultural values, and stakeholder behavior	Lower generalizability; subjectivity risk	Explaining how mechanisms operate in context
Mixed-methods	Index + interviews, models + case validation	Combines comparability with contextual explanation	Time/data intensive; integration quality varies	High-quality reviews and policy-facing studies

3.4. Methodological Challenges and Future Directions

However, in spite of the advancement in methodology, some of the issues are still present in the assessment of cultural tourism sustainability under environmental regulatory pressure. A major problem is that most evaluation structures are static and do not capture the time dynamics and adaptive paths. The potential to evaluate the change in resilience with time is restricted by a lack of use of longitudinal data and dynamic modeling methods.

The other problem is the trade-off between comprehensiveness and functionality in designing the indicator system. Much more detailed indicator systems can be more accurate in reflecting the complexity of the system at the cost of lim-

ited data and transparency, whereas simplified systems are vulnerable to missing some essential aspects of resilience. It is essential to balance policy relevance, data availability, and the research objectives carefully to attain the appropriate balance.

Lastly, contextual heterogeneity also presents tremendous challenges to the comparative analysis. The various types of regulatory regimes, endowments of cultural resources, and development stages imply that resilience indicators and the results of evaluation may not be directly related in different regions. Flexible but standardized evaluation frameworks that enable them to be contextually adjusted but involve conceptual consistency would be useful in future research. To overcome these methodological obstacles, it is necessary to work on resilience-based evaluation and edu-

cate on effective policy design in the process of sustainable cultural tourism development^[52,53].

4. Mechanisms of Environmental Regulatory Pressure Affecting Resilience in Cultural Tourism Systems

The pressure of environmental regulation impacts the cultural tourism system's resiliency through a complex of intertwined mechanisms, which have environmental, economic, social, cultural, and institutional layers of action. Regulatory pressure can be sustained and continuous, policy-based, and reinforced by standards, enforcement, and governance reforms, unlike abrupt external shocks. Its effects thus accumulate over time and change the development across the destination routes, whose effects are experienced in short-term adjustment costs as well as long-term pathways of transformation. To comprehend these processes, we need to go beyond a frame of constraint and benefit and rather explore the way regulation changes incentives, changes the way resources are allocated, and changes adaptive capacities in coupled socio-ecological-economic systems^[3,40].

4.1. Regulatory Instruments and the Nature of Pressure Transmission

The environmental regulatory pressure is conveyed via the various policy tools, such as command-and-control regulations, market-based mechanisms, and voluntary or information-based governance tools^[54]. The command-and-control strategies normally presuppose clear limits and compliance levels regarding emissions, wastewater emissions, land use, heritage site carrying capacity, ecological redlines, or environmental impact assessments. These kinds of measures are especially relevant in cultural tourism, since most tourism practices take place within environmentally sensitive zones and are dependent on cultural landscapes, which are readily vulnerable to congestion, growth in infrastructure, and patterns of consumption that are resource-intensive. Market instruments are used to sustain resilience through the change of relative prices and investment incentives; these are environmental taxes, pollution fees, tradable permits, and green finance programs. The voluntary schemes and

disclosure mechanisms, such as eco-labels, environmental reporting, and corporate social responsibility commitments, operate by creating reputational incentives and encouraging behavioural change among the tourism enterprises and the tourists themselves^[55,56].

Regulatory pressure is not only related to the formal structure of these tools but also to the effectiveness of enforcement, the ability to monitor, and the general environment of governance. When regulations are enforced on a regular basis and predictably, they can provide consistent expectations that can lead to long-term investment in the development of a more sustainable tourism. Regulatory pressure can also be more perverse to operational risk, and a lack of innovation where enforcement is selective or uncertain, and such a policy undermines resiliency by intensifying instability. Consequently, institutional capability and regulatory credibility can lead to varied resilience impacts of a single formal policy tool.

4.2. Constraint Effects: Compliance Costs, Capacity Limits, and Short-Term Vulnerability

One of the key ways in which environmental regulation can influence cultural tourism resilience is by imposing compliance restrictions. Laws tend to make investments in environmental infrastructure, technologies, waste treatment, visitor management, and ecosystem restoration activities. These requirements may increase costs and decrease short-term profitability in many tourism destinations, particularly where small and medium businesses dominate. The short-term impact can be the loss of absorptive capacity because companies and destinations will be less shielded against demand variations or external shocks as the financial margins become slimmer^[3,57].

The development of the tourism supply may also be restricted by environmental controls that restrict the development of land, the construction on the territories of protection, or the number of visitors that come to visit delicate ecosystems and cultural heritage sites. Though this is necessary to ensure long-term sustainability, it can exacerbate the short-term vulnerability of destinations whose strategies of growth are based on scale. Under such circumstances, local economies may be fragile when they are not diversified, and when they do not have alternative sources of livelihood to cover the cost of adjustment caused by regulation. The ef-

fects of these constraints are felt especially strongly in cases of regulatory reforms being introduced in a short period of time, in cases where the financial support mechanism is weak, or in cases where there is not enough policy coordination between sectors^[58].

4.3. Incentive Effects: Innovation, Efficiency, and Green Upgrading Pathways

Simultaneously, the environmental regulatory pressure may also enhance resilience through incentive-based approaches that enhance innovation and modernization. Regulation can encourage the use of cleaner production methods, energy-efficient technologies, circular resource systems, and ecological management innovations by making pollution and inefficient use of resources more expensive, thus encouraging tourism enterprises and destination managers to embrace them. Such innovation is not exclusive to the technical change in a cultural tourism context, but also in the management innovation in visitor flow control, smart monitoring motion, and eco-compensation plans, with a harmonious balance between conservation and usage^[31,59–61].

Product upgrading and market repositioning may also be fueled by regulatory pressure. Due to increased environmental demands placed on destinations, destinations can also move out of the high-volume, high-impact models of tourism to low-impact, high-value cultural tourism that puts more focus on authenticity, education, and heritage stewardship. Such a shift has the potential of increasing the adaptive and transformative capabilities, through less reliance on activities that are environmentally intensive, and increased destination differentiation and competitiveness. Regulatory pressure, in this case, acts as a selection system that works in favor of resilient development strategies focusing on efficiency, quality, and innovation, with a focus on sustainability.

4.4. Structural Adjustment: Industrial Reconfiguration and Risk Redistribution

Environmental regulation transforms the structural principles of the cultural tourism systems because it affects the industrial structure, investment, and regional development patterns. Tourists may accelerate the restructuring of destinations with tourism industries whose activities greatly depend on resource-intensive delivery networks or whose supply

chain is harmful to the environment. In the long run, it may result in the disappearance of high-polluting/ low-efficient businesses, new greener service providers, and a restructuring of tourism-related sectors to cultural creativity, digital services, and the conservation-focused sector.

This adjustment mechanism of structure also redistributes risks and opportunities among the stakeholders. Whereas large businesses can more easily shoulder compliance expenditures and fund green upgrading, smaller operations will be displaced unless they have supportive policies like subsidies, training, and green finance. The communities that rely on informal tourism jobs can also be affected unequally. These distributional dynamics are vital to resilience in that social cohesion and equal distribution of benefits affect the ability to take collective action, trust among stakeholders, and the legitimacy of governance in the long term. Structural adjustment has such an impact on resilience, not only economically but also socially, within the context of transformation as inclusive^[62,63].

4.5. Governance Mediation: Institutional Capacity, Policy Coordination, and Adaptive Learning

Governance structures and institutional capacity have a strong mediating effect on the impact of environmental regulatory pressure on resilience. Regulation is not an isolated process; its outcome is determined by the mode in which policies are adopted, the role played by the stakeholders, and how conflict between conservation and development is overcome. Good governance has the potential to translate the forces of regulatory pressure into an enabling force through offering clear regulatory guidance, transparency in enforcement, cross-sectoral policy objectives of coordination, and capacity-building of tourism enterprises and communities.

The adaptive governance mechanisms are of great significance, especially in cultural tourism, since sustainability issues frequently entail value clashes among heritage conservation, livelihood requirements, and visitor expectations. Within regulatory pressure, destinations need to learn, monitor, and change policies in a continuous manner to ensure the functioning of their systems and enhance sustainability. Resilience can be improved through institutional mechanisms that help in the involvement of stakeholders, in joint planning, and in the joint systems of monitoring to improve the abil-

ity to solve problems collectively. In contrast, fragmented governance and a lack of strong coordination can increase vulnerability, resulting in reactive compliance practices and not proactive innovation and long-term adaptation^[31,64].

4.6. Contextual Heterogeneity and Nonlinear Resilience Outcomes

The connection between environmental regulatory pressure and cultural tourism resilience is hardly linear. Middle-range regulatory pressure can produce a small amount of behavioral change, and it leads to minimal resilience. With pressure and intensified enforcement, incentives to innovate and structural adjustment mechanisms can be even stronger, which can also help increase resilience by upgrading green and reforming governance. Nevertheless, over-regulation or poorly coordinated regulation can also lead to dominating yields or negative effects if compliance pressure exceeds local abilities to adapt. Those nonlinear responses capture threshold effects in system adaptation, whereby the results of resilience to the pressure of the regulation can be determined by whether the regulatory pressure is above the ability of the stakeholders to adapt^[25].

These dynamics are also determined by contextual heterogeneity. Regions that possess good cultural resources, good governance standards, diversified economies, and have access to green finance are more likely to be able to convert regulation into enhancement of resilience. Contrary to that, tourism destinations with weak ecological status, poor institutional capacities, and reliance on tourism as a source of income might experience increased maladaptation risks. The aspect of heterogeneity would thus be critical in understanding empirical evidence, as well as in formulating differentiated regulatory frameworks that would reconcile the environmental agenda with sustainable cultural tourism development.

5. Pathways and Strategies for Enhancing Resilience in Cultural Tourism Systems under Environmental Regulatory Pressure

To increase the resilience of cultural tourism in the face of environmental regulation pressure means that cultural

tourism must shift to active adaptation and change rather than passive compliance. With increasingly tighter regulation and institutionalization of enforcement, destinations need to enhance their ability to take in short-term restrictions and restructure development patterns that can maintain ecological integrity, cultural continuity, and economic sustainability. The multi-actor, multi-level governance process enhancing resilience can thus be viewed as one that incorporates the design of policies, industrial upgrading, community involvement, and technological innovation. This part integrates key pathways referred to in the literature on how regulatory pressure can be transformed into an enabling power for sustainable cultural tourism development^[25,57].

5.1. Aligning Environmental Regulation with Cultural Tourism Development Objectives

One of the common themes used in resilience-based studies is that regulatory pressure yields more sustainable results when environmental management is coordinated with cultural tourism development approaches. Practically, it can be noted that misalignment is more likely to arise when the environmental policies are planned mostly based on industrial pollution control and are implemented in tourism destinations without proper consideration of tourism as a service-based sector, and subject to seasonal variations and reliance on cultural landscapes. This means that resilience can be enhanced by ensuring that the policy is coherent, with environmental policies incorporating ecological specifics to the destination, protection of cultural heritage requirements, and achievable compliance pathways for the tourism business.

Policy alignment also involves the incorporation of environmental regulations in tourism planning tools such as destination master plans, cultural heritage conservation plans, and land-use policies. By having environmental standards incorporated into the planning process at an early stage, destinations are more likely to avoid disruptive regulatory remedies in the future and have a better coordinated approach to infrastructure investment, visitor flow planning, and protection of heritage sites. Besides this, resilience is enhanced where the regulatory systems have flexible arrangements of implementation, which include phased targets, differentiation of standards depending on the sensitivity of the ecological setting, and adaptive management systems

that enable flexibility of the rules to be revised according to results of monitoring. These arrangements will make maladaptive compliance behavior less likely and promote continuous improvement instead of minimum-threshold compliance^[65].

5.2. Strengthening Green Innovation and Technology-Enabled Adaptation

Innovation does not take place automatically, but it may be spurred by environmental regulatory pressure. The issue of resilience enhancement lies in the ability of destinations to convert regulatory incentives into efficient technological and managerial improvements as a condition of institutional capacity and resource endowment. Green innovation in cultural tourism has been used in the form of enhancing waste management, water and energy efficiency, low-carbon mobility, ecological restoration, and green building in tourism sites. These developments directly enhance environmental flexibility and reduce the cost burden in the long term due to compliance.

Meanwhile, innovation in cultural tourism tends to be hybrid, whereby technology facilitates cultural interpretation, visitor management, and preservation of heritage. The digital monitoring systems, smart ticketing and reservation systems, carrying-capacity analytics, and real-time environmental sensors can enhance destination-level governance by providing more accurate control, lessening congestion, and facilitating quick reaction to environmental stress. These adaptations, which are enabled by technology, can be better at resilience because they provide more visibility of the systems and can make better decisions, where destinations can predict the pressure and act before the system breaks^[66–68].

It is also noted in the literature that resiliency driven by innovation requires favorable ecosystems, such as the availability of green finance, technical support, and networks of collaborations among enterprises, research institutions, and local governments. When faced with pressure to comply with regulations, destinations that support innovation platforms and knowledge-sharing mechanisms are likely to gain more resilience in the long run, as learning processes and technological diffusion become institutionalized instead of an isolated experiment.

5.3. Optimizing Industrial Structure and Promoting Low-Impact Product Transformation

The process of resilience improvement is directly connected with the structural features of local tourism economies. The dependence on high-volume visitation and resource-based tourism services exposes more destinations to tightened regulations, restrictions on the ecological capacity, and social conflict. Structural optimization is thus a key resilience pathway, not only in terms of updating tourism supply chains, but also in terms of shifting cultural tourism products towards less negative environmental impact and greater cultural values.

Product transformation may involve a change in a standardised model of sightseeing to experience-based cultural tourism, which is more focused on interpretation, education, participatory heritage experience, and extended visitor stay with reduced per-capita ecological footprint. Destinations are in a position to decrease the burden on the ecological systems by adding value due to cultural richness as opposed to the number of visitors; they are also able to sustain economic stability. This change can also enhance cultural continuity since products of tourism that focus on authenticity and community-oriented cultural expression present an incentive to preserve heritage and enhance local identity^[69,70].

Another major strategy is industrial diversification. By developing complementary industries like cultural and creative industries, local crafts, ecological agriculture, and cultural education services, destinations decrease their reliance on a particular source of revenue and diversify their economic base and resilience. Diversification enhances recovery ability in cases of changes in the regulations and reinforces long-term flexibility by providing alternative means of employment and investment.

5.4. Enhancing Community Participation and Building Social Resilience Foundations

Cultural tourism systems do not only rely on the strength of enterprises and governments, but also rely on the adaptive capacity of communities that are tourism development host communities and cultural heritage custodians. Environmental regulatory pressure has the potential to create social tension in situations where restrictions imposed on

it influence livelihood, informal tourism activities, or traditional use of resources. Enhancement of resilience, thus, should focus on enhancing social roots of the society through participation in governance, sharing of benefits equally, and community empowerment.

Community involvement helps in resilience through the enhancement of policy legitimacy and the elimination of implementation friction. In cases where local people and cultural practitioners are consulted in the process of setting conservation imperatives, visitor management policies, and tourism development policies, regulatory interventions tend to be perceived as broadly justified as opposed to being externally asserted. The involvement also allows incorporating the local ecological knowledge and cultural values into the management practices, and it can enhance the effectiveness of the environmental regulation, as well as the preservation of heritage^[25,71,72].

Equity interests are also at the core. Regulatory pressure can create unequal burdens, especially for small operators and vulnerable groups. The distributional conflicts can be overcome, and social cohesion can be preserved through mechanisms including targeted subsidies, training initiatives, inclusive tourism entrepreneurship support, eco-compensation schemes, and others. Due to the fact that social trust and collective action potential are critical to adaptive governance, reinforcement of these social resilience underpinnings is a pretext to sustainable change in the face of regulatory demands.

5.5. Improving Governance Capacity through Coordination, Monitoring, and Adaptive Management

The capacity to govern it is a pivotal element in environmental regulatory pressure, augmenting or weakening cultural tourism resilience. Strengthening governance entails enhanced coordination of the sector and levels of administration, better monitoring and enforcement, and institutionalization of adaptive administration. The fact that cultural tourism touches on environmental protection, cultural heritage conservation, transportation, land planning, and the provision of public services, especially matters a lot in coordination. Disjointed governance may result in inconsistency of signals, duplication of functions, and gaps in regulations, undermining resilience outcomes^[73].

Resilience is assisted by proper monitoring systems that help to provide timely information regarding the ecological status, visitor pressures, and compliance performances. With pressure on the environment, destinations putting in place a systematic monitoring structure will be able to transition to active risk management, rather than responding to crises as they occur. Monitoring also facilitates learning because the effective working of the policies can be reviewed, and the methods can be enhanced through evidence, not assumptions. Adaptive management develops when the governance institutions are in such a position that they are able to modify rules, incentives, and implementation strategies based on the observed system dynamics in a way that helps to ensure that rigidity does not cause regulation to become a chronic vulnerability.

Moreover, the development of resilience is more and more dependent on a balance between punishment and encouragement. Stringent regulation most likely would pressure either superficial adherence or abandonment of the business, whereas lenient regulation may create greenwashing and further deforestation. It is more likely that systems of governance with a combination of clear standards, transparent enforcement, technical aid, and financial instruments would generate long-term benefits of resilience^[74]. These strategies are summarized in **Figure 3** into a staged resilience strengthening roadmap, which explains how destinations can advance out of policy alignment and technology-enabled adaptation towards inclusive governance and long-term sustainable development results in the context of environmental regulatory pressure^[3,75].

5.6. Building Multi-Scale Collaborative Networks and Long-Term Transformation Capacity

The fact that cultural tourism systems are integrated into the wider region- and nation-level systems of governance means that multi-scale partnerships can be required to support resilience improvement. The pressure of environmental regulations can be influenced by national policy priorities, and their implementation should be undertaken by local governments and destination managers. Good inter-scale collaboration can avail resources and institutional assistance required at the local level to adapt to environmental amenities, such as fiscal transfer toward environmental in-

frastructures, national-level heritage preservation initiatives, and technical advice on green change^[76].

The collaborative networks are also not confined to the government. Collaborations between tourism enterprises, community organizations, non-governmental organizations, and research institutions can enhance resilience through resource pooling and consequent knowledge sharing and co-

ordination of innovation. Cultural tourism destinations are particularly beneficiaries of such networks, in which heritage conservation and environmental management need to involve a community and long-term commitment. Collaborative governance is effective in the long run to make resilience an institutionalized journey of learning and change instead of a single reaction to the tightening of regulations.

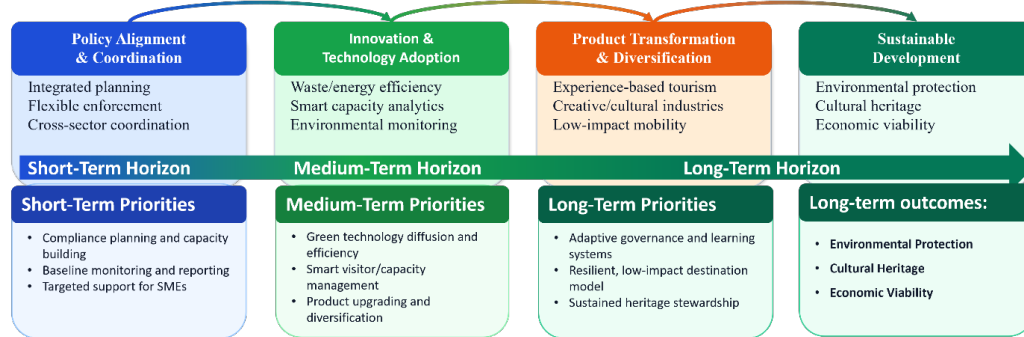


Figure 3. Resilience Enhancement Roadmap for Cultural Tourism under Environmental Regulatory Pressure.

Finally, the improvement of resilience in the context of environmental regulations is necessitated by the transition to the capacity for long-term changes instead of incremental adjustment. This involves the introduction of sustainability goals in the identity and competitive positioning of cultural tourism destinations, the establishment of institutions that contribute to sustained innovativeness, and the assurance that environmental regulations serve not only as a constraint but also as an impetus for sustainable develop-

ment. In such circumstances, regulatory pressure may lead the cultural tourism systems into development directions that are environmentally friendly and also culturally significant. To condense the review in a mobile logic relating policy pressure to the results of resilience, **Table 4** cross-tabulates the most significant regulatory mechanisms with their common risks and chances, the resilience dimensions that they most often correspond to, and the most commonly suggested enhancement strategies in the literature^[12,25,77–80].

Table 4. Mechanism-Strategy Matrix Linking Environmental Regulatory Pressure to Resilience Outcomes in Cultural Tourism.

Regulatory Pressure Mechanism	Likely Negative Pathway (Risk)	Likely Positive Pathway (Opportunity)	Resilience Enhancement Strategy Emphasized in Literature	Resilience Dimension Most Affected
Compliance constraint	Rising costs reduce short-term buffering; small firms exit	Forces efficiency improvements and resource discipline	Subsidies/green finance, phased standards, technical assistance	Economic, institutional
Capacity limits and land-use controls	Visitor caps reduce revenue; conflict with growth goals	Protects carrying capacity and heritage integrity	Smart reservation systems, differentiated zoning, experience-based products	Environmental, cultural
Innovation incentive	Short-term uncertainty discourages investment	Stimulates green tech adoption and product upgrading	Innovation platforms, technology diffusion networks, and green certification	Environmental, economic
Structural adjustment	Unequal burdens create social tension and instability	Shifts industry toward low-impact, high-value offerings	Diversification, creative industries integration, and skill upgrading	Economic, social
Governance mediation	Fragmented governance yields inconsistent policy signals	Coordinated governance enables learning and trust	Cross-sector coordination, monitoring systems, adaptive management	Institutional, social
Reputation and market signaling	Greenwashing risk if standards are weak	Sustainability branding improves competitiveness	Transparent disclosure, eco-labels, community-based stewardship	Economic, cultural

6. Conclusions

This review advances an integrated understanding of cultural tourism resilience under environmental regulatory pressure by synthesizing fragmented research across sustainability, governance, and tourism studies. The central insight emerging from the literature is the fundamental duality of regulatory pressure. While regulation can impose short-term constraints through increased costs, operational restrictions, and capacity limitations, it can also act as a catalyst for long-term resilience by stimulating innovation, improving resource efficiency, and enabling structural upgrading. This duality is neither linear nor universal; rather, it depends critically on contextual conditions such as governance quality, adaptive capacity, and economic diversification.

Despite growing interest in resilience evaluation, significant methodological and conceptual gaps remain. Existing approaches are predominantly static and indicator-driven, with limited ability to capture dynamic adaptation processes, feedback loops, and threshold effects. In addition, inconsistencies in indicator selection and insufficient integration of cultural and institutional dimensions reduce comparability and explanatory power. Mechanism-based research is still underdeveloped, particularly in identifying causal pathways and distinguishing short-term disruptions from long-term transformation.

These limitations point to several priority directions for future research. First, there is a need to develop dynamic and multi-scale evaluation frameworks that better reflect temporal evolution and system interactions. Second, stronger causal identification strategies—such as quasi-experimental designs and longitudinal analyses—are required to clarify how different types and intensities of regulation affect resilience outcomes. Third, greater attention should be paid to heterogeneity across destinations, especially regarding governance capacity, community participation, and cultural specificity. Finally, future studies should integrate distributional perspectives to assess who benefits from resilience-enhancing transitions and who bears the costs.

In sum, environmental regulatory pressure should not be viewed merely as a constraint on cultural tourism development, but as a potential driver of systemic transformation. Unlocking this potential requires aligning regulatory design with innovation support, inclusive governance, and adaptive management. This perspective provides a more coherent

foundation for both future research and policy development aimed at achieving sustainable and resilient cultural tourism systems.

Funding

This work received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

All data were presented in the article.

Conflicts of Interest

The author declares no conflict of interest.

AI Use Statement

The author declares that no artificial intelligence (AI) tools were used in the preparation of this manuscript.

References

- [1] Richards, G., 2018. Cultural tourism: A review of recent research and trends. *Journal of Hospitality and Tourism Management*. 36, 12–21. DOI: <https://doi.org/10.1016/j.jhtm.2018.03.005>
- [2] Liu, Y.-D., 2014. Cultural Events and Cultural Tourism Development: Lessons from the European Capitals of Culture. *European Planning Studies*. 22(3), 498–514. DOI: <https://doi.org/10.1080/09654313.2012.752442>
- [3] Wang, T., Yang, Z., Ma, X., et al., 2025. Resilience of tourism social-ecological systems: Conceptualization and research framework. *Environment, Development and Sustainability*. DOI: <https://doi.org/10.1007/s10668-025-06998-4>
- [4] Shi, Y., Zhang, J., Cui, X., et al., 2022. Evaluating Sustainability of Tourism Projects in Rural Land Development Base on a Resilience Model. *Land*. 11(12), 2245. DOI: <https://doi.org/10.3390/land11122245>
- [5] Liu, Y., Hou, Y., Guo, J., et al., 2024. The impact of

- environment on enhancement of tourism system resilience in China: The moderating role of digital technology. *Technological Forecasting and Social Change*. 206, 123492. DOI: <https://doi.org/10.1016/j.techfore.2024.123492>
- [6] Wang, T., Yang, Z., Zheng, X., 2025. Spatiotemporal evolution and obstacles of tourism socioecological system sustainability from pressure and resilience perspective in arid regions. *Scientific Reports*. 15(1), 41679. DOI: <https://doi.org/10.1038/s41598-025-25564-6>
- [7] Awewomom, J., Dzeble, F., Takyi, Y.D., et al., 2024. Addressing global environmental pollution using environmental control techniques: A focus on environmental policy and preventive environmental management. *Discover Environment*. 2(1), 8. DOI: <https://doi.org/10.1007/s44274-024-00033-5>
- [8] Yang, T., Percival, R.V., 2009. The emergence of global environmental law. *Ecology LQ*. 36, 615. Available from: <https://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1714&context=facpubs>
- [9] Fraccascia, L., Giannoccaro, I., Albino, V., 2018. Resilience of Complex Systems: State of the Art and Directions for Future Research. *Complexity*. 2018(1), 3421529. DOI: <https://doi.org/10.1155/2018/3421529>
- [10] Comfort, L.K., Sungu, Y., Johnson, D., et al., 2001. Complex Systems in Crisis: Anticipation and Resilience in Dynamic Environments. *Journal of Contingencies and Crisis Management*. 9(3), 144–158. DOI: <https://doi.org/10.1111/1468-5973.00164>
- [11] Schoenmakers, S., Feudel, U., 2021. A resilience concept based on system functioning: A dynamical systems perspective. *Chaos: An Interdisciplinary Journal of Nonlinear Science*. 31(5), 053126. DOI: <https://doi.org/10.1063/5.0042755>
- [12] Zhang, F., Lv, Y., Sarker, M.N.I., 2024. Resilience and recovery: A systematic review of tourism governance strategies in disaster-affected regions. *International Journal of Disaster Risk Reduction*. 103, 104350. DOI: <https://doi.org/10.1016/j.ijdr.2024.104350>
- [13] Hall, C.M., Safonov, A., Naderi Koupaie, S., 2023. Resilience in hospitality and tourism: issues, synthesis and agenda. *International Journal of Contemporary Hospitality Management*. 35(1), 347–368. DOI: <https://doi.org/10.1108/IJCHM-11-2021-1428>
- [14] Rosselló, J., Becken, S., Santana-Gallego, M., 2020. The effects of natural disasters on international tourism: A global analysis. *Tourism Management*. 79, 104080. DOI: <https://doi.org/10.1016/j.tourman.2020.104080>
- [15] Giannoukou, I., Beneki, C.C., 2018. Towards sustainability performance management system of tourism enterprises: A tourism sustainable balanced scorecard framework. *International Journal of Global Environmental Issues*. 17(2/3), 175. DOI: <https://doi.org/10.1504/IJGENVI.2018.091457>
- [16] Su, Z., Aaron, J.R., McDowell, W.C., et al., 2019. Sustainable Synergies between the Cultural and Tourism Industries: An Efficiency Evaluation Perspective. *Sustainability*. 11(23), 6607. DOI: <https://doi.org/10.3390/su11236607>
- [17] Yang, Q., Huang, J., Pan, W., 2025. Assessing the Sustainable Development of the Tourism Industry Based on Fuzzy AHP and Grey Relational TOPSIS. *Sustainability*. 17(21), 9799. DOI: <https://doi.org/10.3390/su17219799>
- [18] Sebova, L., Sokologorsky, T., Marcekova, R., 2024. The Current State of Business Environment in Slovakia and Its Impact on Tourism Enterprises. In: Katsoni, V., Cassar, G. (Eds.). *Recent Advancements in Tourism Business, Technology and Social Sciences*, Springer Proceedings in Business and Economics. Springer Nature: Cham, Switzerland. pp. 297–312. DOI: https://doi.org/10.1007/978-3-031-54342-5_18
- [19] Li, Y., Song, R., Ren, P., 2025. A Study on Spatial and Temporal Changes and Synergies/Trade-Offs of the Production-Living-Ecological Functions in Mountainous Areas Based on the Niche Width Model. *Land*. 14(4), 743. DOI: <https://doi.org/10.3390/land14040743>
- [20] Huang, X., Li, C., Zhao, J., et al., 2025. Investigating Spatial Heterogeneity Patterns and Coupling Coordination Effects of the Cultural Ecosystem Service Supply and Demand: A Case Study of Taiyuan City, China. *Land*. 14(6), 1212. DOI: <https://doi.org/10.3390/land14061212>
- [21] Ding, F., Ma, T., 2018. Dynamic Relationship Between Tourism and Homogeneity of Tourist Destinations. *IEEE Access*. 6, 51470–51476. DOI: <https://doi.org/10.1109/ACCESS.2018.2841966>
- [22] Mandić, A., 2020. Structuring challenges of sustainable tourism development in protected natural areas with driving force–pressure–state–impact–response (DP-SIR) framework. *Environment Systems and Decisions*. 40(4), 560–576. DOI: <https://doi.org/10.1007/s10669-020-09759-y>
- [23] Tyrrell, T.J., Johnston, R.J., 2008. Tourism Sustainability, Resiliency and Dynamics: Towards a More Comprehensive Perspective. *Tourism and Hospitality Research*. 8(1), 14–24. DOI: <https://doi.org/10.1057/thr.2008.8>
- [24] Schianetz, K., Kavanagh, L., 2008. Sustainability Indicators for Tourism Destinations: A Complex Adaptive Systems Approach Using Systemic Indicator Systems. *Journal of Sustainable Tourism*. 16(6), 601–628. DOI: <https://doi.org/10.1080/09669580802159651>
- [25] Bui, H.T., Jones, T.E., Weaver, D.B., et al., 2020. The adaptive resilience of living cultural heritage in a tourism destination. *Journal of Sustainable Tourism*. 28(7), 1022–1040. DOI: <https://doi.org/10.1080/09669582.2020.1717503>
- [26] Reyers, B., Moore, M.-L., Haider, L.J., et al., 2022. The contributions of resilience to reshaping sustainable de-

- velopment. *Nature Sustainability*. 5(8), 657–664. DOI: <https://doi.org/10.1038/s41893-022-00889-6>
- [27] Becken, S., 2013. Developing a Framework for Assessing Resilience of Tourism Sub-Systems to Climatic Factors. *Annals of Tourism Research*. 43, 506–528. DOI: <https://doi.org/10.1016/j.annals.2013.06.002>
- [28] Bollettino, V., Alcayna, T., Dy, P., et al., 2017. Introduction to Socio-Ecological Resilience. In: Benouar, D. (Ed.). *Oxford Research Encyclopedia of Natural Hazard Science*. Oxford University Press: New York, NY, USA. DOI: <https://doi.org/10.1093/acrefore/9780199389407.013.261>
- [29] Farley, J., Voinov, A., 2016. Economics, socio-ecological resilience and ecosystem services. *Journal of Environmental Management*. 183, 389–398. DOI: <https://doi.org/10.1016/j.jenvman.2016.07.065>
- [30] Scuttari, A., Corradini, R., 2018. Multidisciplinary approaches to resilience in tourism destination studies: A conceptual framework. In *Destination Resilience*. Routledge: London, UK. pp. 33–48.
- [31] Wu, Y., Tham, J., 2023. The impact of environmental regulation, Environment, Social and Government Performance, and technological innovation on enterprise resilience under a green recovery. *Heliyon*. 9(10), e20278. DOI: <https://doi.org/10.1016/j.heliyon.2023.e20278>
- [32] Roostaie, S., Nawari, N., Kibert, C.J., 2019. Sustainability and resilience: A review of definitions, relationships, and their integration into a combined building assessment framework. *Building and Environment*. 154, 132–144. DOI: <https://doi.org/10.1016/j.buildenv.2019.02.042>
- [33] Kagisho, S., Joao, E.S., 2024. Hospitality's resilience and regenerative adaptations towards sustainability. *Research Square*. Preprint. DOI: <https://doi.org/10.21203/rs.3.rs-5191314/v1>
- [34] Dovgal, O., Goncharenko, N., Reshetnyak, O., et al., 2020. Sustainable Ecological Development of the Global Economic System. The Institutional Aspect. *Journal of Environmental Management and Tourism*. 11(3), 728. DOI: [https://doi.org/10.14505/jemt.v11.3\(43\).27](https://doi.org/10.14505/jemt.v11.3(43).27)
- [35] Mishenin, Y., Yarova, I., Koblianska, I., 2024. Sustainable Spatial Agroforestry in the Context of Forestry Globalization: Strategic Guidelines. In: Raj, A., Jhariya, M.K., Banerjee, A., et al. (Eds.). *Agroforestry*. Wiley: London, UK. pp. 155–198. DOI: <https://doi.org/10.1002/9781394231164.ch6>
- [36] Melnyk, L., Koblianska, I., Dehtyarova, I., et al., 2024. Navigating Sustainability and Ecosystem Management Through a Systemic Lens: Core Principles. In: Banerjee, A., Jhariya, M.K., Raj, A., et al. (Eds.). *Ecosystem Management*. Wiley: London, UK. pp. 353–396. DOI: <https://doi.org/10.1002/9781394231249.ch11>
- [37] Gazoni, J.L., Silva, E.A.M.D., 2022. System Dynamics framework for tourism development management. *Current Issues in Tourism*. 25(15), 2457–2478. DOI: <https://doi.org/10.1080/13683500.2021.1970117>
- [38] Jere Jakulin, T., 2019. Systems Approach to Cultural Tourism and Events. *Academica Turistica*. 12(2), 185–191. DOI: <https://doi.org/10.26493/2335-4194.12.185-191>
- [39] Horn, P., Cottyn, H., 2021. Contested Territories: Lessons from Interdisciplinary Dialogues on Conflict, Resistance and Alternatives in Latin America. Available from: https://www.researchgate.net/publication/352815443_Contested_Territories_Lessons_from_Interdisciplinary_Dialogues_on_Conflict_Resistance_and_Alternatives_in_Latin_America (cited 10 December 2025).
- [40] Espiner, S., Orchiston, C., Higham, J., 2017. Resilience and sustainability: A complementary relationship? Towards a practical conceptual model for the sustainability–resilience nexus in tourism. *Journal of Sustainable Tourism*. 25(10), 1385–1400. DOI: <https://doi.org/10.1080/09669582.2017.1281929>
- [41] Gunningham, N., 2011. Enforcing Environmental Regulation. *Journal of Environmental Law*. 23(2), 169–201. DOI: <https://doi.org/10.1093/jel/eqr006>
- [42] Rivera, J., 2004. Institutional Pressures and Voluntary Environmental Behavior in Developing Countries: Evidence From the Costa Rican Hotel Industry. *Society & Natural Resources*. 17(9), 779–797. DOI: <https://doi.org/10.1080/08941920490493783>
- [43] Mensah, I., 2014. Stakeholder pressure and hotel environmental performance in Accra, Ghana. *Management of Environmental Quality: An International Journal*. 25(2), 227–243. DOI: <https://doi.org/10.1108/MEQ-01-2013-0009>
- [44] Wu, J., Dawood, S.R.S., Sun, J., et al., 2025. The Coupling Coordination Degree of Social-Ecological Systems Resilience of Coastal Tourism Destinations in Guangxi Beibu Gulf. *Case Studies in the Environment*. 9(1), 2458869. DOI: <https://doi.org/10.1525/cse.2025.2458869>
- [45] Zubiaga, M., Sopelana, A., Gandini, A., et al., 2024. Sustainable Cultural Tourism: Proposal for a Comparative Indicator-Based Framework in European Destinations. *Sustainability*. 16(5), 2062. DOI: <https://doi.org/10.3390/su16052062>
- [46] Hu, H., Qiao, X., Yang, Y., et al., 2021. Developing a resilience evaluation index for cultural heritage site: Case study of Jiangwan Town in China. *Asia Pacific Journal of Tourism Research*. 26(1), 15–29. DOI: <https://doi.org/10.1080/10941665.2020.1805476>
- [47] Tsao, C., Ni, C., 2016. Vulnerability, resilience, and the adaptive cycle in a crisis-prone tourism community. *Tourism Geographies*. 18(1), 80–105. DOI: <https://doi.org/10.1080/14616688.2015.1116600>
- [48] Zhang, M., Liu, Y., Wu, J., et al., 2018. Index sys-

- tem of urban resource and environment carrying capacity based on ecological civilization. *Environmental Impact Assessment Review*. 68, 90–97. DOI: <https://doi.org/10.1016/j.eiar.2017.11.002>
- [49] Moldan, B., Janoušková, S., Hák, T., 2012. How to understand and measure environmental sustainability: Indicators and targets. *Ecological Indicators*. 17, 4–13. DOI: <https://doi.org/10.1016/j.ecolind.2011.04.033>
- [50] Huang, A., Tian, L., Li, Q., et al., 2023. Land-Use Planning Serves as a Critical Tool for Improving Resources and Environmental Carrying Capacity: A Review of Evaluation Methods and Application. *International Journal of Environmental Research and Public Health*. 20(3), 2370. DOI: <https://doi.org/10.3390/ijerph20032370>
- [51] Luthe, T., Wyss, R., 2016. Resilience to climate change in a cross-scale tourism governance context: A combined quantitative-qualitative network analysis. *Ecology and Society*. 21(1), art27. DOI: <https://doi.org/10.5751/ES-08234-210127>
- [52] Ko, T.G., 2005. Development of a tourism sustainability assessment procedure: a conceptual approach. *Tourism Management*. 26(3), 431–445. DOI: <https://doi.org/10.1016/j.tourman.2003.12.003>
- [53] Skarakis, N., Skinitis, G., Tournaki, S., et al., 2023. Necessity to Assess the Sustainability of Sensitive Ecosystems: A Comprehensive Review of Tourism Pressures and the Travel Cost Method. *Sustainability*. 15(15), 12064. DOI: <https://doi.org/10.3390/su151512064>
- [54] Gunningham, N., 2012. Regulatory Reform and Reflexive Regulation: Beyond Command and Control. In: Brousseau, E., Dedeurwaerdere, T., Siebenhüner, B. (Eds.). *Reflexive Governance for Global Public Goods*. The MIT Press: Cambridge, MA, USA. pp. 85–104. DOI: <https://doi.org/10.7551/mitpress/9780262017244.003.0042>
- [55] Bowen, F., Panagiotopoulos, P., 2020. Regulatory roles and functions in information-based regulation: A systematic review. *International Review of Administrative Sciences*. 86(2), 203–221. DOI: <https://doi.org/10.1177/0020852318778775>
- [56] Karkkainen, B.C., 2019. Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm? In: Menell, P.S. (Ed.). *Environmental Law*. Routledge: London, UK. pp. 191–304. DOI: <https://doi.org/10.4324/9781315194288-6>
- [57] Kutzner, D., 2019. Environmental change, resilience, and adaptation in nature-based tourism: Conceptualizing the social-ecological resilience of birdwatching tour operations. *Journal of Sustainable Tourism*. 27(8), 1142–1166. DOI: <https://doi.org/10.1080/09669582.2019.1601730>
- [58] Sakapaji, S.C., García Molinos, J., Parilova, V., et al., 2024. Navigating Legal and Regulatory Frameworks to Achieve the Resilience and Sustainability of Indigenous Socioecological Systems. *Resources*. 13(4), 56. DOI: <https://doi.org/10.3390/resources13040056>
- [59] Yaqin, L., Min, L., 2023. Market-Incentive Environmental Regulation and Urban Resilience: Heterogeneity and Influence Mechanisms. *Journal of Resources and Ecology*. 14(3). DOI: <https://doi.org/10.5814/j.isn.1674-764x.2023.03.007>
- [60] Fan, Y., Shi, L., 2025. The role of government fiscal incentives in green technological innovation: A nonlinear analytical framework. *International Review of Economics & Finance*. 103, 104529. DOI: <https://doi.org/10.1016/j.iref.2025.104529>
- [61] Wang, S., Zhang, R., Ma, L., 2024. Market-Incentivized Environmental Regulation and Firm Productivity: Learning from China's Environmental Protection Tax. *SSEN Journal*. DOI: <https://doi.org/10.2139/ssrn.4900409>
- [62] Sun, G., Liu, Y., Qian, Q., et al., 2023. Environmental regulation and tourism industry development: Evidence from China. *Environmental Science and Pollution Research*. 30(34), 81531–81549. DOI: <https://doi.org/10.1007/s11356-022-24917-2>
- [63] Qi, Z., You, Y., 2024. The Impact of the Integration of the Culture Industry and Tourism on Regional Green Development: Empirical Evidence from China. *Sustainability*. 16(8), 3161. DOI: <https://doi.org/10.3390/su16083161>
- [64] Nasution, M.S., Rusli, Z., Heriyanto, M., et al., 2025. Green governance and institutional resilience: strengthening environmental policies for a low-carbon economy in mangrove ecosystems. *Frontiers in Political Science*. 7, 1631249. DOI: <https://doi.org/10.3389/fpos.2025.1631249>
- [65] Farsari, I., 2023. Exploring the nexus between sustainable tourism governance, resilience and complexity research. *Tourism Recreation Research*. 48(3), 352–367. DOI: <https://doi.org/10.1080/02508281.2021.1922828>
- [66] Rothwell, R., 1992. Industrial innovation and government environmental regulation: Some lessons from the past. *Technovation*. 12(7), 447–458. DOI: [https://doi.org/10.1016/0166-4972\(92\)90050-R](https://doi.org/10.1016/0166-4972(92)90050-R)
- [67] Yalabik, B., Fairchild, R.J., 2011. Customer, regulatory, and competitive pressure as drivers of environmental innovation. *International Journal of Production Economics*. 131(2), 519–527. DOI: <https://doi.org/10.1016/j.ijpe.2011.01.020>
- [68] Ambec, S., Cohen, M.A., Elgie, S., et al., 2013. The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness? Review of Environmental Economics and Policy. 7(1), 2–22. DOI: <https://doi.org/10.1093/reep/res016>
- [69] Watson, P., Deller, S., 2022. Tourism and economic resilience. *Tourism Economics*. 28(5), 1193–1215. DOI: <https://doi.org/10.1354816621990943>
- [70] Cheer, J.M., Lew, A.A., 2017. Understanding tourism

- resilience: Adapting to social, political, and economic change. In *Tourism, Resilience, and Sustainability: Adapting to Social, Political and Economic Change*. Routledge: London, UK. pp. 3–17.
- [71] Jugmohan, S., Spencer, J.P., Steyn, J.N., 2016. Local natural and cultural heritage assets and community based tourism: Challenges and opportunities. *African Journal for Physical Activity and Health Sciences (AJPHES)*. 22(1–2), 306–317.
- [72] Suriyankietkaew, S., Krittayarungroj, K., Thinthan, S., et al., 2025. Community Capitals Framework for Sustainable Development: A Qualitative Study of Creative Tourism in Ban Chiang World Heritage Site. *Sustainability*. 17(8), 3311. DOI: <https://doi.org/10.3390/su17083311>
- [73] Schultz, L., Folke, C., Österblom, H., et al., 2015. Adaptive governance, ecosystem management, and natural capital. *Proceedings of the National Academy of Sciences*. 112(24), 7369–7374. DOI: <https://doi.org/10.1073/pnas.1406493112>
- [74] Scarlett, L., 2013. Collaborative Adaptive Management: Challenges and Opportunities. *Ecology and Society*. 18(3), art26. DOI: <https://doi.org/10.5751/ES-05762-180326>
- [75] Shirvani Dastgerdi, A., Kheyroddin, R., 2022. Policy Recommendations for Integrating Resilience into the Management of Cultural Landscapes. *Sustainability*. 14(14), 8500. DOI: <https://doi.org/10.3390/su14148500>
- [76] Tian, Z., Deng, W., Liu, M., et al., 2025. Empowering Sustainability in Power Grids: A Multi-Scale Adaptive Load Forecasting Framework with Expert Collaboration. *Sustainability*. 17(23), 10434. DOI: <https://doi.org/10.3390/su172310434>
- [77] Allen, C., Malekpour, S., Mintrom, M., 2023. Cross-scale, cross-level and multi-actor governance of transformations toward the Sustainable Development Goals: A review of common challenges and solutions. *Sustainable Development*. 31(3), 1250–1267. DOI: <https://doi.org/10.1002/sd.2495>
- [78] Lin, M., Wang, M., Lu, Y., et al., 2025. Synergizing Conservation and Tourism Utilization in Agricultural Heritage Sites: A Comparative Analysis of Economic Resilience in Wujiang and Longsheng, China. *Land*. 14(4), 796. DOI: <https://doi.org/10.3390/land14040796>
- [79] Liu, H., Fang, W., Yuan, P., et al., 2026. The role of climate adaptation policies in shaping tourism resilience: A spatial-temporal analysis. *International Journal of Biometeorology*. 70(2), 55. DOI: <https://doi.org/10.1007/s00484-025-03108-x>
- [80] Erol, I., Dogru, T., Oztel, A., et al., 2026. Building Resilience in Global Tourism: A Theoretical and Empirical Analysis of Indicators for Sustainable Development. *Sustainable Development*. DOI: <https://doi.org/10.1002/sd.70794>