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Climate-Resilient Tourism Logistics and Supply Chain Strategies for Sustainable Destinations

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Abstract

Climate change has become one of the most daunting issues that the global tourism industry has to deal with and its effects have far reached consequences on destination sustainability, continuity of operation and economy. As much as the current body of tourism literature has researched on destination vulnerability and climate adaptation processes, comparatively little has been done on the logistics and supply chain systems which support tourism operations. The logistics associated with tourism, such as transportation systems, provisioning of accommodation, supply of food and beverages, delivery of energy, and waste management have become increasingly vulnerable to the climate induced disturbances comprising extreme weather conditions, damages to infrastructure and shortages of resources. The paper is a critical analysis of climate-resilient tourism logistics and supply chain plans as a mechanism of realization of sustainable destinations. Using the systematic literature review approach, the paper gathers international scholarly and policy-driven studies in order to find resilience-based logistics practices, governance strategies, and technological interventions that could be used in tourism supply chains. The results indicate that climate-resilient supply chains lead to more destination adaptability, lower environmental-footprint, stable livelihoods of tourism-dependent ones, and better competitiveness in the long term. The paper ends by advising the policy makers, destination managers as well as the tourism stakeholders on strategic recommendations which insists on the need to incorporate resilience thinking in tourism logistics planning and sustainable destination govern

Keywords: Climate-Resilient Tourism, Tourism Logistics, Supply Chain Resilience, Sustainable Destinations, Green Logistics, Climate Change Adaptation.

Introduction

Background of the Study

Tourism is among the most globalized and climate-sensitive sectors in the world, which have extremely complicated logistics and supply chain systems encompassing various regions and industries. International transportation and accommodation services, food supply, energy systems, and destination infrastructure all are logistics

of tourism, and they constitute the backbone of tourism economies. These logistics are becoming more vulnerable to climate change which is a global warming, extreme weather conditions, sea level, and environmental degradation.

The difference between the tourist supply chains and the traditional manufacturing supply chains is that the tourist supply chains are highly service oriented, location specific, and very sensitive to the destination environments. Any interruption in the transportation, utilities or availability of resources will trickle down the tourism system resulting in service failures, dissatisfaction among visitors and loss of revenue. Tourism logistics has in turn turned out to be a strategic requirement as opposed to a fringe issue when it comes to climate resilience.

Climate Change and Tourism Logistics Susceptibility

Floods, cyclones, heatwaves, droughts, and wildfires caused by climate provide extreme threats to the tourism logistics infrastructure. Transportation routes can be rendered inoperable, food chains will be broken, power systems will be destroyed, and waste management services will be overwhelmed. Destinations in the coastal tourism are being increasingly exposed to destruction of ports and rise in sea level whereas mountainous and rural destinations are exposed to the dangers of landslides, fluctuation in snowfall and water shortage.

Globalized sourcing, just-in-time delivery model, and overreliance on fossil fuel-based transport system all make tourism logistics systems even more vulnerable. The features minimise the adaptive ability and heighten vulnerability to climate shocks, which underscores the urgent need to adopt resilient and sustainable supply chain strategies.

Statement of the Problem

Although the problem of climate change has increasingly been viewed as a serious issue that threatens the sustainability of tourism, current tourism research and policy frameworks have mostly emphasized on destination-based adaptation, infrastructural resilience, and tourist behavior. Tourism logistics and supply chain dimension is arguably the most operationally significant part that is under explored and incorporated in climate resilience planning.

Climate events are repetitive in the tourism destinations, resulting in supply shortages, high costs of operating, carbon-intensive emergency response, and economic volatility. Lack of climate-resilient logistics plans compromise destination resilience, crisis preparedness, and tends to increase tourism-dependent communities' vulnerability in socio-economic terms. This research paper fills this research and practice gap through systematic research on climate-resilient tourism logistics and sustainability destination supply chain strategies.

Objectives of the Study

The main aim of the study is to critically examine climate resilient logistics of tourism and supply chain strategies which promote sustainable development of destinations.

The specific objectives are:

1. To investigate how the tourism logistics and supply chains are susceptible to climate change.
2. To examine the world literature on climate resilience, tourism logistics and sustainable supply chains.
3. To determine the main climate-resilient logistics strategies that can be implemented in the tourism destinations.
4. To examine the economic, environmental and social consequences of resilient tourism supply chains.
5. The aim is to provide policy and managerial suggestions on sustainable governance of the destination.

Review of Literature

Tourism Systems and Climate Change

Tourism is one of the most climate-sensitive industries because it depends on a stable weather, natural resources, and free international travel, and logistics interference increases the economic losses estimated to be up to \$1-2 trillion in 2050. Gossling et al. (2023) indicate the need to mitigate emissions by supply chains that are low-carbon, mentioning that aviation and accommodation contribute 8% of the total emissions to the environment, with threats such as sea-level rise impacting 90% of the coastal destinations. Scott et al. (2019) measure vulnerability where tourism economies are higher by 20-50% of general GDP exposure in areas such as the Caribbean, which calls on integrated logistics planning.

Tourism Logistics and Supply Chain Foundations

Tourism supply chains (TSCs) combine transport, hospitality, F&B, and activities, which is not the case with manufacturing, being service-based and spatially fixed, thereby being susceptible to cascading impacts of climate shocks. Font et al. (2006) introduce the concept of sustainable supply chain management (SSCM) to tourism, which argues that the policies of tour operators on the impacts of suppliers in the accommodation and transport sector should be promoted to develop sustainability at the destination level. In his evaluation of SSCM in destination management companies (DMCs), such as the Safartica company in Finland, Nguyen (2020) suggests a baseline audit and performance monitoring to introduce sustainability in logistics.

Supply Chain Resilience Theories and Frameworks

Resilience includes absorption, adaptation, and transformation, and such qualities as diversification, collaboration are essential to TSCs in case of disruption. Badoc-Gonzales et al. (2022) put SME resilience in the context of destination catalyst by synthesizing the dimension of MSMEs to develop adaptive capacity after COVID, which can be applied to climate logistics. Ali et al. (2024) apply the fuzzy AHP-QFD to prioritize mitigation strategies of TSC in developing countries, such as hotspots such as transport delays and supplier failures, and increase resiliency through diversified networks.

Tourism Logistics Strategy-Climate Resilience

Green transport, digital solutions, and local sourcing are some of the strategies that can be used to counter risks such as floods and heatwaves. Salim et al. (2021) consider the adaptation of glacier tourism, which encourages diversified agriculture and community networks to provide rural logistics resilience. Zheng (2025) suggests network-genetic methods of TSC resilience prediction, which will allow predictive logistics in the case of extreme events. According to Kiani et al. (2021), agricultural diversification is associated with the stability of tourism supply, which increases income and food security in climate-vulnerable regions.

Green and Sustainable Logistics Practices

The environmental, social, and economic pillars are united in SSCM, whereas the green logistics minimize the emissions through EVs and circular models. Elbanna et al. (2025) compare SSCPs of hotel chains in Egypt and observe that the international corporations can be on the top of the sourcing of suppliers, but Egyptian companies are superior at the sourcing of local suppliers to make the supply chain resilient. Other publications such as TT Club (year unspecified) provide climate-responsive supply chain frameworks, which focus on more adaptive planning in tourism-related logistics.

Research Gaps and Future Directions

Vulnerability and SSCM have been well addressed (2006-2025), but, empirical TSC modeling of climate-specific logistics is limited, particularly in Global Souths such as India. Research gaps exist to incorporate AI/blockchain to achieve real-time resilience, and longitudinal studies and policy simulations are needed. This review fills the gap by generalizing the synthesis of 15+ studies, to inform resilient policies towards sustainable destinations.

Research Methodology

Research Design

To guarantee the rigor and transparency and replicability of the methodology, the study is based on a Systematic Literature Review (SLR) approach. The SLR approach is especially appropriate in synthesizing fragmented literature in terms of tourism, logistics, climate resilience, and sustainability.

Data Sources

Institutional publications, peer-reviewed journal articles, and policy reports were obtained via significant academic databases. Inclusion criteria were on relevance to climate change, tourism logistics, supply chain resilience and sustainable destinations.

Data Analysis Technique

The thematic analysis method was used to be able to locate common patterns and resilience strategies in the chosen literature. The themes were broken down into infrastructure resilience, governance mechanisms, technological adaptation and stakeholder collaboration.

Scope of the Study

The study is concerned with international tourism destinations, but especially the tourism facilities that are vulnerable to climatic change such as coastal tourism, urban tourism, and nature tourism. The results will be used to educate developed and developing contexts of destination.

Results and Findings

The findings of the systematic literature review are provided thematically which can be seen as they reflect the prevailing patterns and relationships and empirical findings observed throughout the reviewed literature. Through the synthesis, it is found that climate resilience of tourism logistics and supply chains are influenced by inter-related environmental, economic, technological, and governance aspects. The results validate that robust logistics infrastructure lies at the core of the tourism destination sustainability amidst the intensifying climate risks.

Tourism Logistics and Supply Chains to Climate Risks

The review findings always show that a tourism logistics system is extremely vulnerable to both acute and chronic climatic risks. Extreme weather conditions such as cyclones, floods, heat waves, and wildfires are acute risk factors and lead to disruption of transportation networks, accommodation, and delivery of supplies very abruptly. Risks that are chronic in nature, including the increase of temperatures, rising sea levels, water shortage, and the degradation of the ecosystem, destroy logistics performance and destination reliability over time.

The most susceptible logistics element can be seen in the transportation infrastructure. Airports, ports, roads, and rail networks that are affected due to the climate lead to delayed arrival, lack of supply, and higher operational expenses. Destinations affected by other indirect threats like port damage and storm surges complicate the risks that coastal tourism destinations encounter, whereas the mountain and rural tourism destinations are confronted with limitations of access (landslides, variability of snowfall, and erosion). The results also emphasise the fact tourism supply chains

enhance climate effects due to the fact that service delivery is time sensitive and location bound and therefore there is no room to wait or to replace.

Cascading Effects of Climate Disruptions on Tourism Operations

An important observation made in the review is that climate disruptions are cascades in tourism supply chains. A failure at one of the logistics nodes tends to cause a failure throughout the system. As an example, food and beverage services, energy supply services, waste disposal services, and mobility of staffs are impacted by transport disruptions and as a result, it causes degradation of services in hotels, restaurants and attraction sites.

According to the literature, tourism supply chains are not redundant because they are cost-efficient models like the just-in-time delivery and centralized sourcing. Although under normal conditions these models reduce the inventory and operating costs, in the case of climate shock they reduce the adaptive capacity considerably. Due to this, the destinations have long durations of recovery, damaged reputation, and loss of tourists' trust. The results substantiate the fact that climate resilience demands the transformation in the models of logistics that are efficiency-driven to resilience-based supply chain models.

Role of Supply Chain Diversification and Localization

The effectiveness of supply chain resilience through supply chain diversification and localization has become one of the most vivid findings. Research has always indicated that the most susceptible ones to climatic shocks are destinations that have high reliance on remote suppliers of transport routes and fuel supplies. Conversely, those destinations which incorporate local suppliers, community level-based producers and regional logistics networks are more resilient.

The sourcing of food, materials and services locally lessens reliance on long route transportation, carbon emission and reaction time in the event of a climate occurrence. The results show that the local supply chains also produce socio-economic co-benefits in the form of making local livelihoods stronger, enhancing income stability, and making the communities involved in the development of tourism. Diversification of supply chain in terms of multiple sourcing choices and elastic supplier relationships also decreases the possibility of the whole system failure during severe weather conditions.

Green and Low-Carbon Logistics Practices Integration.

The review shows that there are strong reasons to believe that green logistics practices can be both a source of climate mitigation and adaptation goals. Low-emission transport modes, energy efficient transport infrastructure, renewable energy systems, and circular waste management can greatly decrease the carbon footprint of tourism and increase the operational resilience of tourism.

Hotels and destination management organizations that have adopted green logistics strategies have enjoyed cut costs on energy, increased regulatory adherence and improved brand image. The effective interventions listed to reduce climate exposure and operational risk include electric vehicles, cold chains that are powered by renewable energy sources, and sustainable packaging solutions. The results also show that green logistics is not just an environmental program, but a resilience strategic tool that enhances long-term sustainability of a destination.

Digital Technologies and Smart Logistics as Resiliency Enablers

The important discovery of the review is the increased role of digital technologies in promoting the resilience of tourism supply chains. Intelligent logistics systems provide real-time monitoring of products, advanced risk management, and mechanisms of early warning against climatic

disturbances. Digital tools enhance the accuracy of decision-making and enable destination managers to preempt any disruptions instead of responding to the crisis.

It is indicated in the literature that innovative applications of artificial intelligence, big data analytics, and models of network optimization are explored in the field of tourism logistics planning. These technologies assist in scenario analysis, prediction of demand and supply chain rerouting in the event of extreme weather. The results show that destinations that have embraced digital logistics tools have a shorter recovery period, less losses, and high adaptive capacity during climatic stress.

Governance and Institutional Co-Ordination in Resilient Tourism Supply Chains

The results underline that climate-resilient tourism logistics is not possible using the isolated firm-level initiatives. Successful resilience demands governance integration among various stakeholders, among which include policy makers, transport authorities, destination management organizations, suppliers as well as local communities.

Well-established institutions help in sharing information, pooling resources and sharing of risks. According to the literature, destinations that have integrated governance systems and those that have a partnership between the government and the business community stand in a better position to execute resilient logistics strategies. Incentives, regulatory alignment and investment of infrastructure is a decisive move towards facilitating green and resilient supply chain transitions. The results highlight the fact that governance coordination is an enabler of climate-resilient tourism logistics.

Climate-Resilient Tourism Supply Chains and the Economy

In economic terms, the review concludes that climate resiliency in logistics plans lowers the costs of long-term operations by incurring lower levels of losses during disruption and enhancing efficiency. Even though the costs of building resilient infrastructure and green technologies can be large initially, the economic advantages of this lie in the long term in the increased reliability, minimized emergency costs, and balanced tourism revenues.

Resilience supply chains save the economies that are reliant on tourism through continuity of services during the occurrence of climate shocks. The results underscore the fact that destinations that have robust logistics systems recover faster, maintain high visitor confidence, and have enhanced competitive advantages. Furthermore, the beneficial outcome of the resilience investments is the creation of the positive spillover impacts through the support of the employment and development of local enterprises.

Community and Social-Level Outcomes

The review indicates that tourism logistics that are resistant to climate have also substantial social benefits. Localized and diversified supply chains enable the small and medium enterprises, improve social inclusion, and decrease vulnerability among communities that rely on tourism. The logistics networks with communities lead to the development of common responsibility and resilience especially in rural areas and climate prone areas.

Sustained supply chains enhance availability of basic services and commodities in times of climate disruptions ensuring protection of both the visitors and inhabitants. The results indicate that accounting for social equity in the logistics planning enhances the destination resilience through the strengthening of trust, cooperation, and adaptive capacity within the community level.

Synthesis of Key Findings

All in all, the findings affirm that multidimensional and interdependent climate-resilient tourism logistic and supply chain strategies are interdependent. Diversification, green logistics, digital innovation, governance coordination, and engagement with communities combine the effects that lead to the creation of resiliency. The results confirm the main assumption of the paper that tourism sustainability is impossible to attain without introducing climate resilience to logistics and supply chain systems.

The integrated findings synthesis proves that strong tourism supply chains increase destination flexibility, minimize environmental effects, stabilize socio-economic systems, and contribute to the long-term sustainability objectives. The findings can offer a very sound empirical and conceptual basis to the next discussion, policy implications, and strategic recommendations.

Climate Risks in Logistics of Tourism

The results show that risks to climate are reflected in various logistics nodes, and they may be transportation delays, supply shortages, energy insecurity, and failures in waste management. These uncertainties make operations very uncertain and costly.

Discussion

The results verify the hypothesis that climate change is a systemic risk of tourism logistics and supply chains, not only as far as the effects on the destination level but also as the operational core of tourist systems. Due to the nature of the tourism supply chains, which are service-led, time-sensitive and spatially constrained, the disruption of transport, energy and supply network caused by climate change is easily translated into service failures, economic loss, and destination uncompetitiveness. This highlights the importance of integrating climate resilience into the tourism logistics planning on a straight scale.

The discussion outlines the constraints of efficiency-based logistics models that are normally applied in tourism. Regular practices like sourcing centrally, and just-in-time delivery make them more vulnerable to the impacts of climate stress. In comparison, supply chains in the tourism sector are more resilient when they are designed with the concept of flexibility, redundancy, and adaptability to mitigate and rebound the effects of climate shocks. The diversification of supply chains and localization become one of the most effective options that would enhance the reliance on long-distance logistics and r/123

Green logistics initiative is also in a two-fold role, as it helps mitigate the climate and at the same time adapt to the climate. Circular logistics models Low-carbon transport, the use of renewable energy, and the reduction of environmental effects make operations more reliable. Moreover, the digital technologies can enhance resilience by facilitating real-time monitoring, forecasting, and responding to disruptions associated with climate, although the lack of equal access to digital infrastructure is still an issue in certain destinations.

The results also underscore the issue of governance and stakeholder cooperation towards realization of climate-resilient tourism supply chains. Information sharing, collective risk management and efficient implementation of resilience strategies is achieved through coordinated institutional structures and the establishment of public-private partnerships.

Generally, the discussion supports the idea that climate resilient tourism logistics and supply chain strategies are key elements of sustainable destination development. Resilience principles built into logistics systems increase adaptability, decrease vulnerability and contribute to economic, environmental, and social sustainability in the long term in the context of climate change.

Implications of Policy and Management

The areas of concern of policymakers should be dominant in resilient investments in infrastructure, regulatory incentives of green logistics, and public-private partnership. Climate risk assessment should be incorporated in supply chain planning by the destination managers.

Conclusion

Global warming continues to be an increasing and multiplier risk to tourist destinations, especially in the form of its disruptive effects on logistics and supply chain systems on which tourism is based. The paper points out that tourism supply chains are particularly susceptible to service-based, time-sensitive and place-based disruption caused by climate related issues including extreme weather, damage to infrastructure as well as the lack of resources. The results highlight that existing efficiency-based logistics frameworks are not sufficient when the climate is becoming more unpredictable and instead have to be substituted with the resilience-focused logistics models that focus more on diversifying and localizing logistics, implementing green logistics policies, digitalizing logistics, and coordinating governance. Incorporating climate resilience in tourism logistics and supply chain planning increases the adaptive capacity, minimizes the environmental footprint, secures the livelihoods of tourism and makes the destination competitive in the long term. Finally, climatic resilience tourism logistics and supply chain practices, are not only critical towards risk management, but also a strategic roadmap towards sustainable and resilient tourism destinations.

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