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**Catastrophe of Environment: The Impact of Natural
Disasters on Tourism Industry**

Ruhet Genç

Associate Professor

Turkish German University, Turkey

drgench@gmail.com

Article

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Abstract

Natural disasters have a catastrophic impact on the lives of humans, interrupting their social and economic activities to a great extent. Communities that are located in high-risk regions encounter greater challenges in developing a resilient and sustainable tourism economy (Tsai et. al., 2016). The past examples of tsunamis, earthquakes, volcanic eruptions all over the world have shown that there are two sides of the issue in terms of tourism sector. First, the devastating effects of the natural disaster slow down the tourism sector like all other activities in a particular destination. On the other hand, the natural disasters are capable of fostering the strong feelings of solidarity (Goodwin, 2005), luring the global interest to the region for further economic opportunities, including tourism. The aim of this manuscript is to investigate the influence of drawbacks and possible positive impacts of natural disasters on tourism activities and to model them in a proper manner. The paper will start with a body of literature on the impact of natural disasters on the tourism industry based on the previous studies. The study will be dealing with the question how natural disasters have an impact on tourism through economic aspects, destination image and the degree of community activity. The methodology will be literature review and critical evaluation of the findings. Finally, a model will be suggested

Corresponding Editor

Ramesh Raj Kunwar
kunwar.dr@gmail.com

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in order to provide a quantitative analysis for the natural disasters, including the possible related economic and social variables.

Introduction

Natural disasters, such as earthquakes, tsunamis, volcano eruptions etc. have been historically causing disastrous impact on the lives of people. In the last 20 years, a global increase in the damage coming from natural disasters has been recorded where the death ratios in low income countries are considerably higher (Kirchberger, 2017, p.41). Recent examples in the past, like Indian Ocean earthquake and Tsunami in 2004 or Haiti earthquake in 2010, stand as clear examples for how catastrophic can be such natural disasters. In such instances, thousands of residents and tourists died or severely wounded and millions of people have been affected. Apart from fatalities, homelessness and economic loss are two prominent dangers that the regions suffering from natural disasters may encounter (Yan & Bissell, 2015, p.2). The catastrophic impact of a natural disaster directly shows itself as damage in buildings including houses, hospitals, schools, factories etc. where people are spending their daily lives or meeting their needs, and further it decreases the motivation of people to take part in economic activities since they may be concerned with the loss of their relatives or properties.

As in all economic activities, tourism sector and touristic destinations are vulnerable to natural disasters, the intensity of which has been rapidly increasing in the next years with respect to climate change (Walters et. al., 2015, p.101). First of all, the occurrence of natural disasters tends to decrease the overall arrivals of international tourists (Peters & Pikkemaat, 2006). Since tourists usually prefer a destination in order to find some rest, the existence of a natural disaster threat or presence of an emergency situation in a touristic destination, tourist will consider other touristic destination alternatives to maximize their utility that they receive from tourism activity. Consequently, economic revenues that a destination receives decrease sharply parallel to the decrease in the number of tourist arrivals, hence the damage that the location gets from natural disaster deepens even further. Nevertheless, the impact of natural disaster is present even if there is no actual natural disaster occurred, and rather there is just a probability for such instances. In other words, travel decisions are made by taking the possible risks into consideration. Therefore, risk perception of tourists combined with the risk analysis on the natural disaster help to understand the dynamics behind such economic and social behaviors.

Although previous literature provides valuable information about natural disasters and their impact on tourism, there has been no study conducted to model the relationship between the variables. The target of this study is to evaluate possible social and economic factors that are capable of explaining the impact of natural

disasters on tourism sector. The research question is therefore how natural disasters have an impact on tourism through three socio-economic main variables, namely economic aspects, destination image and the degree of community activity. By providing a model for the measurement of the impact, the study will open a new pathway for the quantitative analysis of the relationship between natural disasters and tourism sector.

The effect of risk perception in tourism

By definition, risk perception refers to the extent of awareness for a specific issue and its consequences on one's close environment that shapes individual policy preferences, civic engagement, adaptation behavior and other type of responses (Lee et. al., 2015, p.1). In other terms, risk perception is the individual interpretation of a potential risk, regardless of the size of threat in its essence. Since the precise prediction of future natural disasters is practically impossible in the real world settings, scholars focus on assessment of risk perception for individuals which is crucial to find a solution to cope with unforeseen accidents (Yamamura, 2016, p.143). After the development in the means of transportation and increasing competition in the global tourism market, tourists have multiple options for travelling as opposed to past, hence when they perceive high risk in a particular area, they are more likely to focus on other options rather than insisting on traveling to these destinations. Although this does not mean that tourists will not visit a destination with natural disaster risk at all, risk perception can be considered as a good indicator for local authorities or local stakeholders to take the risk of natural disasters into consideration and take measures accordingly.

However, the study conducted Park and Reisinger (2010) suggests that perceived influence of natural disasters and international travel risks differ significantly for tourists with respect to cultural background, socio-demographic properties and economic power. For example, low income level tourists are more concerned about natural disasters compared to high-income profiles, probably because they have less money and they would like to maximize their benefit from such travel trips, and therefore they avoid from making risky travel plans where they encounter adverse impacts of natural disaster (Park & Reisinger, 2010, pp.20-21). In addition to this, a recent study on tourist risk perception for travel decisions, Rittichainuwat et. al. (2018) founded that the risk perception of tourists are related to natural disaster occurrence frequency and destination specific whereas the probability of a natural disaster perception is significantly determined by proximity of a risky area as well as past experience that tourists have witnessed in their lifetime. The risk perception is therefore closely related to the concept of destination image, which implies the overall attributes of a specific destination that include the extent that the destination is capable of overcoming a threat of natural disaster. In this sense, as the destination

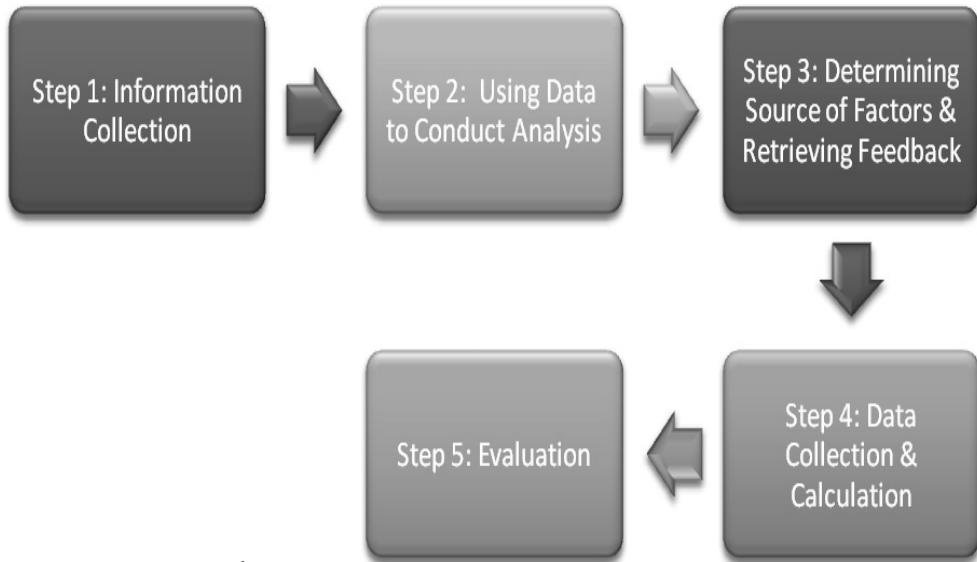
performs a successful crisis management at a time of natural disaster, tourists will be informed about this and they may feel secure to choose that destination, at least for next tourism periods, despite the occurrence of emergency situation.

In short, there are many factors that influence the risk perception with respect to background of individuals and for this reason; both academic investigation and policy development need to take this diversity into consideration in order to achieve better outcomes. Nevertheless, providing a secure environment for tourism with precautions for natural disasters such as strengthening the construction of buildings, monitoring building materials, emergency plans and so on, as well as initiating a well-functioning crisis management with a clear division of responsibilities in case of an emergency situation.

Risk assessment for the impact of natural disasters in tourism

Local or national authorities work on precautions in various ways in order to diminish the negative impact of natural disasters. For instance, promotion of bio-shield through coastal vegetation has been a common practice in the last decade, as they provide a natural protection and a method of disaster management against natural disasters such as storm surges or tsunamis (Feagin et. al., 2010, p.1). However, none of these precautionary applications will work properly without analyzing the risks in a proper manner, hence risk analysis are conducted as the first step for overcoming the adverse impacts of natural disasters.

Risk assessment for the natural disaster is an important process in order to evaluate the possible damage of the risks and take some measures before they cause massive amount of loss of life and property. For that reason, academicians as well as policy makers have been focusing on risk analysis of natural disasters. As suggested in the study by Tsai and Chen (2011) risk analysis is conducted into five main steps. Figure 1 summarizes the procedure:

Figure 1: Natural disaster risk assessment steps in tourism

Source: Tsai & Chen, 2011.

To begin with the first step, basic information is collected for evaluating the construction of tourism facilities including the value of building, total value of contents, business volume, number of floors, year of construction, location and so on. After this, previously collected specified data and different disaster risk assessments are used to conduct the environmental analysis with geographic information system. Third, the source of factors that may have an impact on a natural disaster is determined and the feedback derived from environmental location disaster risk assessment. Next, the data are collected from local sources and the risk assessment index is calculated by using a formula for the degree of earthquake damage that takes geological conditions, existing building conditions, social-economic conditions, conditions of disaster prevention, conditions of refuge and disaster-relief and risk management strategies. Finally, the drawbacks of risk management are evaluated to improve the assessment for the risk of natural disaster (Tsai & Chen, 2011, pp.164-165).

Having discussed the methods for risk assessment, the paper will first discuss three main aspects of the damage of natural disaster on tourism namely the total revenues in a destination, destination image and the level of community activity, and then a model will be suggested in order to depict the relationship between those variables.

Determinants of the impact of natural disasters on tourism

In this section, the impact of natural disaster will be carefully investigated through three different aspects, including economic situation, destination image, and

the communal solidarity, and then these aspects will be considered in a suggested model. To begin with, natural disasters such as tsunamis and earthquakes have a direct impact on certain aspects of economy, such as housing and labor market, in an excessive manner (Kirchberger, 2017, p.42). Although some scholars claim that even extremely large disasters do not have any significant impact on economic growth in the long run (Cavallo et. al., 2013), rising death tolls and loss of property directly influence all sectors in a particular destination. In an emergency situation, the target of the economy would not be maintaining product and service supply; rather the community will concentrate on recovering the damage of natural disaster as rapidly as possible. Besides that, post-disaster effect of natural disaster is hard to overcome, as most of the buildings (schools, hospitals etc.), factories and other production facilities, and - for tourism sector - hotels, restaurants, etc. will require reparation and restoration. As a result, one of the main variables that indicate the damage of natural disaster can be considered as the change in total revenues, which constitute direct economic loss (labor force, properties etc.) as well as indirect economic slowdown that prevents future economic gains in the destination.

Furthermore, a natural disaster is likely to cause dire consequences on the destination image of a particular tourism region. In the early tourism literature, the motivation of tourists for travelling have been distinguished into two categories, namely “push” and “pull” factors, where “push” factors denote personal needs such as escaping the city or relaxing, whereas “pull” factors indicate the destination-specific attributes like a desire to see a particular attractions, landscapes or events in a specific destination (Dann, 1977, p. 187). When travelers witness the preparedness of a destination for a possible natural disaster from the media or a post-disaster situation cannot be managed successfully, destination image of this region is badly affected, leading to adverse further impacts on the economy of this destination, since travelers would be less likely to consider going that place for touristic purposes. Previous studies have shown that when a destination image of a particular travel place is considerably low due to concerns about safety or economic stability, then the opportunities of economic recovery, such as new investments or new visitors, will be diminished (Walters et. al., 2015, p.111). For that reason, the second main variable for measuring the impact of natural disaster is destination image, as it is an important determinant factor for post-disaster travel decision and hence, the economic future of this particular tourism region.

However, the impact of natural disasters is not limited to negative ones. For instance, the study conducted by Yamamura (2016) revealed that the Great Hanshin-Awaji earthquake occurred in Japan in 1995 contributed to the participation in community activity by increasing the interaction among people and voluntary collective action due to an emergency situation. At the times of catastrophic events,

the solidarity bonds within a society get strengthened since most of their co-residents or citizens are in misery. As individuals witness the hardships around them, or if they have ever experienced such a disastrous natural accident in their lives, they are motivated to help other people to cover their losses by participating into these community activities, including voluntary medical treatment, housing or food provision or financial support. Therefore, the level of community activity should be considered as the third and last main determinant for the impact of natural disaster, indicating the positive aspects after a natural catastrophe.

The model

In the light of explanations based on the existing literature in the previous section, the model can be written as:

$$(1) \text{ ND} = \beta_0 - \beta_1 \cdot \text{TR} - \beta_2 \cdot \text{DI} + \beta_3 \cdot \text{CA} + \varepsilon$$

where,

ND implies the *impact of Natural Disaster on tourism sector*

TR implies *Total Revenues*

DI implies *the level of Destination Image*

CA implies *the degree of Community Activity*

β_0 , β_1 , β_2 and β_3 imply coefficients, and

ε implies residual (i.e. the effect of other variables).

According to the model, total revenues, the level of destination image and the degree of community activity are three main variables by which the effect of natural disasters on tourism sector can be explained. In this model, total revenues and the level of destination image variables are considered as negatively related to natural disasters, since the presence of a catastrophe directly decreases the economic revenues in a particular destination as well as popularity for tourism activity due to safety reasons. On the other hand, natural disasters may boost the community activities, which will increase future investments or other type of social benefits. In addition to this, there might be other variables that are capable of explaining the variance in the level of the effect of natural disasters on tourism sector that the suggested model has not captured. Therefore, a residual is presented in the model, denoting the variance that cannot be explained by the three variables.

It should be also noted that this model is suitable for any kind of numerical data because the target of model presented in this study is to measure the damage of natural disaster in a quantitative manner. By modeling the damage of natural disaster on tourism sector with respect to three main variables, the research allows the measurement through statistical analysis and a mathematical structure for

investigation rather than subjective methods which decrease the objectivity and reliability of findings.

Conclusion

In conclusion, natural disasters may create long-lasting impacts on the lives of people, and as an outcome of this, tourism sector may be negatively affected due to labor power decrease and damage in tourism facilities or worsening destination image with respect to bad management of crisis. However, at the same time, touristic destination may change the natural disaster crisis into an opportunity for future investment in the region, by enhancing community support towards the region with a well-organized crisis management. Therefore the disaster management appears as an important strategy for many touristic destinations, since it is impossible to say exactly when a natural disaster will happen and to what extent it will be effective.

Furthermore, the burden of natural disaster precautions or crisis management is not solely on a specific actor. According to the previous findings in the crisis management, both government bodies and actors in the market play a significant role in prevention of disaster before they occur as well as post-disaster actions in order to cope with the negative impacts (Yamamura, 2016, p.144). The emergency situations are the times where people come together and cooperate to overcome the misery in a destination, since everyone would be adversely affected by the disaster regardless of their socio-economic, ethnical or cultural background. Therefore, public-wide decisions should be taken collectively for the measures of natural disasters, such as related to obligatory construction materials for buildings, ensuring periodical check for security systems, emergency plans for a possible natural catastrophe and organization of a community action. All in all, natural disasters are threat for the whole society in a region, thus the steps to overcome the negative impacts of a disaster would require solidarity, mutual support and collective action.

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