© IJARW | ISSN (O) - 2582-1008
November 2026 | Vol. 8 Issue. 5
www.ijarw.com

EFFECT OF PALACAPAO HIGHWAY LANDSLIDE ON TOURIST ARRIVALS AND AFFECTED LOCAL TOURISM BUSINESSES

Mary Cris Abay-Abay Callo[1], Weiss Myer Monares Gesulga[2], Analen Gabito Amboy[3], Jessa Colis Oscar[4], Maiah Elna Mamburam Lituanias[5], Drew Stacey Sophia Ranario Paloma[6], Annie Fritce A. Aballe[7]

Central Mindanao University, Musuan, Maramag, Bukidnon, Philippines

ABSTRACT

The main purpose of this study is to determine how the Palacapao Highway landslide affected tourist arrivals and local tourism businesses in Quezon, Bukidnon. Using a descriptive-correlational quantitative design, it assessed landslide impacts in terms of duration of road closure, severity of the landslide, and level of accessibility disruption, then evaluate the effect on tourist arrivals and decline in visitors' frequency and business performance in terms of revenue loss, decline in customer arrivals, and changes operations. The researchers use purposive sampling in determining the respondents of the study, which resulted to a total population of forty (40) respondents. Data were gathered via a structured questionnaire and analyzed using descriptive statistics, Wilcoxon signed-rank test, Shapiro-Wilk test of normality, and Spearman's rank-order correlation. Findings showed the landslide caused Very High Effect on accessibility, tourist's arrivals, and business performance—most notably on revenue loss, customer decline, and access disruption. All key indicators including arrivals, revenue, operating hours, and delivery efficiency dropped significantly after the landslide. Strong positive relationships were confirmed: greater landslide disruption corresponded to worse declines in tourist arrivals and business performance.

Keyword Palacapao Highway landslide, tourist arrivals, local tourism businesses, accessibility disruption, business performance

1. INTRODUCTION

Tourism is an important source of economic growth in the municipality of Quezon and the entire province of Bukidnon. It creates jobs, provides steady income for local families, and supports many small businesses such as lodging houses, restaurants, souvenir stalls, transport services, and roadside food vendors. Tourism in Quezon depends heavily on the Palacapao Highway — the main road that connects the municipality to nearby towns and brings visitors directly to local attractions. When this essential route is damaged or closed, the movement of tourists and the daily operations of local businesses are immediately and deeply affected.

A severe landslide struck the Palacapao Highway in Quezon, Bukidnon, resulting in a full road closure. This event blocked the primary access used by travelers and visitors, extended travel time significantly, reduced the flow of vehicles, and forced people to take longer, harder, or less reliable alternative paths. These disruptions produce clear effects on tourism in the area. Fewer tourists arrive, repeat visits become less frequent, and local tourism-related businesses experience drops in customers and daily earnings. Dhakal et al. (2020) explained that similar landslide-induced road blockages produce serious effects on visitor arrivals and lead to considerable loss of income in communities that depend mainly on one main access road.

The effects of such events are clearly observed in tourism establishments. Businesses report fewer customers, lower daily sales, shorter operating hours, and changes in staffing when access routes are disrupted. Rindrasih et al. (2016) confirmed that these kinds of changes in business performance are direct effects of poor or blocked access — when roads become unsafe or unavailable, tourists delay or cancel their trips, and local enterprises lose the steady stream of visitors they need to keep running. In Quezon, where most tourism businesses rely entirely on the Palacapao Highway to receive guests and bring in supplies, these effects are expected to be felt throughout the community.

While many studies have discussed natural disasters and tourism in general, there is very limited research that focuses specifically on

Quezon, Bukidnon — especially the effects of a landslide on the Palacapao Highway on tourist arrivals and local tourism businesses. This study addressed that need. Its main purpose was to identify and describe the effects of the Palacapao Highway landslide in Quezon on tourist arrivals and affected local tourism businesses. The information gathered from this study will guide the Local Government Unit of Quezon, business owners, and tourism planners in understanding how such events influence the area, improving road safety, preparing better disaster response plans, and building stronger, more sustainable tourism in the municipality.

1.1 Objectives of the Study

The main objective of this study was to determine the effects of the Palacapao Highway landslide on tourist arrivals and affected local tourism businesses.

Specifically, this research aimed to:

1. Assessed the extent of the effects of the Palacapao Highway landslide on:
   1.1 Duration of road closure;
   1.2 Severity of the landslide; and
   1.3 Level of accessibility disruption;
2. Determined the effect of the landslide on tourist arrivals in the affected area regarding:
   2.1 Volume of tourist arrivals; and
   2.2 Frequency of visitor visits;
3. Identified the effect of the landslide on affected local tourism-related businesses through:
   3.1 Revenue loss;
   3.2 Decline in customer arrivals; and
   3.3 Changes in business operations;
4. Compared the significant differences in business performance indicators before and after the landslide regarding:
   4.1 Average monthly tourist and customer arrivals;
   4.2 Average monthly revenue;
   4.3 Number of operating days; and
   4.4 Transportation and logistics costs; and

5. Establish whether a significant relationship existed between the extent of the landslide effects, tourist arrivals, and the performance of affected local tourism businesses.

2. METHODOLOGY

This chapter presents the methods and procedures that were used in this study. Specifically, it describes the research design, research design, research locale, respondent of the study, research instrument, data gathering procedure, statistical treatment and ethical consideration applied to determine the impact of the Palacapao Highway landslide on tourist arrivals and affected local tourism businesses in Bukidnon.

2.1 Research Design

This study employed a descriptive-correlational research design using a quantitative research approach to determine the effects of the Palacapao Highway landslide on tourist arrivals and local tourism-related businesses in Bukidnon. Descriptive research is appropriate because it systematically describes the extent of the landslide's impact on accessibility, tourist arrivals, and business operations as they naturally occur (Creswell & Creswell, 2018). The correlational component of the study is used to determine whether a significant relationship exists between the extent of landslide effect, tourist arrivals, and local tourism business performance without manipulating the variables under investigation (Fraenkel et al., 2019).

The study employed a comparative before-and-after analysis using available numerical records on tourist arrivals, business revenue, operational days, and transportation costs before and after the landslide event to quantitatively assess changes associated with the disruption. This research collected primary data using structured, close-ended questionnaires with Likert-scale responses.

2.2 Locale of the Study

The study was conducted in tourism-affected areas in Quezon, Bukidnon, Philippines, particularly municipalities and tourism corridors directly influenced by the disruption of the Palacapao Highway caused by the landslide. The locale includes tourism establishments such as lodging facilities, restaurants, souvenir shops, transportation providers, and other tourism-related micro, small, and medium enterprises whose operations are dependent on visitor accessibility through the affected highway. The study area was selected because it represents the primary zone directly affected by the landslide

and contains businesses and tourism sectors most vulnerable to accessibility disruption.

The landslide resulted in road closures and limited accessibility, which affects transportation flow, tourist arrivals, and business performance. This locale is selected to examine how transportation disruption influences tourism demand and the operations of local tourism-related businesses in Bukidnon.

Palacapao lay along the main highway that connected Quezon, Bukidnon to nearby towns and major tourism destinations. This location was important because the highway served as the primary access route for tourists and visitors traveling to the area. When the landslide occurred, it directly blocked this main road, making the location especially meaningful — the map clearly showed that the affected communities and tourism businesses depended entirely on this highway to receive visitors and transport goods.

The study covered a total of 15 tourism-related establishments in the area that were most directly affected by the road closure. These businesses included 10 local vendors who served food and refreshments to visitors and travelers, and 15 souvenir shops that sold local products, gifts, and native items to tourists. The operations of all these establishments relied heavily on easy access through Palacapao Highway to receive visitors and sustain their daily income.

2.3 Respondent of the Study

The respondents of the study consisted of owners, managers, and operators of tourism-related businesses, as well as representatives from local tourism offices in affected areas of Bukidnon. These respondents are selected because they possessed firsthand knowledge regarding changes in tourist arrivals, revenue generation, accessibility, and operational adjustments following the landslide event.

A purposive sampling technique was employed in selecting respondents. Purposive sampling is appropriate when participants are deliberately chosen based on characteristics relevant to the objectives of the study (Etikan et al., 2016). This sampling method is suitable because the study specifically requires participants who were directly affected by the highway disruption and who are actively involved in tourism-related economic activities. To qualify for inclusion, respondents must: (1) operate or manage a tourism-related business or office within the affected area, (2) have been operating for at least one year prior to the landslide incident, and (3) voluntarily consent to participate in the study.

For descriptive-correlational studies using structured surveys, a sample size of 30 to 50 respondents is typically sufficient to achieve meaningful statistical analysis while maintaining depth of data collection (McCabe et al. 2024).

2.4 Research Instrument

The primary data-gathering tool employed in this study was a structured questionnaire entirely adopted from related literature and previously validated research instruments. The instrument was organized into two sections: objective numerical records and perception-based indicators.

The first part gathered objective numerical information on: average monthly tourist and customer arrivals before and after the landslide; average monthly revenue before and after the landslide; average number of operating days before and after the landslide; and average transportation and logistics costs before and after the landslide.

The second part used a 5-point Likert scale to assess respondents perceived level of effect across three dimensions: Extent of Landslide Effects; Effects on Tourist Arrivals; and Effects on Local Tourism Businesses. Likert-type scales were appropriate for measuring attitudes, perceptions, and levels of effect because they provided ordered response categories that could be quantitatively summarized for analysis. Additionally, Likert-type scales were identified as optimal for maintaining data quality while minimizing respondent inattention Dolnicar, et al. (2026).

Table 1: Scale, Range of Means, Responses, and Interpretation Rating for the Effects of the Palacapao Highway Landslide Palacapao Highway Landslide

Scale	Range of Means	Responses	Interpretation Rating

5	4.21 – 5.00	Very High Effect	The landslide caused extremely severe negative effects
4	3.41 – 4.20	High Effect	The landslide caused significant negative effects
3	2.61 – 3.40	Moderate Effect	The landslide caused average or fair negative effects
2	1.81 – 2.60	Low Effect	The landslide caused slight or minimal negative effects
1	1.00 – 1.80	No Effect	The landslide caused no observable negative effects

Prior to administration, the questionnaire underwent content validation by experts in tourism, disaster studies, and research methodology to ensure clarity, relevance, and adequacy of the items.

2.6 Data Gathering Procedure

A formal letter requesting permission for conducting the study was sent to the establishment owners, local vendors, and souvenir shops. After receiving their permission, questionnaires were handed out to the potential respondents. The respondents were informed about the objectives of the research and the nature of the survey prior to conducting the study. It was made clear that the information provided would remain confidential and would only be used for academic purposes.

2.5 Statistical Treatment

The data gathered were analyzed and interpreted statistically using the following measures. Weighted Mean was used to determine the extent of the landslide's impact on tourism arrivals and business operations. Frequency and Percentage were used to describe the profile of the respondents and tourism establishments, as well as the distribution of responses regarding the duration, severity, and accessibility disruptions caused by the Palacapao Highway landslide. Wilcoxon Signed-Rank Test was employed to determine whether there was a significant difference in tourism-related data before and after the landslide. Spearman's Rank-Order Correlation was used to determine the strength and direction of the relationship between the variables. Shapiro–Wilk Test was utilized to determine whether the collected data followed a normal distribution. Lastly, the 0.05 level of significance was used as the basis for determining whether the differences and relationships among the variables were statistically significant.

2.7 Ethical Consideration

Participation in this study was strictly voluntary. Respondents were informed of the nature and purpose of the research and their right to decline participation or withdraw at any point without consequence. The data collected was all handled confidentially, and no identifying personal or business-sensitive information were disclosed in the reporting of findings. These ethical procedures were consistent with the principles of respect for individuals, beneficence, and justice outlined in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

Prior to data collection, the researchers secured permission from relevant authorities and informed respondents about the purpose and procedures of the study. Informed consent was obtained before the distribution of the questionnaires. The researchers assured respondents that their identities would remain confidential and that all data collected would be used strictly for academic purposes only. The researchers-maintained honesty, respect, and integrity in gathering, analyzing, and presenting the data. No information was altered or fabricated, ensuring the credibility and reliability of the study.

3. RESULT

Table 2.
Descriptive Statistics on the Extent of the Palacapao Highway Landslide Effect

Item	Landslide Effect Indicator	Mean	Standard Deviation	Descriptive Rating
B1	The road closure significantly disrupted access to tourism destinations.	4.92	0.27	Very High Effect
B2	Alternative routes were difficult for tourists and travelers to use.	4.83	0.39	Very High Effect
B3	Travel time to tourism sites increased after the landslide.	4.78	0.48	Very High Effect
B4	Transportation costs increased due to road disruption.	4.50	0.82	Very High Effect
B5	Safety concerns discouraged tourists from visiting the area.	4.67	0.76	Very High Effect
Overall Extent of Landslide Effect		4.74	0.36	Very High Effect

Table 2 presents the respondents' assessments of these effects through five indicators. B1 measures

the duration of road closure by determining whether the road closure disrupted access to tourism destinations, addressing SOP 1.1. B2, B3, and B4 measure the level of accessibility disruption under SOP 1.3 by assessing the difficulty of using alternative routes, increased travel time to tourism sites, and higher transportation costs caused by the disruption. Meanwhile, B5 On the other hand, B5 is in line with SOP 1.2 by assessing whether safety concerns caused by the landslide discouraged tourists from visiting the area, reflecting the perceived severity of the event. Together, these indicators provide a structured assessment of the immediate effects of the landslide on road access and travel conditions in the affected area.

Table 2 shows that respondents assessed the Palacapao Highway landslide as having a Very High Effect overall, with an overall mean rating of 4.74 (SD = 0.36) corresponds to a Very High Effect, indicating that respondents consistently perceived substantial disruption associated with the landslide.

Among the indicators, road closure significantly disrupting access to tourism destinations (B1) recorded the highest mean rating (M = 4.92, SD = 0.27), indicating that disruption of access was the most prominent effect reported by respondents. This was followed by difficulty in using alternative routes (B2) (M = 4.83, SD = 0.39) and increased travel time to tourism sites (B3) (M = 4.78, SD = 0.48). The relatively small standard deviations for these indicators suggest a high degree of consistency among respondents in their assessments.

Safety concerns discouraging tourists from visiting the area (B5) also received a Very High Effect rating (M = 4.67, SD = 0.76). Although increased transportation costs due to road disruption (B4) obtained the lowest mean (M = 4.50, SD = 0.82), it remained within the Very High Effect category. The larger standard deviation for B4 indicates comparatively greater variability in respondents' assessments of transportation-cost impacts. These results indicate that the landslide severely compromised accessibility—the foundation of local tourism—whereby the primary road closure directly cut off destinations, difficult alternate routes and longer travel times discouraged visits, and safety concerns further deterred tourists, with cost increases remaining a significant concern despite differing individual experiences.

The findings are supported by the study of Dhakal et al. (2020). The authors stated that landslide-induced highway blockage reduces the number of tourists and their access to tourist destinations. It can be noticed in Table 2, road closure disrupting tourism destinations (B1) has got the highest mean of 4.92 (SD = 0.27), which is Very High Effect. Yang et al. (2021) explained that transportation accessibility affects tourists' decision-making process about the travel destination. It can be noticed in Table 2, using an alternative route becomes difficult (B2) has moderate mean of 4.83 (SD = 0.39), increased travel time (B3) has a mean of 4.78 (SD = 0.48). On the other side, Rossello et al. (2020) explained that natural disasters affect tourism demand through safety concerns and accessibility to the destination. In Table 2, safety concerns discouraging tourists from visiting the destination (B5) has got a mean of 4.67 (SD = 0.76). Thus, the studies of Dhakal et al. (2020); Yang et al. (2021); Rossello et al. (2020) support the findings of this research that Palacapao Highway landslide has a Very High Effect on tourism accessibility, convenience, and willingness to visit.

Table 3 outlined the variables and measurement approach used to evaluate changes in tourist arrival patterns following the Palacapao Highway landslide. It focused on two main factors of tourist activity: how many tourists came to the area and how often they returned or made visits, which served as key indicators of the disaster's impact on tourism demand.

Table 3.
Descriptive Statistics on the Level of Effect on Tourism in Terms of Tourist Arrivals and Decline in Visitors' Frequency

Item	Tourist Effect Indicator	Mean	Standard Deviation	Descriptive Rating
C1	Tourist arrivals decreased after the landslide.	4.88	0.40	*Very High Effect*
C2	Planned visits or bookings were cancelled because of accessibility issues.	2.80	1.57	*Moderate Effect*
C3	Repeat visits from tourists declined after the landslide.	4.45	0.85	*Very High Effect*
C4	Tourist activities in the area became less frequent.	4.40	0.63	*Very High Effect*
C5	The attractiveness of the area as a tourist destination was negatively affected.	4.25	0.90	*Very High Effect*
	Overall Level of Effect on Tourism	4.16	0.55	*High Effect*

Table 3 shows how each indicator measures tourist arrivals ans decline in visitors' frequency.

C1 and C2 correspond to SOP 2.1 by assessing whether tourist arrivals decreased and whether bookings or planned visits were canceled after the landslide. Meanwhile, C3, C4, and C5 correspond to SOP 2.2 by examining declines in repeat visits, less frequent tourism activities, and changes in the area's attractiveness as a destination. These indicators help determine how the landslide affected the number of tourists visiting the area and the frequency of their visits.

Table 3 shows that the Palacapao Highway landslide produced an overall High Effect on tourism in terms of tourist arrivals and decline in visitors' frequency. The overall mean rating of 4.16 (SD = 0.55) corresponds to a High Effect, indicating that respondents generally perceived substantial changes in tourist arrivals and visitation patterns following the landslide. The relatively small overall standard deviation suggests that respondents were reasonably consistent in their assessments.

Among the indicators, decreased tourist arrivals after the landslide (C1) obtained the highest mean rating (M = 4.88, SD = 0.40), classified as Very High Effect. This indicates that the reduction in tourist arrivals was the most strongly perceived tourism-related effect. The small standard deviation further suggests a high degree of agreement among respondents regarding this decline. This was followed by decline in repeat visits from tourists (C3) (M = 4.45, SD = 0.85) and reduced frequency of tourist activities in the area (C4) (M = 4.40, SD = 0.63), both categorized as Very High effect.

Similarly, the negative effect on the attractiveness of the area as a tourist destination (C5) received a mean rating of 4.25 (SD = 0.90), also corresponding to a Very High Effect. These findings indicate that respondents perceived the landslide as being associated not only with fewer tourist arrivals but also with less frequent visits and reduced tourism activity.

In contrast, cancellation of planned visits or bookings due to accessibility issues (C2) recorded the lowest mean rating (M = 2.80, SD = 1.57) and was classified as Moderate Effect. These results reveal that accessibility disruption and perceived risk did not merely reduce immediate visitor numbers but also weakened the destination's overall appeal and loyalty, discouraging both first-time and returning tourists despite differing individual experiences with formal cancellations. The findings are supported by the study of UNWTO (2022). The report revealed that natural disasters have negative implications on tourism, which include limiting tourist arrivals due to safety concerns and accessibility. It can be noticed in Table 3, decreased tourist arrivals (C1) has the highest mean of 4.88 (SD = 0.40), which indicates Very High Effect. Sigala (2020) added that the impacts of disruption on tourism create barriers to tourists' intentions to revisit the destination. It can be noticed in Table 3, decreased number of repeat visitors (C3) has a mean of 4.45 (SD = 0.85).

Additionally, Zhang et al. (2021) explained that disruption due to disasters has negative implications on destination image and travel intentions. In Table 3, decreased appeal of the destination (C5) has a mean of 4.25 (SD = 0.90). Thus, the findings of this study on the impact of Palacapao Highway landslide on decreased tourist arrivals, number of repeat visitors, and decreased appeal are supported by the study of UNWTO (2022); Sigala (2020); Zhang et al. (2021) as they indicate High Effect.

Table 4 detailed the variables used to examine how local tourism businesses were affected by the Palacapao Highway landslide. It examined Revenue Loss, Decline in Customer Arrival, and Change in Business Operation, which were three important aspects of how the disaster affected business conditions and performance.

Table 4.
Descriptive Statistics on the Level of Effect on Local-Related Business in Terms of Revenue Loss, Decline in Customer Arrival, and Change in Business Operation

Item	Business Effect Indicators	Mean	Standard Deviation	Descriptive Rating
D1	Customer arrivals decreased after the landslide.	4.95	0.22	*Very High Effect*
D2	Daily sales or revenue declined after the landslide.	4.97	0.16	*Very High Effect*
D3	Business operating hours were reduced.	4.20	1.34	*High Effect*
D4	Transportation or supply delivery became more difficult.	4.47	0.91	*Very High Effect*
D5	Businesses adjusted operations because of reduced tourist activity.	4.72	0.68	*Very High Effect*
Overall Level of Effect on Local-Related Business		4.67	0.49	*Very High Effect*

The table 4 shows how each business-related variable was assessed using specific indicators. D2

corresponds to SOP 3.1 (revenue loss) by assessing whether daily sales or revenue declined. D1 corresponds to SOP 3.2 (decline in customer arrivals) by determining whether fewer tourists visited the businesses. Meanwhile, D3, D4, and D5 correspond to SOP 3.3 (changes in business operations) by examining reduced operating hours, difficulties with supply deliveries, and adjustments made because of fewer visitors. These indicators help explain the business-related difficulties experienced following the landslide.

Table 4 shows that the landslide caused an overall Very High Effect on local tourism businesses with a mean rating of mean 4.67 (SD = 0.49). Indicating that respondents consistently perceived substantial adverse changes in local business conditions following the landslide.

Among the indicators, decline in daily sales or revenue (D2) obtained the highest mean rating (M = 4.97, SD = 0.16), indicating that revenue loss was the most strongly perceived business-related impact. The very small standard deviation suggests a high degree of consistency among respondents regarding the decline in sales or revenue. This was closely followed by decreased customer arrivals (D1) (M = 4.95, SD = 0.22), also classified as Very High Effect, suggesting that reducedcustomer activity was another prominent concern among affected businesses.

The adjustment of business operations due to reduced tourist activity (D5) recorded a mean of 4.72 (SD = 0.68), while increased difficulty in transportation or supply delivery (D4) obtained a mean of 4.47 (SD = 0.91)4.47 (SD = 0.91). Both were categorized as Very High Effect, indicating that respondents also perceived considerable disruptions in the operational aspects of local businesses.

In comparison, reduced business operating hours (D3) obtained the lowest mean rating (M = 4.20, SD = 1.34) (M = 4.20, SD = 1.34) and was classified as High Effect. Although the mean still indicates a substantial perceived effect, its relatively large standard deviation shows greater variability in respondents' experiences. This suggests that reductions in operating hours were not experienced as uniformly across businesses as the declines in revenue and customer arrivals. These findings demonstrate that revenue loss and visitor decline were the most immediate and universally felt consequences, while operational difficulties in transport and supply chains compounded the crisis, forcing businesses to adapt hours and procedures to sustain operations.

These findings are supported by Gössling et al. (2021), who discussed that disruptions in the arrival of tourist traffic can have negative implications for the financial status of tourism businesses, especially in regard to small and medium tourism enterprises. This was found to correspond with the current study, in which the decline in the daily sales or revenue (M = 4.97, SD = 0.16) and decreased customer arrivals (M = 4.95, SD = 0.22) received the highest mean scores, suggesting that these were the most impact consequences of the Palacapao Highway landslide. Similar support for the current findings can be found in the work of Li et al. (2024), who highlighted that transportation and accessibility disruptions can result in challenges in the delivery of supplies and an increase in operational costs. This can be seen in the findings on transportation or supply delivery difficulties (M = 4.47, SD = 0.91), which were indicated as Very High Effect. On the other hand, Ivanov and Webster (2021) discussed the importance of infrastructure-related disruptions in requiring businesses to make adjustments to their operations, which relates to the findings on business adjustments due to reduced tourist activity (M = 4.72, SD = 0.68) and reduced operating hours (M = 4.20, SD = 1.34). Altogether, the mentioned works offer possible support for the findings of the current work, which showed that there was a Very High overall perceived impact of this event on the local tourism businesses (SD = 0.160, SD = 0.161).

Table 5 aimed to determine whether significant differences existed in business performance indicators before and after the Palacapao Highway landslide. Specifically, it examined average monthly tourist and customer arrivals, average monthly revenue, number of operating days, and transportation and logistics costs.

Table 5.
Shapiro-Wilk Normality Test for Differences in Business-Related Variables Before and After the Landslide

Business-Related Variable	Shapiro-Wilk Statistic (W)	p-value	Decision
Customer Arrivals (Before – After)	0.183	< 0.001	Not normally distributed
Revenue (Before – After)	0.864	< 0.001	Not normally distributed
Operating Hours (Before – After)	0.677	< 0.001	Not normally distributed
Transportation/Supply Delivery (Before – After)	0.648	< 0.001	Not normally distributed

Table 5 shows how each indicator corresponded to the specific variables under Statement of the Problem 4, which examined whether significant differences existed in business performance before and after the Palacapao Highway landslide. Customer Arrivals corresponded to SOP 4.1 by comparing average monthly tourist and customer arrivals, while revenue corresponded to SOP 4.2 by comparing average monthly revenue. Operating hours corresponded to SOP 4.3 by examining differences in the number of operating days, and transportation/supply delivery corresponded to SOP 4.4 by comparing transportation and logistics costs. These indicators helped determine whether significant differences occurred in the business performance of affected local tourism-related businesses before and after the landslide.

Table 5 shows that the Shapiro-Wilk test ($p < .001$) below for all four business-related variables—customer arrivals, revenue, operating hours, and transportation/supply delivery—resulting in the rejection of the null hypothesis of normality and confirming that the before-and-after differences were not normally distributed, thereby justifying the use of nonparametric statistical procedures such as the Wilcoxon Signed-Rank Test for subsequent comparisons. This outcome indicates that the Palacapao Highway landslide did not affect businesses uniformly; rather, impacts were unevenly distributed, with some establishments experiencing sharp declines while others faced comparatively milder changes, reflecting differences in business size, financial preparedness, location, and degree of reliance on visitor traffic.

These findings are supported by Dube (2022), who highlighted that infrastructure damage could have different impacts on tourism businesses depending on their operational capacity and dependence on tourist arrivals. This relates to the present study, since the Shapiro-Wilk test revealed that the differences in terms of customer arrivals, revenue, operating hours, and transportation/supply delivery before and after the landslide were not normally distributed ($p < 0.001$). Additionally, Ratten (2021) emphasized that smaller and newer businesses are often more vulnerable to disruptions, thus contributing to the variations experienced by different establishments.

Table 6.
Wilcoxon Signed-Rank Test of Business-Related Variables Before and After the Landslide

Business-Related Variable	Wilcoxon Statistic (W)	p-value	Mean Difference (Before-After)	95% CI Lower	95% CI Upper	Rank-Biserial Correlation
Customer Arrivals	820	< 0.001	300	225	400	1.000
Revenue	788	< 0.001	42500	26500	65000	0.922
Operating Hours	135	< 0.001	19	12	25	0.978
Transportation/Supply Delivery	817	< 0.001	8750	5000	32750	0.991

Table 6 shows Wilcoxon Signed-Rank Test of Business-Related Variables Before and After the Landslide Analysis of the data shows that the Wilcoxon Signed-Rank Test revealed statistically significant differences across all four business-related variables ($p < 0.001$), with customer arrivals showing a mean decrease of 300 visitors, revenue declining by an average of ₱42,500, operating hours reducing by 19 hours, and transportation/supply delivery costs increasing by ₱8,750, all accompanied by very large effect sizes ranging from 0.922 to 1.000, confirming substantial and meaningful changes in business conditions after the landslide. These results demonstrate that the Palacapao Highway landslide brought about immediate, profound, and measurable harm to local tourism businesses, simultaneously cutting visitor numbers and income while raising operational costs and reducing available service hours.

These findings are supported by Dube (2022), who highlighted that infrastructure damage could negatively impact tourism businesses through the disruption of tourist arrivals and business income. This relates to the present study, since the Wilcoxon Signed-Rank Test revealed statistically

significant differences ($p < 0.001$) in all four business-related variables before and after the Palacapao Highway landslide. Specifically, customer arrivals reduced by an average of 300 visitors, revenue decreased by ₱42,500, operating hours were reduced by 19 hours, and transportation/supply delivery costs increased by ₱8,750. Additionally, Ratten (2021) emphasized that the disruptions in terms of accessibility could force businesses to reduce their operating hours and services, while Biggs et al. (2016) highlighted the impact of transportation disruptions on increased operational costs. These studies could explain the significant changes experienced by local tourism businesses after the landslide.

Table 7 shows the variables, research objectives, and indicators used to examine the relationships among the extent of the Palacapao Highway landslide effects, tourist arrivals, and the performance of affected local tourism-related businesses. It addresses Statement of the Problem 5, which determines whether significant relationships exist among these variables.

Table 7.
Shapiro-Wilk Normality Test for Palacapao Highway Landslide, Tourist arrivals and Local Tourism Business Performance

Variables	Shapiro-Wilk Statistic (W)	p-value	Decision
Palacapao Highway Landslide Impact	0.748	< 0.001	Not normally distributed
Impact on Tourist Arrivals and Decline in Visitors' Frequency	0.942	0.041	Not normally distributed
Local Tourism Business Performance	0.720	< 0.001	Not normally distributed

Table 7 addressed Statement of the Problem 5, which aimed to determine whether significant relationships existed among these variables. The table presented the relationship between the extent of the landslide effects and tourist arrivals, as well as the relationship between tourist arrivals and business performance. These relationships helped determine whether greater disruption was associated with fewer tourist arrivals and whether a decrease in tourist arrivals was associated with poorer business performance among affected local tourism-related businesses.

Table 7 shows that the Shapiro-Wilk test results indicated all three variables — Palacapao Highway landslide impact ($p < 0.001$), impact on tourist arrivals and visitors' frequency ($p = 0.041$), and local tourism business performance ($p < 0.001$) — deviated significantly from a normal distribution, confirming that Spearman's rank-order correlation was the appropriate statistical measure to examine relationships among them. These results reflect that perceptions of the landslide's severity, changes in visitation patterns, and experiences of business harm are subjective assessments shaped by individual location, business profile, and personal observation rather than standardized, evenly distributed measurements.

Supported by Yang et al. (2021), who noted that tourist perceptions of accessibility and destination suitability vary across individuals and locations, Dhakal et al. (2020), who observed that landslide effect on visitation and commerce are unevenly distributed along affected highway corridors, and Rosselló et al. (2020), who found that tourism demand responses to disaster events differ across market segments and visitor types, these findings validate the use of nonparametric correlation for this study, guide future researchers in selecting appropriate statistical tools for similar disaster-impact inquiries, and remind stakeholders that recovery planning must account for diverse experiences and perspectives across the affected community.

Table 8.
Relationship Among Palacapao Highway Landslide Effect, Tourist arrivals, and Local Tourism Business Performance

Variables	Spearman's Statistic (ρ)	p-value	Decision
Palacapao Highway Landslide Impact and Tourist Arrivals	0.342	0.031	Significant
Palacapao Highway Landslide Impact and Local Tourism Business Performance	0.481	0.002	Significant
Tourist Arrivals and Local Tourism Business Performance	0.320	0.044	Significant

Table 8 shows that Spearman's rank-order correlation revealed significant positive relationships: Palacapao Highway landslide

impact correlated moderately with local tourism business performance (ρ = 0.481, p = 0.002), weakly with tourist arrivals (ρ = 0.342, p = 0.031), and tourist arrivals correlated weakly with local tourism business performance (ρ = 0.320, p = 0.044), meaning higher perceived landslide disruption consistently corresponded to greater declines in visitor numbers and worse business outcomes. These results confirm the direct and interconnected link between highway integrity, tourist mobility, and local economic livelihood — the Palacapao Highway is not merely a transportation route but the essential lifeline sustaining the area's tourism industry, so damage to the road directly translates to reduced access, fewer visitors, and diminished income.

These findings are supported by Yang et al. (2021), who emphasized the importance of transportation accessibility to facilitate tourist movement and destination choice. This relates to the present study, since the Spearman's rank-order correlation revealed a significant positive relationship between the Palacapao Highway landslide impact and tourist arrivals (ρ = 0.342, p = 0.031), as well as local tourism business performance (ρ = 0.481, p = 0.002). Additionally, Dhakal et al. (2020) highlighted the disruption of tourism activities and business revenue due to road blockages, thus supporting the relationship between highway disruptions and local business performance. Furthermore, Rosselló et al. (2020) emphasized the importance of tourist arrivals in sustaining tourism business revenue, which relates to the significant positive relationship between tourist arrivals and local tourism business performance (ρ = 0.320, p = 0.044). These studies could provide supporting explanations for the significant relationships in the present study, with regard to the interrelated roles of transportation accessibility, tourist arrivals, and local tourism business performance.

4. CONCLUSIONS

The study aimed to determine the impact of the Palacapao Highway landslide on tourist arrivals and the affected local tourism businesses. It also intended to establish the implications of the incident on the former and the operations and income of the latter. The findings were expected to contribute to the enhancement of preparedness and response to future occurrences of a similar disaster. Based on the findings of the study, the following conclusions were drawn:

1.The Palacapao Highway landslide had a very high level of effect on all aspects of accessibility. The highway is the main lifeline connecting the tourism destinations and communities in the area; without it, there would be no access, and the travel will be much more expensive and difficult. Accessibility is not a merely convenience but a crucial prerequisite for local tourism development.

2. The landslide significantly reduce both the number of tourists arriving at the destination and their number of visits. In addition to the obvious reduction in the number of tourists, the image of the destination was harmed by the infrastructure disruption. It proves that tourism development is not only about restoration of physical roads but also about the restoration of the image and attractiveness of the destination.

3. The tourism businesses operating in the locality faced huge financial and logistical problems. The decline in customer base was associated with the drop in income, while the problems associated with transport were also present. Local businesses had to adjust and modify their working conditions in order to stay alive. Tourism businesses that relied on daily visitor flow suffered the most.

4. All measured indicators of business performance deteriorated significantly following the landslide. The consistent and large magnitude of change — fewer visitors, lower earnings, reduced service hours, and higher costs — provides clear statistical evidence that the Palacapao Highway landslide was the direct cause. These changes were not part of normal seasonal or market fluctuation.

5. There is a direct relationship between the condition of Palacapao Highway, tourist arrivals, and the financial well-being of tourism-related businesses in the area. With increased disruption on the highway, there are fewer tourist arrivals and declines business performance. The highway is more than just a means of transportation; rather, it is an economic resource that needs to be protected and maintained.

5. RECOMMENDATIONS

This recommendation is made based on the findings and conclusion from the study:
The researchers recommend that the concerned local government units, tourism stakeholders, local businesses, and future researchers consider the findings of this study in addressing the effects of the Palacapao Highway landslide on tourism and local businesses.
0
1. Local Government Units (LGUs), should improve road access and prepare alternative routes during road closures to lessen travel difficulties and reduce disruption to tourism activities.

2. Tourism Offices and Tourism Stakeholders, should provide updated information about road conditions, alternative routes, and tourist destinations to help visitors plan their trips despite road disruptions.

3. Local Tourism-Related Businesses, should prepare strategies to manage possible decreases in customers and revenue and adjust their operations during transportation difficulties.

4. Future Researchers, should conduct further studies on the long-term effects of landslides on tourism and local businesses, including other affected areas and a larger number of respondents.

REFERENCES

[1] Afroz, F., Hassan, K., & Ferdaus, J. (2023). Factors impacting financial loss of small tourism businesses due to COVID-19. GeoJournal of Tourism and Geosites, 50(4), 1268–1275. https://doi.org/10.30892/gtg.50407-1125

[2] Ampofo, E. T. (2021). The effect of demographic characteristics on employee retention in the tourism industry. Tourism Management Perspectives, 38, 100819. https://doi.org/10.1016/j.tmp.2021.100819

[3] Ariyani, D., Sutikno, S., & Nugroho, A. (2024). Estimating the flood, landslide, and heavy rainfall susceptibility of transportation networks in South Kalimantan Province, Indonesia. Sustainability, 16(4), 1554. https://doi.org/10.3390/su16041554

[4] Asghar, M., Gull, N., Bashir, M., & Akbar, M. (2021). The impact of demographic factors on job satisfaction and turnover intentions in the hospitality sector. International Journal of Hospitality & Tourism Administration, 22(4), 1–20.https://doi.org/10.1080/15256480.2020.1862034

[5] Asian Disaster Preparedness Center. (2017). Disaster risk managementsystems analysis. https://www.adpc.net

[6] Bashir, T., Bergantino, A. S., Troiani, G., & Falcone, G. (2025). Impact of traffic disruptions on road network accessibility and vulnerability in inner Campania areas. Applied Spatial Analysis andPolicy.https://link.springer.com/article/10.1007/s12061-025-09679-x

[7] Bataycan, U. C., Caballes, J. J. A., Orpeza, J. A., Racaza, N. A. M., Singh, L. B., & Aballe, A. F. A. (2024). Assessment on employee loyalty of selected hotels in Valencia City, Bukidnon. International Journal of Advanced Research and Writing, 6(6), 1-11.

[8] Biggs, D., Hall, C. M., & Stoeckl, N. (2016). The resilience of formal and informal tourism enterprises to disasters: Reef tourism in Phuket, Thailand. Journal of Sustainable Tourism, 24(4), 645–665. https://doi.org/10.1080/09669582.2015.1092478

[9] Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2020). Technological disruptions in services: Lessons from tourism and hospitality. Journal of Service Management, 31(3), 484–506. https://doi.org/10.1108/JOSM-12-2019-0398

[10] Chen, C. M., & Li, S. C. (2017). Tourism demand, transportation infrastructure, and disaster impacts. Transportation Research Part A: Policy and Practice, 103, 90–103. https://doi.org/10.1016/j.tra.2017.06.012

[11] Choi, Y., Kim, J. S., & McGinley, S. (2022). The role of demographic characteristics in job satisfaction and organizational commitment in hospitality. Sustainability, 14(9), 5234. https://doi.org/10.3390/su14095234

[12] Chow, W. W., & Peng, P. (2025). Age differences in job performance: The moderating role of organizational support in the hotel industry. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2025.1377368

[13] Cruz, J., & Santos, A. (2022). Impact of the Sagada landslide on tourism flow and local businesses. Cordillera Tourism Review.

[14] Czernek-Marszałek, K., & McCabe, S. (2024). Turning crisis into chances: Tourism entrepreneurs' timing strategies amidst emergencies. Journal of Entrepreneurship, Management and Innovation, 20(3). https://jemi.edu.pl/vol-20-issue-3-2024/turning-crisis-into-chances-tourism-entrepreneurs timing-strategies-amidst-emergencies

[15] Department of Tourism. (2022). Philippine tourism industry performance report. https://beta.tourism.gov.ph

[16] Dhakal, S., Cui, P., Rijal, C. P., Su, L.-J., Zou, Q., Mavrouli, O., & Wu, C.-H. (2020). Landslide characteristics and its impact on tourism for two roadside towns along the Kathmandu–Kyirong Highway. Journal of Mountain Science, 17, 1840–1859. https://doi.org/10.1007/s11629-019- 5871-3

[17] Dolnicar, S., Grün, B., & MacInnes, S. (2026). Towards more reliable survey items: An item-level stability protocol. Annals of Tourism Research, 118, 104148. https://doi.org/10.1016/j.annals.2025.104148

[18] Dube, K. (2022). Infrastructure disruption and tourism recovery: Implications for small tourism enterprises. Tourism Geographies, 24(4–5),1–20. https://doi.org/10.1080/14616688.2021.1938667

[19] Estevão, C., & Costa, C. (2020). Natural disaster management in tourist destinations: A systematic literature review. European Journal of Tourism Research, 25, 2502. https://doi.org/10.54055/ejtr.v25i.417

[20] García, M., & López, R. (2023). Workforce diversity and innovation performance in the hotel industry. International Journal of Hospitality Management, 112, 103513. https://www.sciencedirect.com/science/article/pii/S0278431923000639

[21] Genç, R. (2018). Catastrophe of environment: The impact of natural disasters on the tourism industry. Journal of Tourism & Adventure, 1(1), 86–94. https://doi.org/10.3126/jota.v1i1.22753

[22] Gössling, S., Scott, D., & Hall, C. M. (2021). Pandemics, tourism and global change: A rapid assessment of COVID-19. Journal of Sustainable Tourism, 29(1), 1–20. https://doi.org/10.1080/09669582.2020.1758708

[23] Hall, C. M., Scott, D., & Gössling, S. (2022). Pandemics, transformations and tourism resilience. Journal of Sustainable Tourism, 30(1), 1–20. https://doi.org/10.1080/09669582.2021.2008128

[24] Hallak, R., & Lee, J. (2023). Conceptual foundations of tourism enterprises (pp. 1–13). CABI. https://doi.org/10.1079/9781789249446.0001

[25] Harrington, R. D. (2021). Natural disasters, terrorism, and civil unrest: Crises that disrupt the tourism and travel industry. Worldwide Hospitality and Tourism Themes, 13(4), 445–452. https://doi.org/10.1108/WHATT-01-2021-0008

[26] Hu, X., Zhu, Y., & Wang, Y. (2021). Initiation mechanisms and dynamics of a deep-seated landslide due to rainfall: A case study. Bulletin of Engineering Geology and the Environment, 80(3), 1893–1907. https://doi.org/10.1007/s10064-020-02038-5

[27] Ivanov, S., & Webster, C. (2021). Economic resilience of tourism businesses in times of crisis. Tourism Economics, 27(7), 1313–1328. https://doi.org/10.1177/1354816620931942

[28] Karatepe, O. M. (2021). The effects of work engagement on job performance in hotel employees: The moderating role of age. International Journal of Hospitality Management,

93,102798. https://doi.org/10.1016/j.ijhm.2020.102798

[29] Kim, J., Shoji, Y., Mameno, K., Kubo, T., & Aikoh, T. (2023). Visitors use patterns and repeat visitation in recreational areas. International Journal of Environmental Research and Public Health, 20(2), 1205. https://doi.org/10.3390/ijerph20021205

[30] Kim, J. S., McGinley, S., & Choi, Y. (2022). The effects of demographic characteristics on job satisfaction and service performance in hospitality organizations. Sustainability, 14(9), 5234. https://doi.org/10.3390/su14095234

[31] Koporcic, N., Kukkamalla, P. K., Markovic, S., & Maran, T. (2025). Resilience of small and medium-sized enterprises in times of crisis: an umbrella review. Review of Managerial Science, 20(1), 301–329. https://doi.org/10.1007/s11846-025-00883-0

[32] Korablinov, A. Y. (2024). Problems of accessibility and comfort of tourist infrastructure facilities for the development of automobile tourism in Russia. Scientific Research and Development. Economics. https://www.osci.ru/en/nauka/article/89400/view

[33] Li, X., Hu, Y., & Yin, J. (2024). Emergency accessibility analysis based on traffic big data and flood scenario simulation in the context of Shanghai hotel industry. Travel Behaviour and Society. https://doi.org/10.1016/j.tbs.2024.100900

[34] Liu, J., Yeung, A., Xiao, T., Tian, X., Kong, Z., Zou, L., & Wang, X. (2019). Chen-Style Tai Chi for Individuals (Aged 50 Years Old or Above) with Chronic Non-Specific Low Back Pain: A Randomized Controlled Trial. International Journal of Environmental Research and Public Health, 16(3), n/a.

[35] Matias, F., Rebelo, S., Andraz, G., & Guerreiro, J. (2024). The influence of firm characteristics and macroeconomic factors on financial performance: Evidence from the Portuguese hotel industry. Economies, 12(11), 306. https://www.mdpi.com/2227-7099/12/11/306

[36] Sigala. (2022). Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. Journal of Business Research, 117, 312–321.

[37] Oloruntobi, O., Alola, U. V., & Saint Akadiri, S. (2023). Transportation infrastructure and tourism development: A global perspective. Tourism Economics.

[38] Orchiston, C., & Higham, J. (2016). Knowledge management and tourism recovery after disasters. Tourism Management, 54, 552–564. https://doi.org/10.1016/j.tourman.2015.12.012

[39] Ozdemir, O., Dogru, T., Kizildag, M., Mody, M., & Suess, C. (2021). Quantifying the economic impact of COVID-19 on the U.S. hotel industry: Examination of hotel segments and operational structures. Tourism Management Perspectives, 39, 100864. https://doi.org/10.1016/j.tmp.2021.100864

[40] Philippine Atmospheric, Geophysical and Astronomical Services Administration. (n.d.). Rainfall and landslide advisories. https://www.pagasa.dost.gov.ph

[41] Pudasaini, S. P., & Krautblatter, M. (2021). The mechanics of landslide mobility with erosion. https://arxiv.org/abs/2103.14842

[42] Rajesh, R., & Praveen, M. (2025). Exploring the relationship between disasters and tourism in India: A quantitative approach. Disaster & Development, 14(1), 79–??. https://nidm.gov.in/journal/PDF/Journal/NIDMJOURNAL_JanJun2025/NIDMJOURNAL_JanJun20254.pdf

[43] Ramajoe, L., Maloka, C., & Sefotho, M. (2025). Human resource management practices and employee turnover intentions in the hospitality sector. African Journal of Hospitality, Tourism and Leisure, 14(1), 1–15.

[44] Ramos Jesus, C., Serra Coelho, L. M., & Quitério Ramos, C. M. (2025). Building company resilience: Determinants in the tourism industry. European Journal of Tourism Research, 39, 3907. https://doi.org/10.54055/ejtr.v39i.3654

[45] Ratten, V. (2021). Tourism entrepreneurship and crisis management: The role of

resilience in small businesses. Tourism Review, 76(2), 1–13. https://doi.org/10.1108/TR-04-2020-0150

[46] Rosselló, J., Becken, S., & Santana-Gallego, M. (2020). The effects of natural disasters on international tourism: A global analysis. Tourism Management, 79, 104080. https://doi.org/10.1016/j.tourman.2020.104080

[47] Schofield, P., Coromina, L., Camprubí, R., & Kim, S. (2020). An analysis of first-time and repeat-visitor destination images through the prism of the three-factor theory of consumer satisfaction. Journal of Destination Marketing & Management, 17, 100463. https://doi.org/10.1016/j.jdmm.2020.100463

[48] Shimizu, R. R., Chatterjee, J. R., & Cheung, M. A. (2023). Natural hazards and their effects on the tourism and hospitality sector in the Philippines. Journal of Hospitality and Tourism Management, 6(4), 12–22.

[49] Shin, H., Nicolau, J. L., Kang, J., & Yu, L. (2022). Travel decision determinants during and after COVID-19: The role of tourist trust, travel constraints, and attitudinal factors. Tourism Management, 88, 104428. https://doi.org/10.1016/j.tourman.2021.104428

[50] Sigala. (2022). Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research. Journal of Business Research, 117, 312–321.

[51] Sigala, M. (2021). Crisis management, digital transformation, and resilience in tourism. Journal of Business Research, 117, 312–321. https://doi.org/10.1016/j.jbusres.2020.06.012

[52] Sigala, M., Rahimi, R., & Thelwall, M. (2022). Big data and innovation in tourism and hospitality: Opportunities and challenges. Journal of Hospitality and Tourism Management, 52, 120–129. https://doi.org/10.1016/j.jhtm.2022.06.003

[53] Singh, S. K., Gupta, S., Busso, D., & Kamboj, S. (2021). Top management knowledge value and firm innovation capability. Journal of Knowledge Management, 25(3), 577–602. https://doi.org/10.1108/JKM-08-2020-0600

[54] Torres, J. M., Castillo, R. A., & Mendoza, P. L. (2023). Business resilience and recovery of tourism enterprises after highway infrastructure damage in Northern Luzon. Asia Pacific Journal of Tourism Research, 28(4), 1–15. https://doi.org/10.1080/10941665.2023.2187654

[55] Troncone, A., Pugliese, L., & Conte, E. (2021). Analysis of an infinite slope considering the elastoplastic behavior of soil. Geosciences, 11(3), 128. https://doi.org/10.3390/geosciences11030128

[56] Ugwu, F. O., Onyishi, I. E., & Rodríguez-Sánchez, A. M. (2022). Linking demographic variables and employee performance in service organizations. Frontiers in Psychology, 13, 845123. https://doi.org/10.3389/fpsyg.2022.845123

[57] United Nations Office for Disaster Risk Reduction. (2015). Sendai framework for disaster risk reduction 2015–2030. https://www.undrr.org

[58] Wang, J., Su, A., Liu, Q., & Xiang, W. (2021). Deformation characteristics and stability evolution behavior of Woda landslide during the rainy season. Landslides, 18(4), 1315–1329. https://doi.org/10.1007/s10346-020-01569-2

[59] Winter, M. G., Shearer, B., Palmer, D., Peeling, D., Harmer, C., & Sharpe, J. (2016). The economic impact of landslides and floods on the road network. Procedia Engineering, 143, 1425–1434. https://doi.org/10.1016/j.proeng.2016.06.168

[60] World Bank. (2021). Small and medium enterprises (SMEs) finance and development report. https://www.worldbank.org

[61] Yang, Y., Luo, H., & Law, R. (2021). Tourist mobility and spatial accessibility in tourism destinations. Journal of Travel Research.

[62] Zhang, X., Seyler, D., Di, H., Wang, Y., & Tang, J. (2021). Impact of earthquakes on natural area-driven tourism: Case study of China's Jiuzhaigou National Scenic Spot. https://www.researchgate.net