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Investigating the Climate Change, Natural Disasters and Tourism Industry in Himachal Pradesh, India

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Abstract

Tourism is a major global economic sector undergoing tremendous growth in emerging economies and is often touted as salient for development and poverty alleviation in developing countries. Tourism is recognized as a highly climate-sensitive sector, one that is also strongly influenced by environmental and socioeconomic change influenced by climate change. This research examines climate changes and natural disasters' ramifications on tourism businesses in Himachal Pradesh, India. It encompasses factors such as supply chain interruptions, distribution network inefficiencies, and trade blockades affecting market demand, tourist influx, information technology issues, and the necessity for risk management in changing climatic conditions. Additionally, the demographic profiles of 500 respondents are analyzed to understand the specific challenges tourism businesses face. The findings of this research contribute to the understanding of the complex interplay between climate change, natural disasters, and tourism in Himachal Pradesh. They serve as a foundational framework for formulating strategies geared toward augmenting the resilience and sustainability of tourism enterprises when confronted with these challenges, ultimately ensuring the enduring prosperity of regions heavily reliant on tourism.

1. Introduction

Climate change is the greatest challenge of the century and inevitably affects society, the environment, and business operations (Dwivedi et al., 2022; Schneider et al., 2011). Almost always, climate change is regarded as a topic of international concern. However, there is still a lot of contention concerning the seriousness of the threat of climate change. Scientists studying the effects of climate change have identified that climate change is approaching faster than predicted and now needs immediate action. Although climate change has received considerable public and government attention there-after, recent studies show that several participating countries are falling short of the GHG targets set in the Paris Climate Deal, thus accelerating the consequences of climate change risks (Diffenbaugh et al., 2018).

The exposition of climate change includes higher temperatures, altered rainfall patterns, and frequent or intense extreme weather events such as heat waves, drought, floods, cold spells, and storms. The disruption costs due to extreme weather conditions have increased considerably (Halldórsson & Kovács, 2010; Nyaupane & Chhetri, 2009). However, notwithstanding existing regulatory responses, according to a report by the World Economic Forum (WEF), climate change and natural disasters are among the top global risks for businesses in terms of their potential impact on tourism and transport sectors (Băhnăreanu, 2019; Diabat & Simchi-Levi, 2009). Consequently, this research paper aims to explore the various effects of climate change and natural disasters on the tourism industry.

2. Literature Review

Various factors and forces shape tourism, including exogenous ones without a direct link with the tourism sector. Natural disasters and unexpected events are prime examples of such determining factors, as they profoundly affect individuals and society and can potentially affect tourism flows considerably. The link between tourism demand, mobility, and climate change has been the object of continuous attention by scholars

in the last 10 years. Through climate indexes, (Carrillo et al., 2022) studied the effects of climate change to measure the attractiveness of tourist destinations.

Gössling et al. (2012) assessed the influence of climate change on tourism demand, providing a framework for better comprehension of tourists' consumer behavior and demand response to climate change. Neumayer & Barthel (2011) analyzed the economic damage from climate-related disasters and found no significant upward trends in normalized data globally over the last 30 years. However, the same study acknowledged that the frequency of weather-related natural disasters indicates an upward trend. The most direct inhibitors of tourism business relate to the damage inflicted by a disaster that prevents the affected areas from engaging in tourism activity.

Secondly, the physical transportation and supply chain constraints created inefficiencies (Kozak et al., 2007; Sönmez et al., 1999). In many cases, disasters pose significant physical constraints on the delivery of tourism services, thus severely limiting the supply side of tourism (Shaw et al., 2012). Critical infrastructure could be compromised or dysfunctional depending on the type and extent of the disaster. Prominent examples include airports and ports, land transport infrastructure, and electricity and telecommunication networks (Ghobarah et al., 2006; Parajuli & Haynes, 2015). In addition, core tourism assets such as accommodation establishments and key attractions could be damaged and not ready for business.

For instance, Shrestha (2021) earthquake in Kathmandu, Nepal, resulted in the widespread destruction of UNESCO-listed World Heritage sites, and several trekking routes were deemed unsafe due to risks of rock falls and movements following further aftershocks or heavy rain events (Buckley et al., 2015). Even longer-term and insidious disasters, such as drought, may impede the ability of a destination to cater for tourism. A recent example was the water shortage in Cape Town, South Africa, which reduced tourism and a notable loss in income for local businesses.

The decline was possibly influenced by requests to conserve water. Climate change and disasters convey the resulting loss of life, human suffering, public and private property damage, and economic and social disruption. The ensuing negative publicity often characterizes the period after a disaster, lasting until full recovery is achieved and pre-disaster conditions resume (Sönmez et al., 1999). For instance, Cohen et al. (2005) point out that religious beliefs relating to the bodies of the tsunami victims trapped in sediment and rubble were behind a group of Asian tourists deciding to abandon their plans to visit Thailand after the 2006 Tsunami.

Others may simply consider it inappropriate to visit a disaster zone. Apart from religious or ethical concerns, some travelers do not wish to impede recovery and place additional burdens on the destination's resources and infrastructure (Becken, 2015). In some cases, the local tourism organizations deliberate and lead the delayed recovery of previous tourism figures. It was the case for Christchurch (Elliott et al., 2012), where extensive destruction of the city made tourism impossible, or at best, would have led to unsatisfactory tourist experiences, leading Christchurch Canterbury Marketing to de-market Christchurch but promote surrounding regions instead (Orchiston & Higham, 2016).

While both theory and empirical evidence point to a decline in tourism following a disaster, the present research hypothesizes a negative relationship between national disasters and tourism business. Thus, the main objective of this research is to assess the impact of climate change and natural disasters on the tourism business in Himachal Pradesh.

3. Materials and Methods

This study comprises two distinct stages, employing an empirical research methodology. It leverages both primary and secondary data to provide a comprehensive understanding of the research objectives. Here's a concise summary of the research methodology:

3.1. Data Sources

This study uses primary and secondary data. Primary Data: Initial data collection involved interactions with tourist business owners and enterprises in Himachal Pradesh, primarily within the Kullu district. Two schedules were meticulously designed and pre-tested to ensure accuracy and relevance to the small business context. Secondary Data: Published and unpublished documents and reports from both the central government and the Himachal Pradesh government were used to complement the primary data. Extensive personal visits were made to key organizations, including the Himachal Pradesh Small Industries and Export Corporation, Himachal Pradesh Industrial Development Corporation, Himachal Pradesh Economics and Statistical Organization, and Himachal Pradesh Directorate of Industries.

3.2. Data Collection Techniques

For primary data, demographic information of the respondents was gathered through a common questionnaire, interviews, and scheduling, ensuring a comprehensive insight into the small business owners.

3.3. Design of the Study and Sample

The study employed a probability sampling method, specifically stratified random sampling, to account for the diversity of the tourist business landscape. This approach aimed to achieve a true representation of the entire universe. The universe of this study was geographically limited to the Kullu district,

encompassing regions like the Parvati Valley and areas above Manali. Stratification was based on respondents' ages, gender, educational levels, family incomes, company types, business locations, and marital status.

3.4. Sample Size

The sample size was determined using the population proportion, and it involved selecting 500 business owners from the tourism and related sectors with diverse demographic profiles within the Kullu region.

3.5. Data Analysis

The study employed Exploratory Factor Analysis to identify key factors influencing the tourist business environment. Data analysis involved a range of statistical tools, such as mean, percentage, standard deviation, correlation, and relevant hypothesis testing. Cross-sectional analysis was utilized to uncover potential relationships wherever applicable. This research methodological framework enabled a holistic exploration of tourist business enterprises in Himachal Pradesh, shedding light on the intricate interplay of factors that influence their operations and success.

4. Results and Discussion

Climate change and climate variability pose substantial challenges to transportation and warehousing systems. These impacts are not merely the result of meteorological events such as storms, floods, and heatwaves but are also deeply intertwined with the vulnerabilities of the networks they disrupt. Transportation networks serve as critical lifelines for economic and social activities and are increasingly exposed to climatic stresses, with far-reaching consequences for interconnected systems like supply chains. As these disruptions become more frequent and severe, they highlight the urgent need to address network vulnerabilities through robust planning and adaptation strategies.

Transportation systems are particularly vulnerable to climate-related fuel and electricity supply interruptions, which are essential for their operation. Extreme weather conditions often damage infrastructure, delay transit schedules, and impede access to vital services. For instance, hurricanes and floods can wash out roads and turn off railways, and ground air travel, resulting in widespread delays and economic losses. Additionally, communication networks, which are integral to coordinating transportation and logistics, are also prone to disruptions during climatic events, compounding the challenges the transportation sector faces.

Warehousing, a critical component of the supply chain, is similarly affected when transportation networks are compromised. Extreme weather events can delay the delivery of goods to warehouses, creating bottlenecks in the storage and distribution process. Perishable items, such as food and pharmaceuticals, are particularly at risk of spoilage during delays, while non-perishable goods face increased storage costs and risks of damage due to prolonged exposure to unsuitable conditions. Moreover, raw materials required for manufacturing processes may arrive late, causing production halts and economic losses for businesses reliant on just-in-time supply chain models.

The ripple effects of climate change extend beyond transportation and warehousing to impact broader economic systems. For instance, disruptions in supply chains and logistics can lead to shortages of essential goods, driving up costs for consumers and businesses. This, in turn, can have a destabilizing effect on local economies, especially in regions heavily reliant on trade and tourism. Addressing these challenges requires coordinated efforts to enhance the resilience of infrastructure and ensure the continuity of critical supply chains under adverse climatic conditions.

Within the tourism industry, climate change exerts a profound influence across multiple dimensions. Alterations in weather patterns and the increasing frequency of extreme weather events discourage tourist visitation to affected regions. Destinations that rely heavily on seasonal tourism are particularly vulnerable, as unfavorable weather conditions during peak seasons can significantly reduce revenue. Furthermore, disruptions in transportation networks limit accessibility to tourist destinations, compounding the challenges faced by the industry.

The economic repercussions of these changes are considerable, given that tourism is a primary revenue source for many regions. Prolonged disruptions reduce tourist inflows and limit access to essential goods and services required to sustain the industry. Local businesses, from hotels to restaurants and tour operators, often face financial instability during such periods, leading to job losses and reduced incomes for communities dependent on tourism.

Additionally, the aesthetic and ecological value of tourist destinations is increasingly compromised by climate change. Rising sea levels, deforestation, and the intensification of natural disasters degrade many regions' natural beauty and cultural heritage. Coastal areas face significant risks of erosion and flooding, while wildfires and deforestation impact mountainous and forested regions. This environmental degradation diminishes the appeal of these destinations, reducing their ability to attract visitors and sustain tourism enterprises.

Thus, the multifaceted impacts of climate change on transportation, warehousing, and tourism underscore the interconnectedness of environmental factors and economic systems. These challenges necessitate a comprehensive approach to building resilience across sectors. Investments in climate-

resilient infrastructure, enhanced early warning systems, and sustainable practices in supply chain and tourism management are essential to mitigating the impacts of climate change. By addressing these vulnerabilities proactively, stakeholders can safeguard critical industries, promote economic stability, and ensure the long-term sustainability of regions affected by climate change.

5. Conclusions

In conclusion, climate change and variability pose significant challenges to transportation and warehousing systems. These systems are susceptible to extreme weather events and increasingly vulnerable due to their interconnectedness with other sectors like energy and communications. Transportation networks, for example, face disruptions from direct weather impacts and fuel, electricity, and communications interruptions, all further stressed by climatic conditions. As a result, supply chains, including the transportation of perishable goods or raw materials, are compromised, highlighting the broader impact of climate-induced disruptions. This interconnectedness between climate change and the logistics infrastructure underscores the need for comprehensive risk management strategies to mitigate these vulnerabilities.

Furthermore, the broader implications of these climatic disruptions extend beyond transportation and warehousing to impact the tourism industry, a key sector for many regions' economies. Shifts in tourist patterns and disruptions in supply chains and infrastructure can lead to severe economic consequences, especially in areas dependent on tourism revenue. The visual and aesthetic qualities of tourist destinations are also threatened by climate change, potentially diminishing their attractiveness. These cascading effects underline the need for industries, particularly tourism, to adapt to the evolving challenges posed by climate change. The cumulative impact on logistics and tourism reveals the urgency of addressing environmental risks to ensure these critical sectors' long-term sustainability and resilience.

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