

# Chapter 14

## Key Resilience Factors in Four Patagonia Nature-Based Tourism Destinations in the Aysén Region of Chile



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**Abstract** This chapter supports the idea that tourism destinations should be prepared for adversities and that this preparation is the responsibility of key tourism stakeholders in the territory. Key resilience factors are identified for tourism destinations associated with protected areas in Chilean Patagonia. We analyze the strategic planning aspects of four case studies: Aysén Patagonia Queulat, Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and *Provincia de los Glaciares* (Province of the Glaciers). A measurement model was applied to assess three fundamental pillars of resilience (capabilities, ownership, and connections), incorporating natural risk assessment as a mechanism to relate resilience capacity to the territorial context. Results indicate positive evaluations for several resilience factors in three of the four tourism destinations. Nevertheless, all four destinations presented high levels of natural risks, with the *Provincia de los Glaciares* destination as the most vulnerable. The discussion focuses on the implications for each of the study's destinations, suggesting that destinations with higher levels of natural risks should focus on strengthening their resilience factors. Thus, these destinations should develop strategies to build connections (relations with other networks), capacities (management of tools and knowledge, social and technical skills), and ownership (participation of local actors and managers in the governance of the territory).

**Keywords** Patagonia · Resilience · Nature-based tourism · Natural risk assessment · Vulnerability

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## 14.1 Introduction

Economic crises, natural disasters, and climate change pose complex and interrelated challenges for the planning and management of tourist destinations. Since 2019, Chile has been engulfed by crises, including social and political unrest and the COVID-19 pandemic. Resilience has emerged as a metric for gauging recovery from such crises and has been applied to a diverse range of fields, including ecology, economics, psychology, sociology, and development studies. This chapter applies the resilience perspective to four Patagonian tourism destinations in the Aysén Region of Chile to evaluate factors that influence their resilience.

Patagonian tourism destinations consist of a range of distinct characteristics, including pristine and isolated landscapes, changing natural resources, and disparate levels of human and territorial development that interact with crises in complex and uncertain ways. Tourism activity in Patagonia is founded on the use of natural resources of great international value, causing the region to be particularly sensitive and vulnerable to the ongoing social and environmental turbulence in the world. Tourism offerings within Patagonia are typically related to the natural features and characteristics of the territory's protected areas (PAs), many of which are administered within the National System of State Natural Protected Areas (SNASPE). By 2017, Patagonia's Aysén Region had the largest system of SNASPE PAs in Chile (52,000 km<sup>2</sup>), distributed in 18 territorial units, of which 5 were National Parks, 11 were National Reserves, and 2 were Natural Monuments (Aedo et al. 2020). This study compares resilience factors between tourist destinations that hold an abundance of SNASPE PAs in order to enrich our current knowledge about tourism resilience. This was done by considering how resilience factors interact with the diverse natural risks that affect tourism in these PAs and their surrounding territories. A better understanding of the strengths and vulnerabilities of Patagonian tourism destinations will help guide future planning and management strategies in the region.

This study applies a resilience measurement model to consider the effect of various natural risks on system resilience. Secondary information from the following four tourism destinations in Chilean Patagonia is analyzed, as defined by the Chilean National Tourism Service (2014): Aysén Patagonia Queulat; Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and the *Provincia de los Glaciares* (Province of the Glaciers). Secondary data consisted of documents generated by regional actors and/or organizations within the public, private, and civil sectors. Documents were analyzed for information related to resilience factors in the following areas: Economic/Touristic, Environmental, Policy/Instructional, and Sociocultural.

## 14.2 Theoretical Framework

The concept of resilience has been researched within a wide range of disciplines, including psychology (e.g., Scoville 1942) and biology (e.g., Rutter 1987). Yet, there is no agreed upon definition for resilience among the various researchers and

disciplines, nor is it known exactly in which discipline the use of the concept began (Kalawski and Haz 2003). Nevertheless, resilience has been, and continues to be, widely applied to situations and contexts to explain the capacity to resist and react in the face of adverse events. The United Nations International Strategy for Disaster Reduction (United Nations 2009) defined resilience as:

the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. (p. 24)

This global view of resilience, which has formed the basis for further international agreements and strategies, emphasizes the importance of strengthening capacities to respond to change and provides general guidelines for disaster risk management and reduction.

According to research conducted by the World Resources Institute (WRI) in 2009, resilience can be conceptualized as the capacity of a system to receive disturbances or alterations and recover. For humans, this means improving our capacity to learn, plan, and organize (Cuevas-Reyes 2010). Walker et al. (2006) and Folke et al. (2002) described ecological resilience as the level of disturbance that an ecosystem can absorb without crossing the threshold of a different ecosystem structure or state. Alterations which can affect an ecosystem are varied and can range from natural ones that are not controllable by humans (i.e., earthquakes, tsunamis, hurricanes) to anthropogenic alterations (e.g., logging, indiscriminate fishing, overexploitation of pastures) that are controllable (Ecoespaña and the WRI 2009).

Although resilience can be approached from a personal or individual perspective (e.g., Henderson 2007), experts working with resilience in vulnerable tourism destinations have identified that a collective resilience focus, looking at the territory as a destination, may have greater utility (Ecoespaña and WRI 2009; Tanana et al. 2019). A collective approach may facilitate efforts to strengthen weak areas and improve preparedness for natural, social, health, economic, and political disturbances, among others. Furthermore, Tanana et al. (2019) recommend a shared focus that combines an understanding of vulnerability with prevention management, training, and awareness building with tourism destination stakeholders, visitors, and the local community.

In a tourism context, resilience has generally been defined in terms of the options and response capacity of vulnerable subsectors of the tourism industry to cope with shocks and changes generated at the local, regional, and global levels (Biggs et al. 2012; Hall et al. 2003; Henderson 2007; Kontogeorgopoulos 1999; Ritchie and Crouch 2003). Tourism resilience research contributes to a better understanding of how the tourism industry and its businesses might effectively respond and positively adapt in the face of global disruptions, disturbances, or changes (Farrell and Twining-Ward 2004; Tyrrell and Johnston 2008).

Although there is a significant body of literature that has studied the societal resilience (e.g., Biggs et al. 2012; De Sausmarez 2007; Farrell and Twining-Ward 2004; Smith and Henderson 2008; Strickland-Munro et al. 2010), its applications to

tourism systems are more recent and exploratory in nature, with less precision for tourism-specific conceptual models and tools (Chang 2009; Farrell and Twining-Ward 2004; Plummer and Armitage 2007; Stadel 2008). The most recent works focus on measuring resilience in destinations affected by natural disasters in order to facilitate recovery (Gutiérrez 2013; Miller et al. 2017; Min et al. 2020; Nakanishi et al. 2014). This is supplemented by resilience research in other fields, including planning (Becken and Khazai 2017; Gutiérrez 2013; Holladay and Powell 2016), business management (Biggs et al. 2012; Calgaro et al. 2014; Guo et al. 2018), and destination development (Farrell and Twining-Ward 2004; McKercher and Young 1999), among others.

### 14.2.1 Resilience Factors

Measuring resilience requires the definition of resilience factors. Carpenter et al. (2012) synthesized six enabling conditions for resilience from the literature: *diversity*, which includes the breadth of reactions to changes or shocks, cultural diversity, and the heterogeneity of socio-ecological systems in the landscape; *modularity*, which includes different peoples' problem-solving approaches and organizational diversity; *openness*, which includes the strength of connections between socio-ecological systems; *reserves*, which include the capacities to re-mobilize system features that have been lost through disturbances, funding, recolonization, or social memory; *feedback*, which involves how ecosystems are enriched and/or networks of economic transactions; and *nesting*, which involves cross-scale governance systems made up of municipalities, provinces, and regions (Walker and Salt 2012; Levin 1999; Biggs et al. 2012). More recently, Herrera and Rodríguez (2016) proposed a series of factors for evaluating territorial resilience. Their matrix offered qualitative and quantitative factors within four dimensions (*economic, social, institutional, and infrastructure*). For each factor, they defined indicators and the impact they had on resilience.

Varghese et al. (2006) contended that levels of community resilience are affected by the degree of *local ownership* within the community, which they defined as including local autonomy and power, local flexibility in decision-making, and the distribution of local-level benefits. They pointed out that the extent of local ownership within a community affects the level of commitment and involvement of both local and external groups, and the forms of local ownership influenced their decision-making processes. Generally, the greater the commitment and involvement of workers, managers, and community members, the greater the possibility of setting goals that support local job creation, community programs, and long-term business viability.

In 2009, Ecoespaña and the WRI published a report which, among other things, supported the Varghese et al. (2006) concept of *local ownership*, as a community resilience factor. The Ecoespaña and the WRI (2009) report identified three key community resilience factors. First, they posed that *capacities* are based on the

management of tools and knowledge that enable sustainable resource development. Capacities are linked to social, technical, and entrepreneurial skills used to manage resources and create enterprises and may include support skills that help build capacity and influence. The second resilience factor proposed in the 2009 report involved *ownership*, which was linked to the strong involvement of local development actors and managers and an enabling environment, including favorable public policies, a non-discriminatory fiscal and regulatory environment, and the commitment of government agencies. The third factor was *connections*, which were related to being articulated with others, not only horizontally but also vertically, in all areas in which a company/organization can be linked (i.e., both public and private spheres), to improve access to learning, support, and commercial networks and associations.

Additionally, several tools have been developed for measuring community resilience. For example, the international humanitarian organization, GOAL (2015), developed a tool to measure the components of community resilience to disasters. This tool grouped resilience components into five thematic areas: *governance*, *risk assessment*, *knowledge and education*, *risk management and vulnerability reduction*, and *disaster preparedness and response*. And the United Nations Office for Disaster Risk Reduction (2017a, b, 2021) has provided a series of self-assessment tools and local urban indicators to address the concept of resilient cities. Their resilience self-assessment tools address ten essential aspects: organizing for resilience, identifying risks, strengthening financial capacity for resilience, promoting resilient urban design and development, protecting natural buffer zones, strengthening institutional capacity, understanding and strengthening social capacity, increasing the resilience of vital infrastructure, ensuring an effective response to disasters, and accelerating the recovery process/building back better.

While all of these frameworks and tools are helpful and increase understanding of resilience in a range of contexts, their primary focus is on resilience elements that are internal to the territories, with little to no consideration for external elements that may also affect it. Thus, their conceptual use in tourism may be limited, as the tourism sector incorporates physical, environmental, human, governmental, internal, and external elements, among others. Therefore, Gutiérrez (2013) built on prior work, especially the community resilience factors proposed by Ecoespaña and the WRI (2009), integrating these factors with relevant tourism literature (e.g., Becken and Khazai 2017; Biggs et al. 2012; Calgaro et al. 2014; Farrell and Twining-Ward 2004; Guo et al. 2018; Holladay and Powell 2016; McKercher and Young 1999; Pearce et al. 2016; Varghese et al. 2006). Further, Gutiérrez (2013) identified four spheres of action particularly relevant to tourism destinations (economic—touristic, environmental, political-institutional, and sociocultural), and tourism-specific indicators for each of the three resilience community resilience factor domains (capabilities, ownership, and connections).

Within the Gutiérrez (2013) model, the economic-touristic sphere of action focused on tourism within the local economy, tourism dynamics, public and private investment, and tourism equipment and infrastructure. The environmental sphere of action focused on understanding and managing the environmental repercussions

and impacts of tourism and of disasters and crises that could affect the environment and nature-based tourism destinations. The political-institutional sphere of action included aspects of tourism governance, institutional linkage, and crisis/disaster management. Finally, the sociocultural sphere of involved actions related to local communities and tourism, including employment, education, training, well-being, and the repercussions of any negative impacts.

### ***14.2.2 Risks and Tourism***

Recovery capacity varies depending on the degree of disturbance to which a territory is subjected. For example, disaster resilience evaluates the potential for disasters within a territory and the capacity for measures to protect and enhance infrastructure performance, thus reducing potential losses when extreme events occur (Tierney and Bruneau 2007). According to research developed by Blake and Sinclair (2003), the global tourism industry involves the movement of travelers between territories around the world; as such, the diversity of potential risks and disasters is unlimited. And, the contribution of tourism is so important, both for industrialized and developing countries, that any crisis that affects aspects of social life should be considered a concern by the tourism sector. Nevertheless, they found tourism resilience planning measures to be lacking at the time of their research, pointing out that the industry's general response to declining tourism demand was to pressure governments to implement policies to counteract the crisis, rather than taking preemptive or responsive action to improve resilience on its own.

The 2020 version of the Global Risks Report, published by the World Economic Forum (WEF), indicated that global economic risk, which dominated public discourse during the 2007–2015 period, had been overshadowed by environmental risks in recent years (2016–2020), with an emphasis on events related to climate change and natural disasters (e.g., tornadoes, floods, forest fires, droughts, and heat waves). Additionally, they noted that cyberattacks have caused severe damage around the world in recent years. In 2021, the WEF published follow-up research that specifically addressed global tourism resiliency, adding scenarios that reflected a greater long-term impact, including infectious diseases, failure in climate action, weapons of mass destruction, and the loss of biodiversity (Al-Khateeb 2021).

Many risk and crisis researchers have suggested that the tourism sector is particularly prone to disturbance because its permeability, dynamism, and dependence on other sectors of the economy make it especially vulnerable to crisis (e.g., Goeldner and Ritchie 2009; Lerbinger 1997; McKercher and Young 1999; Murphy and Price 2005; Muñoz and Brea 2010; Pennington-Gray et al. 2014; Richardson 1994). Murphy and Price (2005) noted that tourism development typically occurs in places with higher potential for natural and/or social risk, calling for greater consideration of this trend and the establishment of appropriate and timely information and security alerts. Muñoz and Brea (2010) observed that tourism was becoming more and more technologically driven and, as a result, tourism communication,

information, and reservation systems were becoming more sophisticated, with greater automation and reliance on technology; yet, these required greater knowledge and responsibility on the part of travelers, making them more fragile and vulnerable. Goeldner and Ritchie (2009) posed that the nature of tourism, as a cross-cutting sector that influenced—and was influenced by—many other sectors, made it susceptible to a varied set of external factors that could generate a crisis. Henderson (2007) described the vulnerabilities associated with the fragmented nature of the tourism sector, writing: “a structure that offers products related to the experience and that are the result of the joint work of several suppliers who must face various problems of fragmentation and control” (p. 8).

Conversely, other researchers have noted that tourism’s connection to other sectors of the economy does not necessarily weaken the industry (e.g., Glaesser 2003; Henderson 2007; Pennington-Gray et al. 2014; Pike 2004). For example, Pike (2004) observed that the tourism sector has proven itself to be resilient, through frequent tests that have demonstrated its capacity for quick recovery in the face of crisis, in many cases, much faster than other sectors. And after the 2010 earthquakes and tsunamis that affected destinations throughout Chile, Pennington-Gray et al. (2014) identified that the development of ongoing co-management approaches that would focus communities and destinations on bringing the diverse groups of actors involved in the tourism sector together through increased linkages, planning, and private-public coordination could contribute to increased resilience and effective disaster response/recovery. Glaesser (2003) and Henderson (2007) proposed a matrix that would help destinations identify the types of events that could affect tourism and analyze their possible impact, based on the level of surprise and the degree of control related to each event. According to these authors, greater levels of anticipation and control over events or shocks for tourism operators, tourists, and authorities would improve destination resilience (Glaesser 2003; Henderson 2007).

In recent years, territorial risk detention and reduction has advanced considerably as a result of the widespread adoption of the Sendai Framework for Disaster Risk Reduction 2015–2030 around the world. This framework is aligned with other global-level 2030 frameworks such as the Paris Agreement on Climate Change and the Sustainable Development Goals (United Nations 2015). The Sendai Framework offers several helpful concepts for evaluating and managing disaster risks and their potential impacts on the tourism sector. For example, it contains a roadmap of concrete actions to support its position about the primary role central governments should play in disaster risk reduction and the shared responsibility held by other public and private stakeholders—including local governments—for territorial assessment and resilience building (United Nations Office for Disaster Risk Reduction 2017b). One of the concrete tools that has been developed to assist with these efforts is the Quick Risk Estimation, which facilitates the identification and understanding of current and future risks, and exposure threats for human and physical assets (United Nations Office for Disaster Risk Reduction 2017a, b, 2021). This tool is notable as it employs citizen participation to identify risks and hazards associated with specific locations in smaller territories; thus, it may offer an interesting perspective for tourism destination risk evaluation efforts. And, while the QRD does



not support large-scale risk assessment, the hazard indicators included in the QRE tool are aligned with the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Sustainable Development Goals (United Nations Office for Disaster Risk Reduction 2017a, 2021).

## 14.3 Materials and Methods

### 14.3.1 Study Area

This chapter measures and compares key resilience factors in nature-based tourism destinations in the Aysén Region of Chilean Patagonia. The Aysén Region is one of the most remote areas of the Chilean territory, with a great wealth of natural resources and climatic variety, including Patagonian pampas, evergreen and deciduous forests, lakes, rivers, fjords, and glaciers. It is the region with the largest amount of fresh water in Chile and has the third largest extension of continental ice in the world. At the time of this research, approximately 50% of the territory was encompassed within SNASPE and managed under a range of Chilean mandates, including seven National Parks, eight National Reserves, and two Natural Monuments (Aedo et al. 2020). There were also several other forms of protected lands within the region, including private protected areas (PPAs), nature sanctuaries, national monuments, national conservation areas, marine protected areas, and municipal parks (Aedo et al. 2020).

In 2019, prior to a period of national social unrest and the subsequent COVID-19 pandemic, tourism in Aysén was at an all-time high, with a reported 217,711 tourist arrivals during the peak months of December 2018 through February 2019 (Chilean National Tourism Service 2019). For this same time period, the 11 SNASPE PAs that manage their entrances reported 88,158 visitors (Chilean National Tourism Service 2019). All four of the regional sub destinations chosen for the study focused their tourism offerings on nature and adventure, with PAs serving as important local attractions and settings. Each of the destinations had relevant strategic tourism planning instruments that guided tourism development, marketing, management, and governance (Pearce et al. 2016). Additionally, SNASPE PAs had relevant planning documents, including General Management Plans and Public Use Plans (Gale et al. 2018), and the Chilean National Emergency Office of the Ministry of the Interior (ONEMI) had designed various plans to deal with risk and disaster situations. Further, there was even a Regional Plan for Disaster Risk Reduction (Chilean National Emergency Office of the Ministry of the Interior 2018).

The Aysén Region of Chilean Patagonia can be divided into four sub destinations, which comprised the study area for the research presented in this chapter: Aysén Patagonia Queulat, Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and the *Provincia de los Glaciares* (Province of the Glaciers). The Aysén Patagonia Queulat sub destination is one of three officially declared Zones of



Interest for Tourism (ZOITs), along with Lago General Carrera and the Provincia de los Glaciares. ZOITs are officially designated territories within Chile, recognized for having special conditions that make them especially attractive for tourism. Along with other planning and management requirements, having a ZOIT designation implies that tourism development within the territory will be managed in a participatory manner (Chilean National Tourism Service 2017). Two of the sub destinations, Aysén Patagonia Queulat and the Provincia de los Glaciares, are located in more remote areas of the Aysén Region, while the other two, Coyhaique-Puerto Aysén-Cerro Castillo and Lago General Carrera, are closer to urban centers.

The Aysén Patagonia Queulat ZOIT is located within the northern part of the Aysén Region and includes several PAs (i.e., Queulat National Park, Melimoyu National Park, Isla Magdalena National Park, Lago Las Torres National Reserve, Lago Carlota National Reserve, and Lago Rosselot National Reserve), distributed within three communes: Guaitecas, Cisnes, and Lago Verde. The Coyhaique-Puerto Aysén-Cerro Castillo sub destination represents the most developed transect of the Aysén Region, including the regional capital of Coyhaique and the second largest city in the region, Puerto Aysén. PAs in this sub destination include large sections of the Cerro Castillo National Park, Río Simpson National Reserve, Coyhaique National Reserve, Dos Lagunas National Monument, and a number of private reserves and urban parks. The Lago General Carrera sub destination is also a ZOIT, under the name of Chelenko. The Chelenko ZOIT is located in the central zone of the Aysén Region, in the territory surrounding Lago General Carrera, which includes large sections of Cerro Castillo National Park, San Rafael Lagoon National Park, and the Jeinimeni Sector of Patagonia National Park, distributed within the Río Ibáñez and Chile Chico communes (Chilean National Tourism Service and Guazzinni Consultores 2017). The final sub destination in the study, located in the southernmost reaches of the Aysén Region, is the Provincia de los Glaciares, also designated as a ZOIT. This sub destination includes much of San Rafael Lagoon National Park, Patagonia National Park, and Bernardo O'Higgins National Park, distributed within three communes, Cochrane, Tortel, and O'Higgins (Chilean Subsecretary of Tourism 2017).

The Aysén Region and its sub destinations are exposed to a number of natural hazards including seismic (tectonism, mass movements associated with the presence of the Andes Mountains), tidal waves or tsunamis, volcanic eruptions, hydro-meteorological events (i.e., river flooding, river erosion, snowfall, alluvium), and forest fires (Chilean National Emergency Office of the Ministry of the Interior 2018). The region has also experienced natural disasters of great magnitude, including the forest fires that occurred in the Guaitecas islands in 1998, the eruptions of the Hudson volcano in 1971, 1991, and 2011, forest fires in the sector of La Junta in 1996 affecting 50 km<sup>2</sup>, forest fires in the sector of La Taperia in 2007 affecting 70 km<sup>2</sup>, forest fires in the Pallavicini sector in 2009 affecting 80 km<sup>2</sup> in Chile and 120 km<sup>2</sup> in Argentina, a frontal system bringing blizzards to much of the region in 2010, and forest fires in Coyhaique, Balmaceda, and Puerto Chacabuco in 2014.

### 14.3.2 *Evaluation Procedures for Resilience Factors and Risk*

The research employed an exploratory, mixed-methods, descriptive approach to evaluate resilience factors and risk for the four Aysén tourism sub destinations mentioned: Aysén Patagonia Queulat, Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and the Provincia de los Glaciares.

For both resilience factors and risk, the research team identified documents containing information about plans, programs, natural and anthropogenic hazards and phenomena, and initiatives that could affect tourism resilience in each of the four sub destinations. Criteria used for the search included that the documents be available in digital format, accessible to the public, and published between the year 2000 and the time of the study. The final collection of 28 articles was authored by public institutions, business organizations, NGOs, universities, and national and regional research centers.

For the evaluation of tourism resilience factors, document analysis involved a systematic search of the texts and figures to identify content and imagery related to the Gutiérrez (2013) matrix, which included the Ecoespaña and the WRI (2009) resilience factors: *capacities*, *ownership*, and *connections* and four domains or spheres of action: *Economic/Touristic*, *Environmental*, *Political/Institutional*, and *Sociocultural* (Fig. 14.1).

When questions or doubts arose for the team, they contacted tourism, land planning, and risk/disaster experts within the Aysén Region and/or sub destination to clarify through guided discussions. This iterative approach of secondary and primary data collection continued until the research team was satisfied that they were informed adequately and could conduct a qualitative evaluation, based on rankings, for each of the sub destinations. This evaluation involved coding each of the factors and criteria with respect to three areas: (1) whether or not it was *observed* in the data, (2) their understanding of its *impact* on destination resilience (positive or negative), and (3) its *relevance* for destination recovery. Each member of the team coded individually, and then triangulation was conducted to arrive at a consensus around the final scores.

Natural and anthropogenic hazards were also identified and ranked according to *likelihood* and *severity*, using the definitions and process outlined by the QRE (United Nations Office for Disaster Risk Reduction 2017a, 2021). For example, the likelihood was assessed in terms of the potential for an event to occur as a result of a hazard, based on existing hazards, trends, and historical events, in comparison to other potential events within the same territory. Decisions were influenced by the team's understanding of the territory's exposure and vulnerability, as well as the current prevention measures and actions in place (scale of 1–10). Severity was rated according to the perceived impact and consequence that each of the hazards could have on the territory and sub destination (scale of 0–100). Lower scores were associated with decreased likelihood and severity, while higher scores were associated with increased likelihood and severity and therefore called for a more substantial response (United Nations Office for Disaster Risk Reduction 2017a, 2021).

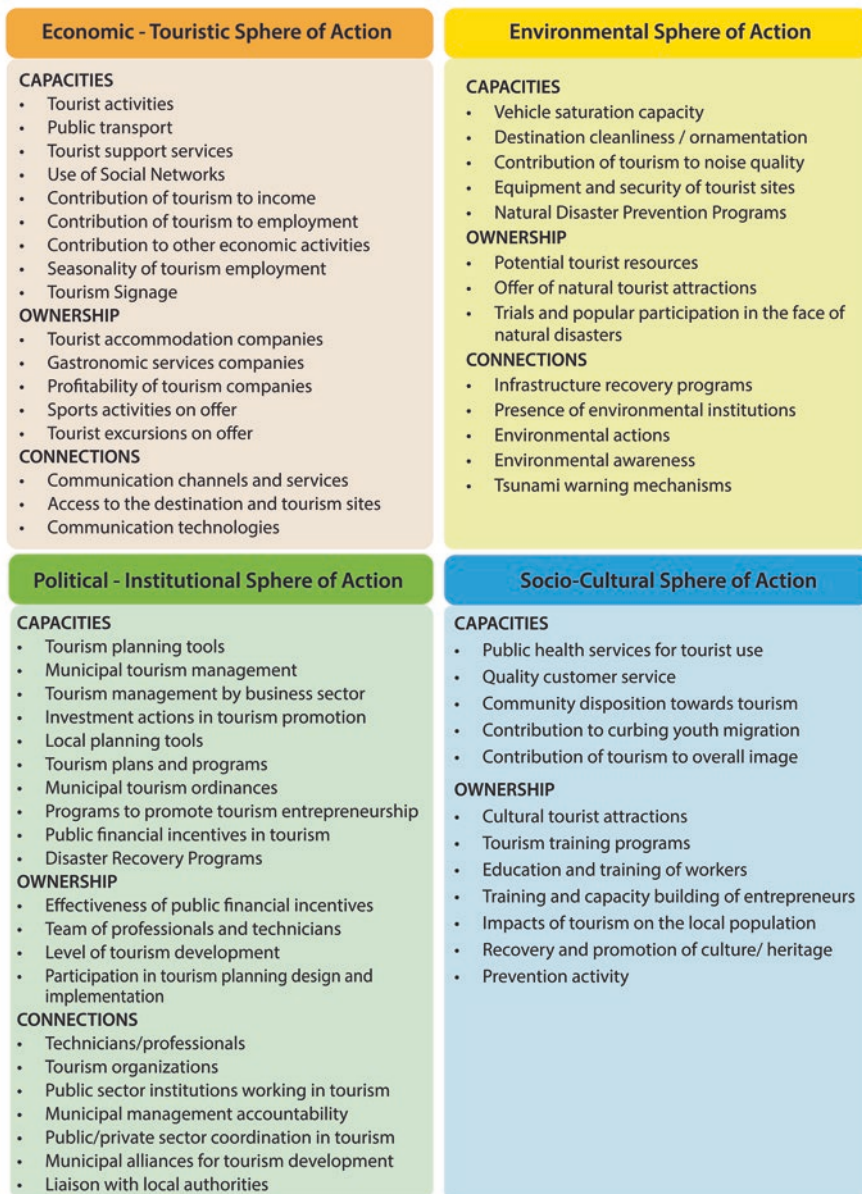


Fig. 14.1 Resilience indicators by spheres of action for each of the three factors considered in the study

### 14.3.3 Analysis

To analyze the tourism destination resilience data, each member of the research team assigned a value from one to five for each indicator and sub destination, along a scale of one to five, based on the amount of evidence and clarity with which each indicator was addressed. Indicators that were not mentioned within any of the documents received a score of one. Those which received only casual mention within one or more of the documents received a score of two. Indicators that were explicitly addressed within one or more of the documents with a concrete mention within larger strategies or tactics received a three. Indicators for which there were specialized technical plans and strategies received a four. Finally, indicators with specialized technical plans and strategies that also had established monitoring actions received a five. A score of three or more signified that the indicator was *observed* at the destination. Once the individual rankings were complete, the team realized a process of triangulation to achieve a consensus for each indicator and sub destination. Then, the destination tourism resilience equation (Eq. 14.1), developed by Gutiérrez (2013), was employed to compare the findings for each of the four sub destinations:

$$F = \left\{ \left[ \left( \text{PI}rO \times \omega_i^r + \text{PI}nrO \times \omega_i^{nr} \right) \times g \right] + \left[ \left( \text{NI}rNO \times \omega_i^r + \text{NI}nrNO \times \omega_i^{nr} \right) \times h \right] \right\} - \left\{ \left[ \left( \text{NI}rO \times \omega_i^r + \text{NI}nrO \times \omega_i^{nr} \right) \times g \right] + \left[ \left( \text{PI}rNO \times \omega_i^r + \text{PI}nrNO \times \omega_i^{nr} \right) \times h \right] \right\} \quad (14.1)$$

- “*F*” being the resilience factor analyzed (capabilities, ownership, connections)
- *PI* = Positive impact for resilience
- *NI* = Negative impact for resilience
- *r* = Highly relevant for recovery
- *nr* = Non-highly relevant for recovery
- *O* = Observed
- *NO* = Not observed
- $\omega_i^r$  and  $\omega_i^{nr}$  = Weighting factor used to consider highly relevant and not highly relevant aspects for recovery in the measurement of the factor,  $\sum \omega_i^r + \sum \omega_i^{nr} = 1$
- *g* and *h* = Weighting factor used to consider *observed* and *not observed* indicators,  $g + h = 1$

During the resiliency indicator evaluation phase, relevancy differences emerged for the tourism destinations for some of the measures related to recovery considerations. Thus, a weighting was used ( $\omega_i^r$  and  $\omega_i^{nr}$ ), which assigned a weight of 0.70 to the highly relevant factors that arose during a subjective determination by a panel of tourism stakeholders and experts, and a weight of 0.30 was assigned to non-highly relevant factors from this panel (Gutiérrez 2013). The objective of this weighting was to highlight aspects that tourism stakeholders and experts should view as decisive when facing adversities or crises (Gutiérrez 2013).

A second weighting was applied to the factors (*g* and *h*), based on the prior sensitivity analysis developed by García (2005), which established a weighting of 0.51

for resiliency factors that were observed by the panel (scores of 3–5) and 0.49 for factors that were not observed by the panel (scores of 1 or 2). The objective of this weighting measure was to assign a special value to the factors that would have an impact on the final resilience calculation for each of the destinations under study.

Once scores were achieved for each of the three factors, sub destination resiliency scores were calculated by adding the scores obtained for each of the three factors (capabilities, ownership, connections). Sub destination category scores for risk (geophysical, hydrological, meteorological, climatological, anthropogenic) were obtained by multiplying the average likelihood and severity values for the hazards that were observed in the data related to the respective category. Sub destination scores were calculated by multiplying the average likelihood and severity values for all of the hazards observed.

## 14.4 Results

### 14.4.1 Resilience Factors and Indicators

The majority of *Capabilities* factor indicators were evaluated as having a positive effect on destination resilience within all four sub destinations, with the exception of the *seasonality of tourism employment*, the *vehicle saturation capacity*, *destination cleanliness/ornamentation*, and the *contribution of tourism to noise quality* (Fig. 14.2). Nine highly relevant tourism resilience *capability* indicators were present for the sub destinations, including the *seasonality of tourism employment*, *equipment and security of tourist sites*, *natural disaster prevention programs*, *tourism planning tools*, *municipal tourism management*, *tourism management by business sector*, *tourism plans and programs*, *disaster recovery programs*, and *public health services for tourist use*. The main differences between sub destinations with respect to the capabilities factor manifested within the evaluation of whether or not indicators were observable within the data. For example, while capabilities relating to *the use of social networks* and *community disposition for tourism* were observed within the data for the Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and Provincia de los Glaciares sub destination, these indicators did not manifest within the data related to the Aysén Patagonia Queulat sub destination. And only the Lago General Carrera sub destination showed clear capacities with respect to the *vehicle saturation capacity*, the *equipment*, and the *security of tourist sites* indicators. Another notable difference was found in the *tourism plans and programs* and *contribution to curbing youth migration* indicators. For both of these indicators, all of the ZOIT destinations had clearly documented capacities; yet, they were not observed within the data for the Coyhaique-Puerto Aysén-Cerro Castillo sub destination.

All of the *Ownership* factor indicators were evaluated as having a positive effect on tourism resilience, with the exception of the *impacts of tourism on the local*



CABILITIES RESILIENCE FACTOR		AYSÉN PATAGONIA QUEULAT (ZOIT)					COYHAIQUE-PUERTO AYSÉN - CERRO CASTILLO					LAGO GENERAL CARRERA (ZOIT CHELENKO)					PROVINCIA DE LOS GLACIARES (ZOIT)									
Spheres of Action	Tourism indicators	Evaluation variables					Evaluation variables					Evaluation variables					Evaluation variables									
		PI	NI	r	nr	O	NO	PI	NI	r	nr	O	NO	PI	NI	r	nr	O	NO	PI	NI	r	nr	O	NO	
Economic - Touristic	Tourist activities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Public transport	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tourist support services	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Use of Social Networks	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution of tourism to income	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution of tourism to employment	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution to other economic activities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Seasonality of tourism employment	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tourism Signage	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Environmental	Vehicle saturation capacity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Destination cleanliness / ornamentation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution of tourism to noise quality	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Equipment and security of tourist sites	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Natural Disaster Prevention Programs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Political - Institutional	Tourism planning tools	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Municipal tourism management	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tourism management by business sector	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Investment actions in tourism promotion	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Local planning tools	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tourism plans and programs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Municipal tourism ordinances	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Programs to promote tourism entrepreneurship	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Public financial incentives in tourism	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Disaster Recovery Programs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Socio - Cultural	Public health services for tourist use	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Quality customer service	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Community disposition towards tourism	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution to curbing youth migration	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Contribution of tourism to overall image	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Fig. 14.2 Capabilities tourism resilience indicators scorecard for the four tourism sub destinations in Aysén

population (Fig. 14.3). Eight highly relevant indicators emerged within the literature associated with the sub destinations, including *trials and popular participation in the face of natural disasters, education and training of workers, training and capacity building of entrepreneurs, impacts of tourism on the local population, recovery and promotion of culture/heritage, prevention activity, effectiveness of public financial incentives, and levels of tourism development*. Of the three tourism resilience factors, the most differences between the sub destinations arose with respect to the observation of strategies and actions related to the indicators within the *Ownership* factor. In fact, differences resulted between the sub destinations for indicators across all four spheres of *Ownership* action. For example, *tourist accommodation companies* and *gastronomic services companies* were not observed in Provincia de los Glaciares. And evidence related to the *tourist excursions on offer*

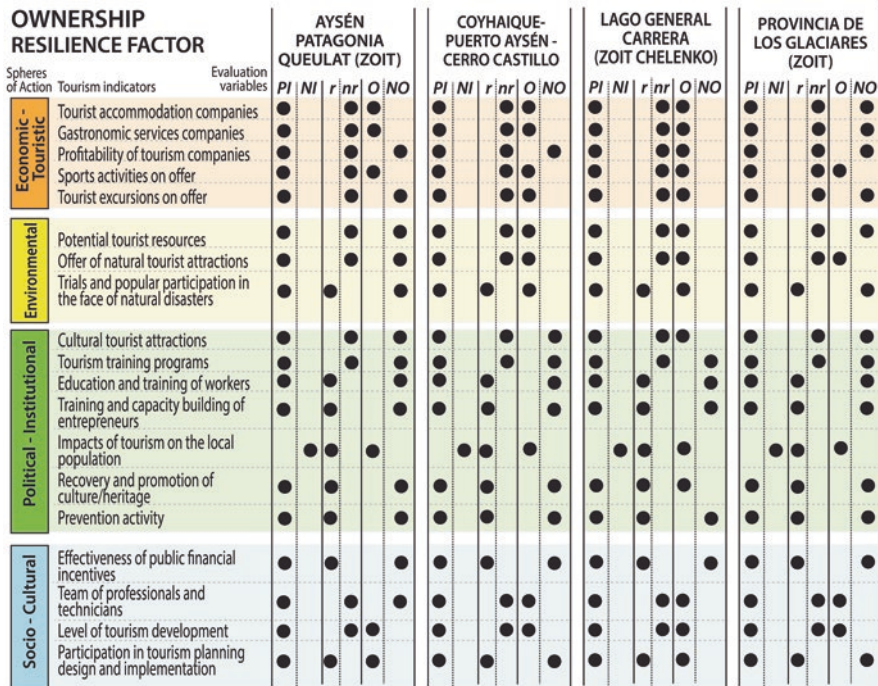


Fig. 14.3 Ownership tourism resilience indicators scorecard for the four tourism sub destinations in Aysén

indicator was observed in Coyhaique-Puerto Aysén-Cerro Castillo and Lago General Carrera, but not observed in Aysén Patagonia Queulat or Provincia de los Glaciares.

All of the *Connections* factor indicators were evaluated as having a positive effect on tourism resilience within the four sub destinations (Fig. 14.4). Six of the indicators were evaluated as being highly relevant for tourism recovery, including *communication channels and services*, *access to the destination and tourism sites*, *communication technologies*, *infrastructure recovery programs*, *public/private sector coordination in tourism*, and *municipal alliances for tourism development*. Differences between the sub destinations occurred across all three of the *Connections* spheres of actions, with respect to evidence of the indicators within the data. For example, evidence of *communication channels and services* arose within the Coyhaique-Puerto Aysén-Cerro Castillo and Lago General Carrera sub destinations but was absent in Aysén Patagonia Queulat and Provincia de los Glaciares. And, while the investigators observed clear evidence of *infrastructure recovery programs* and a *presence of environmental institutions*, in all of the sub destinations they did not observe evidence of *environmental actions* in Provincia de los Glaciares and only observed evidence of *environmental awareness* in Coyhaique-Puerto Aysén-Cerro Castillo. Similarly, for the *Political-Institutional* sphere of action, while all of



CONNECTIONS RESILIENCE FACTOR		AYSÉN PATAGONIA QUEULAT (ZOIT)					COYHAIQUE-PUERTO AYSÉN - CERRO CASTILLO					LAGO GENERAL CARRERA (ZOIT CHELENKO)					PROVINCIA DE LOS GLACIARES (ZOIT)											
Spheres of Action	Tourism indicators	Evaluation variables					PI	NI	r	nr	O	NO	PI	NI	r	nr	O	NO	PI	NI	r	nr	O	NO				
		PI	NI	r	nr	O																			NO			
Economic-Touristic	Communication channels and services	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Access to the destination and tourism sites	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Communication technologies	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Environmental	Infrastructure recovery programs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Presence of environmental institutions	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Environmental actions	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Environmental awareness	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tsunami warning mechanisms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Political-Institutional	Technicians/professionals	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Tourism organizations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Public sector institutions working in tourism	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Municipal management accountability	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Public/private sector coordination in tourism	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Municipal alliances for tourism development	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Liaison with local authorities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

Fig. 14.4 Connections tourism resilience indicators scorecard for the four tourism sub destinations in Aysén

the sub destinations had evidence of there being *municipal alliances for tourism development*, a *liaison with local authorities* was not observed for the Aysén Patagonia Queulac sub destination, and evidence of *public sector institutions working in tourism* was only observed for the Coyhaique-Puerto Aysén-Cerro Castillo sub destination.

From the indicator evaluations, factor resilience scores were determined for the four sub destinations (Fig. 14.5). All four sub destinations scored positively for the *Capabilities* and *Connections* factors and negatively for the *Ownership* factor. The *Capabilities* factor of resilience was generally the strongest factor for sub destinations within the Aysén territory; however, for both the Aysén Patagonia Queulac and the Provincia de los Glaciares sub destinations, *Capability* and *Connections* factor scores were very similar; in fact, for the Provincia de los Glaciares, the *Connections* factor score was slightly stronger than the *Capabilities* factor score.

The Lago General Carrera sub destination scored most favorably across the factors, with scores of 0.420 and 0.369 for the *Capabilities* and *Connections* factors, respectively, and the most negative score for the *Ownership* factor (-0.326). The Aysén Patagonia Queulac sub destination scored least favorably across the factors, with scores under 0.1 for both *Capabilities* and *Connections* factors and a score of -0.449 for the *Ownership* factor. The other two sub destinations scored in between; the Coyhaique-Puerto Aysén-Cerro Castillo sub destination obtained a better rating than the Provincia de los Glaciares for both *Capabilities* and *Ownership*; yet, for *Connections*, the Provincia de los Glaciares ranked higher.

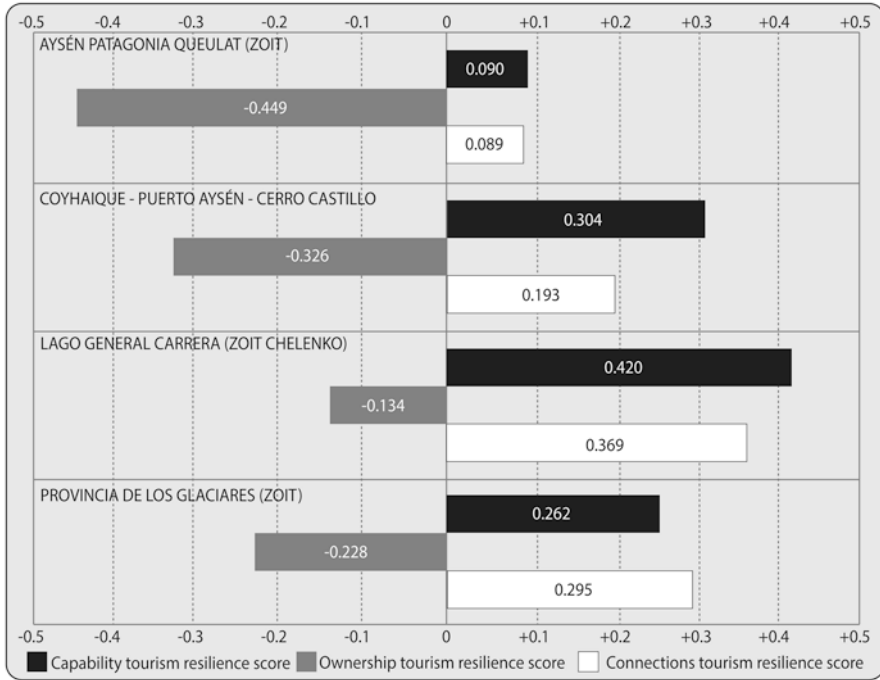


Fig. 14.5 Tourism resilience factor score for the four sub destinations in Aysén

### 14.4.2 Risk Analysis Results

The risk analysis for the four sub destinations (Table 14.1) showed several common risks across the four sub destinations, including *falling ash*, in the *Geophysical* category, and all of the phenomena within the *Hydrological* category of hazards (*overflowing rivers, avalanche/snowslides, and rockslides/falling boulders*), as well as several *Meteorological* risks, including *cold waves, snow/ice, and freezing temperatures*. *Anthropogenic* risks, including *traffic accidents and boating accidents*, were also common across the sub destinations.

The *meteorological* risk was evaluated as the highest category of risk, with an average score of 228 for the four sub destinations (Fig. 14.6). This average was heavily influenced by the Provincia de los Glaciares and the Aysén Patagonia Queulat sub destination scores (213 and 202, respectively). *Geophysical* risks were the next highest scoring category with an average risk of 206 between the four sub destinations. Within this category, the Lago General Carrera and Aysén Patagonia Queulat sub destinations received the highest scores (213 and 202, respectively).

**Table 14.1** Risks identified by type and destination within the Aysén Region based on the document analysis

	Aysén Patagonia Queulat (ZOIT)		Coyhaique- Puerto Aysén-Cerro Castillo		Lago General Carrera (ZOIT Chelenko)		Provincia de los Glaciares (ZOIT)	
	L	S	L	S	L	S	L	S
<i>Likelihood (L) and Severity (S):</i>								
<i>Geophysical category—Averages</i>	5	43	6	30	6	40	5	43
Post-event landslide	6	50	7	30	6	40	–	–
Ground movement	–	–	4	10	–	–	6	30
Falling ash	2	20	7	30	6	50	6	60
Volcanic mudflows	–	–	5	40	–	–	3	30
Landslide	6	60	7	40	5	30	5	50
<i>Geophysical risk</i>	202		180		227		213	
<i>Hydrological category—Averages</i>	6	30	5	17	4	27	5	47
Overflowing rivers	6	10	4	20	2	20	6	40
Avalanche/snowslides	6	40	6	10	6	40	5	50
Rockslides/falling boulders	6	40	6	20	5	20	5	50
<i>Hydrological risk</i>	180		89		116		248	
<i>Meteorological category—Averages</i>	7	40	7	20	5	28	7	53
Cold wave	7	60	7	20	6	40	7	50
Snow/ice	7	50	8	20	6	10	8	50
Freezing	6	10	7	20	4	20	7	50
Hail	–	–	–	–	5	50	–	–
Heatwave	–	–	–	–	2	20	–	–
Wind	–	–	–	–	–	–	6	60
<i>Meteorological risk</i>	267		147		129		368	
<i>Climatological category—Averages</i>	6	30	6	10	3	20	6	40
Forest fire	6	30	6	10	–	–	6	30
Brush fire	–	–	–	–	3	20	–	–
Flooding	–	–	–	–	–	–	5	50
<i>Climatological risk</i>	180		60		60		220	
<i>Anthropogenic category—Averages</i>	5	15	6	10	5	10	5	10
Traffic accident	6	10	6	10	5	10	5	10
Boating accident	4	20	5	10	5	10	4	10
Aircraft accident	–	–	–	–	–	–	5	10
<i>Anthropogenic risk</i>	75		55		50		47	
<b>Sub destination average</b>	<b>6</b>	<b>33</b>	<b>6</b>	<b>21</b>	<b>5</b>	<b>27</b>	<b>6</b>	<b>39</b>
<b>Sub destination risk</b>	<b>189</b>		<b>126</b>		<b>128</b>		<b>219</b>	

Notes: L = Likelihood score, scale of 0–10; S = Severity score, scale of 0–100

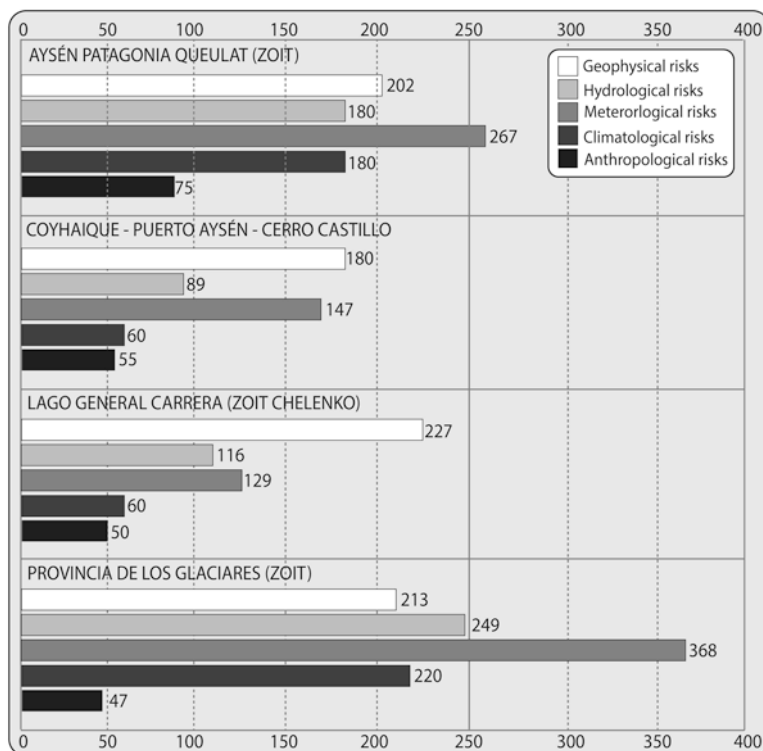


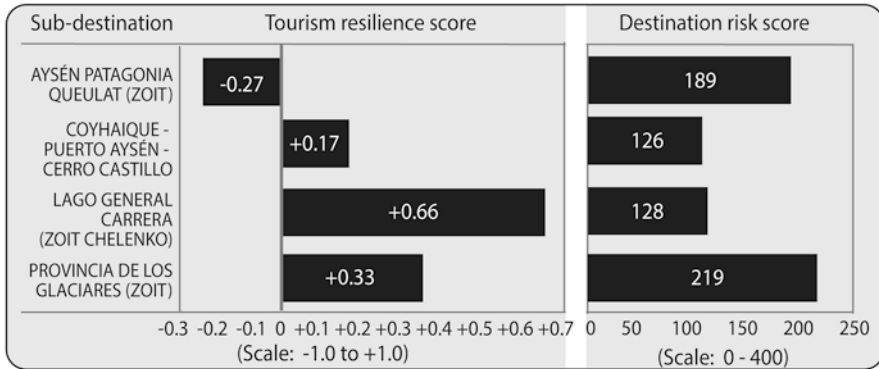
Fig. 14.6 Territorial risks by category for the four sub destinations in Aysén

Based on the data, *Anthropogenic* risks received the lowest ratings, with an average score of 57, which was influenced primarily by the high score within the Aysén Patagonia Queulat sub destination (75) and the low risk score within the Provincia de los Glaciares (47).

## 14.5 Discussion

### 14.5.1 Integrating Resilience Factors with Territorial Risks

This study investigated the synergy between community resilience factors for tourism and territorial risk to provide a more integrated view of tourism destination resilience. Integrating the resilience factors and risks for the four sub destinations in the Aysén Region of Chilean Patagonia provides a simple scorecard that may help tourism actors within these territories understand their current situations and how tourism in their territories is likely to respond in the face of natural adversities (Fig. 14.7).



**Fig. 14.7** Destination tourism resilience and risk scores for the four sub destinations in Aysén

At the time of our study, results indicated that the Lago General Carrera sub destination presented the best combination of resilience factors for facing risk. Moreover, the risk analysis results suggested relatively low levels of territorial risk in comparison to the two more remote regional sub destinations Aysén Patagonia Queulat and Provincia de los Glaciares. Nevertheless, our analysis identified some specific areas that will require continued attention and resources, including the development of a critical mass of good quality lodging providers and increased opportunities for specialized education and training. And all levels of natural risks can have a negative impact on territories, so although this sub destination fared well in our analysis, this does not mean that they are enough to positively overcome adversity. In general, favorably overcoming adversity requires that destinations have: a strong commitment to efficient financial support, municipal alliances in tourism, private alliances, public-private coordination bodies in tourism, training and capacity building for the sector, and stable participation mechanisms for the design, planning, and implementation of tourism development plans.

The Provincia de los Glaciares sub destination had the second highest resilience index of the four sub destinations but scored highest of the four in terms of risk factors. This sub destination includes three communes: Cochrane, Tortel, and O’Higgins, each with its own political and administrative teams and capacities; building tourism resilience will require strong collaborations between these groups. Efforts are required for the generation of public and private coordination bodies in tourism, as well as alliances between the different municipalities involved. Analysis of this sub destination also suggested the need for more and higher quality lodging, tourism support services, and public transport options. Also, our analysis suggested the importance of expanded education and training for the tourism sector, and the need for formal protocols for the management of natural disasters, accompanied by periodic simulations to improve awareness, participation, and preparedness among sector actors and local communities. Tourists should also be made aware of risks and disaster response procedures. Relatedly, a number of deficiencies were identified with respect to communication mechanisms, including insufficient coverage

and bandwidth for cellular and internet connectivity, and low use of communication technologies by tourism service providers.

The Coyhaique-Puerto Aysén-Cerro Castillo scored positively in terms of tourism resilience but lower than the previous two sub destinations. This territory scored lowest in terms of risk factors; however, its location, between important urban points of connection, makes it more vulnerable to the effects that natural hazards could have. Specifically, with urban centers such as Puerto Aysén, Mañihuales, Coyhaique, Balmaceda, and Villa Cerro Castillo, this destination represents some of the larger urban centers regionally, with greater anthropogenic intervention; thus, the impacts of natural disasters are more widespread, extending beyond the natural environment of PAs to affect infrastructure and safety for human within the cities and towns. For this reason, we recommend a focus on building tourism ownership levels, through joint development of public financial incentives, participatory tourism planning design and implementation, and training and capacity building, including prevention training. Efforts should span the different municipalities and private actors of this sub destination, building connections and networks of professionals and technicians that are prepared to collaborate.

The Aysén Patagonia Queulat sub destination had the only negative score, indicating that this sub destination is least prepared to handle adversity. Moreover, this sub destination scored high in terms of destination risk. Priority actions for this sub destination include programs to evaluate and improve the safety of tourism sites and mechanisms to extend the tourism season, reducing dependence on the relatively short Patagonia summer. Integrated destination planning and management arose as areas that needed increased emphasis within the Aysén Patagonia Queulat sub destination, with active participation from all of the affected municipalities and stakeholders. A number of negative tourism impacts surfaced in the data for Aysén Patagonia Queulat, including cleanliness, noise pollution, vehicle congestion, and an inflation of prices for goods, services, land, and housing. Addressing these issues will require coordination and participation beyond the tourism sector. Perhaps tourist dispersion can be improved, helping to address some of the crowding-related issues, if tourist resources that have not yet been leveraged are developed for safe and appropriate use. We recommend developing recreational and entertainment activities for the local population, with ancillary use by tourists. This may generate a greater disposition toward tourism among the local community and in parallel create additional cultural tourism products and experiences. It is tremendously important to have professionals in the area of tourism to support the different aspects of tourism development in the destination, from the provision of information, to planning and management, to disaster recovery. A number of other deficiencies were identified in our analysis, including a lack of sufficient, high-quality, tourist support services, public transport and health services, and the need for better management of social networks at the public and private sector levels so that they include a tourism focus.

## 14.6 Conclusions

This chapter employed the Gutiérrez (2013) model for measuring tourism resilience factors within four tourism sub destinations in the Aysén Region of Chilean Patagonia: Aysén Patagonia Queulat, Coyhaique-Puerto Aysén-Cerro Castillo, Lago General Carrera, and the Provincia de los Glaciares. Analysis of Gutiérrez's (2013) factors and indicators produced a set of valuable diagnostic snapshots for the destinations, providing important inputs for resilience strategies and plans (Figs. 14.2, 14.3, and 14.4). Moreover, applying the research process to the four Aysén sub destinations helped us identify current areas of strength as well as priorities for resilience development in the coming years.

Our analysis of the *Capacities* tourism resilience factor demonstrated positive results for all four sub destinations. Results were especially positive for the Lago General Carrera and Coyhaique-Puerto Aysén-Cerro Castillo sub destinations, where the factor scores were 0.420 and 0.304, respectively, on a scale of  $-0.5$  to  $+0.5$ . This seems logical; these two sub destinations are the most consolidated within the region and include the largest urban centers, where there is a larger concentration of tourism infrastructure, operators, and secondary services. The *Connections* factor scores were highest for Lago General Carrera and the Provincia de los Glaciares (0.369 and 0.295, respectively, on a scale of  $-0.5$  to  $+0.5$ ). We attribute these high scores to the work that has been done over the past several years in the designation and management of the ZOITs. The Coyhaique-Puerto Aysén-Cerro Castillo sub destination scored much lower in this area, reflecting the lack of coordination and networking that has occurred to date between tourism stakeholders involved with the main sites of this destination that are dispersed within three separate communes: Aysén, Coyhaique, and Río Ibáñez. All four destinations received low scores for the *Ownership* resilience factor. We attribute these deficiencies to two main factors. First, throughout the Aysén Region, there is a scarcity of tourism professionals and technicians to manage and support the development of tourism, especially at a sub destination level. Second, tourism-related territorial planning, including risk management and disaster recovery, is lacking, especially in terms of coordinated plans between sectors and communes. Finally, a review of the factor scores for the Aysén Patagonia Queulat sub destination revealed deficiencies in all areas as compared with the other sub destinations.

Next, we conducted a risk analysis, building on prior work from the United Nations Office for Disaster Risk Reduction (2017a, b, 2021), to illuminate several common risks across the four sub destinations and provide them with comparisons that can inform both local and regional tourism sector planning and management. Through this analysis, we identified the increased risks associated with more remote sub destinations, such as Aysén Patagonia Queulat and the Provincia de los Glaciares. The biggest areas of risks were associated with meteorological risks, though geophysical risks were also of concern. Anthropogenic risks were evaluated as lowest in our models for all four destinations; nevertheless, some of the biggest anthropogenic risks, such as recent social movements and the COVID-19 pandemic, were not captured by our model. More research is needed to develop and fine-tune



tourism risk models, capable of capturing the broad range of contemporary anthropogenic risk, so that we can consider these factors in future planning and management.

Finally, we integrated these two analyses to provide an easily navigable dashboard (Fig. 14.7) that provides valuable information for developing local destination-level resilience strategies, public policies, and strategic roadmaps. At a regional level, this dashboard is helpful for informing priorities and areas for needed investment. For example, the combinations of scores in Aysén Patagonia Queulat and Provincia de los Glaciares indicate a regional priority for investment in tourism resilience planning and capacity building, including disaster planning and simulation.

To support these efforts, it is essential that public and private actors in the territories involved conduct more in-depth research to further understand the indicators and factors of tourism risk and resilience. Research and practice must incorporate all decision-makers, public and private managers, representatives of the communities, and also the tourists who visit each of these sub destinations. Co-management frameworks, such as the Tourism Area Response Network (TARN) proposed by Pennington-Gray et al. (2014), provide interesting frameworks from which to build and should be considered in future research and practice. There is little doubt that preparing nature-based tourism destinations where there are an abundance of PAs and a blend of urban and remote areas to manage and recover from crises and disaster is of vital importance. We hope this study will inform and advance the consolidation of actors in these destinations and prepare them to be stronger in the face of adversity.

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## References

- E. Aedo, A. Rovira, J. Boldt, G. Inostroza, G. Pacheco, P. Szmulewicz, E. Szmulewicz, A. Arriagada, A. Malla, D. Quintana, *Turismo sustentable y áreas silvestres protegidas en Patagonia, Chile (Sustainable Tourism and Protected Wilderness Areas in Patagonia, Chile)*, ed. by P. Szmulewicz (Kultrún, 2020)
- A. Al-Khateeb, How global tourism can become more sustainable, inclusive and resilient. World Economic Forum, 12 Apr 2021. <https://www.weforum.org/agenda/2021/04/how-global-tourism-can-become-more-sustainable-inclusive-and-resilient/>
- S. Becken, B. Khazai, Resilience, tourism and disaster, in *Tourism and Resilience*, ed. by R.W. Butler, (CABI Publishing, Wallingford, 2017), pp. 96–104
- D. Biggs, C.M. Hall, N. Stoeckl, The resilience of formal and informal tourism enterprises to disasters: Reef tourism in Phuket, Thailand. *J. Sustain. Tour.* **20**(5), 645–665 (2012). <https://doi.org/10.1080/09669582.2011.630080>
- A. Blake, M. Sinclair, Tourism crisis management: US response to September 11. *Ann. Tour. Res.* **30**(4), 813–832 (2003). [https://doi.org/10.1016/S0160-7383\(03\)00056-2](https://doi.org/10.1016/S0160-7383(03)00056-2)
- E. Calgaro, K. Lloyd, D. Dominey-Howes, From vulnerability to transformation: A framework for assessing the vulnerability and resilience of tourism destinations. *J. Sustain. Tour.* **22**(3), 341–360 (2014). <https://doi.org/10.1080/09669582.2013.826229>

- S.R. Carpenter, K.J. Arrow, S. Barrett, R. Biggs, W.A. Brock, A.S. Crépin, et al., General resilience to cope with extreme events. *Sustainability* **4**(12), 3248–3259 (2012). <https://doi.org/10.3390/su4123248>
- S. Chang, Urban disaster recovery: A measurement framework and its application to the 1995 Kobe earthquake. *Disasters* **34**(2), 303–327 (2009). <https://doi.org/10.1111/j.1467-7717.2009.01130.x>
- Chilean National Emergency Office of the Ministry of the Interior, *Plan regional para la reducción del riesgo de catástrofes (Regional Plan for Disaster Risk Reduction)* (Ministerio del Interior, 2018)
- Chilean National Tourism Service, *Plan de acción Región de Aysén del General Carlos Ibáñez del Campo sector turismo 2014–2018 (Aysén Region of General Carlos Ibáñez del Campo Tourism Sector Action Plan 2014–2018)* (Sernatur, 2014). Retrieved 13 Jan 2023, from <https://www.sernatur.cl/wp-content/uploads/2018/10/Plan-de-Accio%CC%81n-Aysen.pdf>
- Chilean National Tourism Service, *Plan de acción para la gestión participativa de Zonas de Interés Turístico (ZOIT): Aysén Patagonia Queulat (Action Plan for Participatory Management of Zones of Tourist Interest (ZOIT): Aysén Patagonia Queulat)* (Sernatur, 2017). Retrieved 12 Jan 2023, from <http://www.subturismo.gob.cl/wp-content/uploads/2015/10/Plan-Accion-ZOIT-Patagonia-Queulat.pdf>
- Chilean National Tourism Service, *Barómetro Región de Aysén (Aysén Región Barometer)* (Sernatur, 2019). Retrieved 23 Jan 2023, from [https://estadisticas.aysenpatagonia.cl/app-assets/pdf/barometro\\_v11.pdf](https://estadisticas.aysenpatagonia.cl/app-assets/pdf/barometro_v11.pdf)
- Chilean National Tourism Service & Guazzinni Consultores, *Plan de acción para la gestión participativa de Zonas de Interés Turístico (ZOIT): Zona de interés turístico Chelenko (Action Plan for the Participatory Management of Zones of Tourist Interest (ZOIT): Chelenko Area of Tourist Interest)* (Sernatur, 2017). Retrieved 20 Dec 2022, from <http://www.subturismo.gob.cl/wp-content/uploads/2015/10/Plan-Accion-ZOIT-Chelenko.pdf>
- Chilean Subsecretary of Tourism, *Plan de acción para la gestión participativa de las Zonas de Interés Turístico (ZOIT), Zona de interés turístico Provincia de los Glaciares (Action Plan for the Participatory Management of the Zones of Tourist Interest (ZOIT): Glacier Province Zone of Tourist Interest)* (Sernatur, 2017). Retrieved 20 Dec 2022, from <http://www.subturismo.gob.cl/wp-content/uploads/2015/10/PLAN-ACCI%CC%83%93N-PROVINCIA-DE-LOS-GLACIARES.pdf>
- P. Cuevas-Reyes, Importancia de la resiliencia biológica como posible indicador del estado de conservación de los ecosistemas: Implicaciones en los planes de manejo y conservación de la biodiversidad (Importance of biological resilience as a possible indicator of ecosystem conservation status: Implications for biodiversity management and conservation plans). *Biológicas* **12**(1), 1–7 (2010)
- N. De Sausmarez, The potential for tourism in post-crisis recovery: Lessons from Malaysia's experience of the Asian financial crisis. *Asia Pac. Bus. Rev.* **13**(2), 277–299 (2007). <https://doi.org/10.1080/13602380601045587>
- Ecoespaña, & World Resources Institute, *Recursos mundiales: Las raíces de la resiliencia. Aumentar la riqueza de los pobres. Propiedad, capacidad, conexión (Global Resources: The Roots of Resilience. Increasing the Wealth of the Poor. Ownership, Capacity, Connection)* (Ecoespaña, 2009)
- B.H. Farrell, L. Twining-Ward, Reconceptualizing tourism. *Ann. Tour. Res.* **31**(2), 274–295 (2004). <https://doi.org/10.1016/j.annals.2003.12.002>
- C. Folke, S. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, B. Walker, Resilience and sustainable development: Building adaptive capacity in a world of transformations. *AMBIO: J. Hum. Environ.* **31**(5), 437–440 (2002). <https://doi.org/10.1579/0044-7447-31.5.437>
- T. Gale, A. Adiego, A. Ednie, A 360° approach to the conceptualization of protected area visitor use planning within the Aysén Region of Chilean Patagonia. *J. Park. Recreat. Adm.* **36**, 22–46 (2018). <https://doi.org/10.18666/JPra-2018-V36-I3-8371>

- G. García, *Medición de la capacidad de carga de la población local y los turistas en un destino turístico (Measurement of the Carrying Capacity of the Local Population and Tourists in a Tourist Destination)* (Universidad de Valencia, 2005)
- D. Glaesser, *Crisis Management in the Tourism Industry* (Routledge, London, 2003)
- GOAL, *Herramienta para medir la resiliencia comunitaria ante desastres. Guía metodológica (Tool for Measuring Community Resilience to Disasters Methodological Guide)* (DG ECHO, 2015). Retrieved 6 Jan 2023, from <https://dipecholac.net/docs/herramientas-proyecto-dipecho/honduras/Guia-Medicion-de-Resiliencia.pdf>
- C. Goeldner, J.R.B. Ritchie, *Tourism: Principles, Practices, Philosophies* (Wiley, Hoboken, 2009)
- Y. Guo, J. Zhang, Y. Zhang, C. Zheng, Examining the relationship between social capital and community residents' perceived resilience in tourism destinations. *J. Sustain. Tour.* **26**(6), 973–986 (2018). <https://doi.org/10.1080/09669582.2018.1428335>
- C.A. Gutiérrez, *La resiliencia como factor clave en la recuperación de destinos turísticos : Aplicación al caso de un desastre natural en Chile (Resilience as a Key Factor in the Recovery of Tourist Destinations: Application to the Case of a Natural Disaster in Chile)* (Universidad de Valencia, 2013) <https://roderic.uv.es/handle/10550/32139#.Y4-V7udrGfk.mendeley>
- C.M. Hall, D.J. Timothy, D.T. Duval, *Safety and Security in Tourism: Relationships, Management, and Marketing* (Routledge, London, 2003)
- J.C. Henderson, *Tourism Crises: Causes, Consequences and Management* (Butterworth-Heinemann, Oxford, 2007)
- G. Herrera, G. Rodríguez, Resiliencia y turismo: El caso de la ciudad de Baños de Agua Santa, Ecuador (Resilience and tourism: The case of the town of Baños de Agua Santa, Ecuador). *Holos* **3**, 253–280 (2016). <https://doi.org/10.15628/holos.2016.4303>
- P.J. Holladay, R.B. Powell, Social-ecological resilience and stakeholders: A qualitative inquiry into community based tourism in the Commonwealth of Dominica. *Caribb. Stud.* **44**(1–2), 3–28 (2016). <https://doi.org/10.1353/crb.2016.0000>
- J. Kalawski, A. Haz, Y. ¿Dónde está la resiliencia? Una reflexión conceptual (And where is resilience? A conceptual reflection). *Int. J. Psychol.* **37**(2), 365–372 (2003)
- N. Kontogeorgopoulos, Sustainable tourism or sustainable development? Financial crisis, ecotourism, and the “Amazing Thailand” campaign. *Curr. Issue Tour.* **2**(4), 316–332 (1999). <https://doi.org/10.1080/13683509908667859>
- O. Lerbinger, *The Crisis Manager: Facing a Risk and Responsibility* (Lawrence Erlbaum Associates, Mahwah, 1997)
- S. Levin, *Fragile Dominion* (Perseus, Reading, 1999)
- B. McKercher, I. Young, The potential impact of the millennium bug on tourism. *Tour. Manag.* **20**(4), 533–547 (1999). [https://doi.org/10.1016/S0261-5177\(99\)00016-3](https://doi.org/10.1016/S0261-5177(99)00016-3)
- D.S. Miller, C. Gonzalez, M. Hutter, Phoenix tourism within dark tourism. *Worldw. Hosp. Tour. Themes* **9**(2), 196–215 (2017). <https://doi.org/10.1108/WHATT-08-2016-0040>
- J. Min, K.C. Birendra, S. Kim, J. Lee, The impact of disasters on a heritage tourist destination: A case study of Nepal earthquakes. *Sustainability* **12**(15), 6115 (2020). <https://doi.org/10.3390/su12156115>
- D. Muñoz, J.A. Brea, Gestión de crisis en el turismo: La cara emergente de la sostenibilidad (Crisis management in tourism: The emerging face of sustainability). *Rev. Enc. Cient. Tour. Manag. Stud.* **6**, 49–58 (2010)
- P.E. Murphy, G.G. Price, Chapter 9 – Tourism and sustainable development, in *Global Tourism*, ed. by W.F. Theobald, 3rd edn., (Butterworth-Heinemann, Oxford, 2005), pp. 167–193
- H. Nakanishi, J. Black, K. Matsuo, Disaster resilience in transportation: Japan earthquake and tsunami 2011. *Int. J. Disaster Resil. Built Environ.* **5**(4), 341–361 (2014). <https://doi.org/10.1108/IJDRBE-12-2012-0039>
- D. Pearce, C. Guala, K. Veloso, S. Llano, J. Negrete, A. Rovira, et al., Destination management in Chile: Objectives, actions and actors. *Int. J. Tour. Res.* **19**(1), 50–67 (2016). <https://doi.org/10.1002/jtr.2083>

- L. Pennington-Gray, A. Schroeder, T. Gale, Co-management as a framework for the development of a tourism area response network in the rural community of Curanipe, Maule Region, Chile. *Tour. Plann. Dev.* **11**(3), 292–304 (2014). <https://doi.org/10.1080/21568316.2014.890124>
- S. Pike, *Destination Marketing Organizations* (Elsevier, Oxford, 2004)
- R. Plummer, D. Armitage, Charting the new territory of adaptive co-management: A Delphi study. *Ecol. Soc.* **12**(2), 10 (2007)
- B. Richardson, Crisis management and the management strategy: Time to “loop the loop”. *Disaster Prev. Manag. Int. J.* **3**(3), 59–80 (1994). <https://doi.org/10.1108/09653569410795632>
- J. Ritchie, G. Crouch, *The Competitive Destination: A Sustainable Tourism Perspective* (CABI Publishing, Wallingford, 2003)
- M. Rutter, Psychosocial resilience and protective mechanisms. *Am. J. Orthopsychiatry* **57**(3), 316–331 (1987). <https://doi.org/10.1111/j.1939-0025.1987.tb03541.x>
- M. Scoville, Wartime tasks of psychiatric social workers in Great Britain. *Am. J. Psychiatr.* **99**(3), 358–363 (1942). <https://doi.org/10.1176/ajp.99.3.358>
- R.A. Smith, J.C. Henderson, Integrated beach resorts, informal tourism commerce and the 2004 tsunami: Laguna Phuket in Thailand. *Int. J. Tour. Res.* **10**, 271–282 (2008). <https://doi.org/10.1002/jtr.659>
- C. Stadel, Vulnerability, resilience and adaptation: Rural development in the tropical Andes. *Pyrenees* **163**, 15–36 (2008). <https://doi.org/10.3989/pirineos.2008.v163.19>
- J.K. Strickland-Munro, H.E. Allison, S.A. Moore, Using resilience concepts to investigate the impacts of protected area tourism on communities. *Ann. Tour. Res.* **37**(2), 499–519 (2010). <https://doi.org/10.1016/j.annals.2009.11.001>
- A. Tanana, C. Rodriguez, V. Gil, Strategic tourism management to address natural hazards in coastal areas: Lessons from Buenos Aires, Argentina. *Tour. Rev.* **74**(3), 503–516 (2019). <https://doi.org/10.1108/TR-04-2018-0047>
- K. Tierney, M. Bruneau, Conceptualizing and measuring resilience: A key to disaster loss reduction. *TR News* **250**, 14–17 (2007)
- T.J. Tyrrell, R.J. Johnston, Tourism sustainability, resiliency and dynamics: Towards a more comprehensive perspective. *Tour. Hosp. Res.* **8**(1), 14–24 (2008)
- United Nations, *2009 UNISDR Terminology on Disaster Risk Reduction* (UNDRR, 2009)
- United Nations, *Resolution Adopted by the General Assembly on 3 June 2015* (UN General Assembly, 2015). Retrieved 2 Dec 2022, from [https://disasterlaw.ifrc.org/sites/default/files/media/disaster\\_law/2021-03/A\\_RES\\_69\\_283.pdf](https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2021-03/A_RES_69_283.pdf)
- United Nations Office for Disaster Risk Reduction, *Herramienta de auto-evaluación para la resiliencia frente a desastres a nivel local (Self-Assessment Tool for Disaster Resilience at the Local Level)* (UNISDR, 2017a). Retrieved 29 Nov 2022, from <https://eird.org/camp-10-15/docs/herramienta-evaluacion.pdf>
- United Nations Office for Disaster Risk Reduction, *How to Make Cities more Resilient. A Handbook for Local Government Leaders* (UNDRR, 2017b). Retrieved 29 Nov 2022, from [https://www.unisdr.org/campaign/resilientcities/assets/toolkit/Handbook%20for%20local%20government%20leaders%20%5B2017%20Edition%5D\\_English\\_ed.pdf](https://www.unisdr.org/campaign/resilientcities/assets/toolkit/Handbook%20for%20local%20government%20leaders%20%5B2017%20Edition%5D_English_ed.pdf)
- United Nations Office for Disaster Risk Reduction, *Quick Risk Estimation (QRE) Tool* (UNDRR, 2021). Retrieved 7 Dec 2022, from <https://mcr2030.undrr.org/quick-risk-estimation-tool>
- J. Varghese, N. Krogman, T. Beckley, S. Nadeau, Critical analysis of the relationship between local ownership and community resiliency. *Rural. Sociol.* **71**(3), 505–527 (2006). <https://doi.org/10.1526/003601106778070653>
- B. Walker, D. Salt, *Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function* (Island Press, Washington, DC, 2012)
- B. Walker, L. Gundersob, A. Kinzing, C. Kolkes, C. Carpenter, L. Schultz, A handful of heuristic and some propositions for understanding resilience in social-ecological system. *Ecol. Soc.* **11**(1), 13 (2006)
- World Economic Forum, *The Global Risks Report 2020*, 15th edn. (World Economic Forum, Marsh & McLennan, Zurich Insurance Group, 2020). Retrieved 4 Dec 2022, from [https://www3.weforum.org/docs/WEF\\_Global\\_Risk\\_Report\\_2020.pdf](https://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf)

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