Communicating risk to tourists: A mental models approach to identifying gaps and misperceptions

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A B S T R A C T

This study compares the perspectives of government agencies, academic experts, and tourism suppliers on providing tourists with tsunami risk information. Previous studies highlight that government agencies are often in charge of developing tourism-oriented risk communication plans; academic experts are recognized as having a more in-depth understanding of the technical aspects of a risk, as well as the hazard development and potential effects; and tourism suppliers play a fundamental role during the risk communication process, due to direct connection with the tourists. However, tourists are often found to be insufficiently informed about risks and warning systems. We use the Mental Models approach, aiming to analyze the communication between the aforementioned categories of stakeholders. We carried out interviews and conducted field trips in Japan between April and December of 2018. Results highlight an increased general awareness regarding tourists' preparedness, poorly supported by risk-communication gaps, misperceptions, and a lack of efficacy analyses.

1. Introduction

Japan is characterized by an exponentially developed tourism industry, reaching 28.7 million international tourists in 2017 (Japan National Tourism Organization, 2018). These numbers are expected to grow during and after Tokyo hosts the Olympic and Paralympic Games in 2020. At the same time, the country is exposed to several natural hazards (including earthquakes and tsunamis), exposing residents and tourists to serious risks. This condition requires disaster risk management initiatives such as the "Basic Act for National Resilience" that was approved by the Kokkai (Diet of Japan) in December 2013 (Murata et al., 2018). According to the Act, National Resilience is intended as a series of measures linked to disaster prevention and mitigation, including swift recovery and reconstruction (Murata et al., 2018; Cabinet Secretariat, 2013). These measures may be structural (e.g., tsunami seawall and dikes) and non-structural such as risk information and evacuation warnings (Cabinet Secretariat, 2014; Murata et al., 2018). This study focuses on non-structural measures. In particular, the study focuses on tsunami risk information to tourists that may improve tourist preparedness during the emergency phase. Investigating tsunami risk communications is an important topic, as they require efficient warning systems due to their unpredictability and the limited evacuation time during emergencies (Arce, Onuki, Esteban, & Shibayama, 2017).

Considering the importance to provide risk information to tourists,

this study evaluates and compares the perspective of three actors who play key roles during the risk communication process: government organizations, academic experts, and tourism suppliers. These actors are expected to have a dialogue in order to identify and coordinate effective risk communication. In particular, government organizations are often in charge of developing tourism-oriented risk communication plans; academic experts are recognized as having a more in-depth understanding of the technical aspects of a risk, as well as the hazard development and potential effects; and tourism suppliers play a fundamental role during the risk communication process, due to direct connection with tourists. In order to understand the perspectives of the above-mentioned stakeholders in Japan regarding the risk communication process to tourists, interviews with the stakeholders were carried out. Field trips were also conducted to further understand the topic.

2. Theoretical background

The tourism disaster management framework, proposed by Faulkner (2001), represents a milestone for tourism literature. Despite the difficulty being clearly classifying disaster risk management phases due to potential overlaps, the framework proposes a useful simplification in six main phases: 1) pre-event, 2) prodromal, 3) emergency, 4) intermediate, 5) long-term (recovery), and 6) resolution. For each phase,

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disaster management plans should include clearly articulated protocols to be followed in order to reduce the impact of disasters. Once the protocols have been identified, all stakeholders should be involved in identifying them and making the disaster management plan effective (Ritchie, 2004). In order to reach this target, it is necessary to appropriately manage risk communication at all phases of the disaster management framework (Ritchie, 2004). This study focuses on risk communication's ability to affect tourists' behavior during the emergency phase. Tourists are often found to be insufficiently informed about risks and warning systems (Johnston et al., 2007; Nagai, Ritchie, Sano, & Yoshino, 2019), suggesting the presence of gaps and misperceptions during the risk communication process. Previous studies used the collaborative planning theory to analyze conflictual tourism- and disaster-related strategies and practices that have failed (Nguyen, Imamura, & Iuchi, 2017), suggesting that all stakeholders need to collaborate and coordinate to improve disaster risk management. Collaborative planning requires dialogue between stakeholders, mutual and social learning, and voluntary participation (Gray, 1989). It is, therefore, necessary to understand each stakeholder's perspective to highlight risk communication gaps and decrease tourists' vulnerability to disasters.

Compared to residents, tourists are particularly vulnerable, for several reasons. First, they usually travel through unfamiliar environments, facing several barriers such as a different language, different traffic rules, and little or no connection with the local communities (Jeuring & Becken, 2011). They are difficult to reach with important information such as disaster warnings (Bird, Gisladottir, & Dominey-Howes, 2010). Tourists also have a low predisposition toward receiving risk information while on vacation (Becken & Hughey, 2013). As a consequence, tourism suppliers fear that providing risk-related information to tourists may influence their decision-making and undermine their business (Becken & Hughey, 2013; Bird et al., 2010; Rittichainuwat, 2013). In addition, the lack of resources, knowledge, and awareness of tourism suppliers, can affect disaster risk management (Calgaro & Lloyd, 2008; Cioccio & Michael, 2007) and tourists' disaster-preparedness (Johnston et al., 2007).

Several actors influence the success of tourism disaster risk reduction strategies. Previous studies identified government agencies as key actors involved in the creation, communication, and use of warning information (Arce et al., 2017). Cahyanto and Pennington-Gray (2015) suggested that Destination Management Organizations (DMOs) may contribute to an increase in disaster preparedness by providing tourism suppliers with training or guidelines for strategically communicating risk to tourists. In Japan, government agencies are usually responsible for international tourist-oriented disaster risk reduction strategies (Arce et al., 2017). DMOs, including many convention and visitor bureaus, such as the Okinawa Convention & Visit Bureau (OCVB), are often expected by the central government agencies to carry out this activity (Ministry of Land, Infrastructure, Transport and Tourism, 2019). Studies conducted in the United States regarding risk communication during Hurricane Katrina showed that communications provided by government agencies may decrease their credibility if local citizens consider them late and ineffective (West & Orr, 2007). However, government agencies are still generally considered reliable information sources during disasters (Pieniak, Verbeke, Scholderer, Brunsø, & Ottar Olsen, 2008). Despite this aspect, and the necessity to constantly improve the efficiency of risk communication, government agencies usually do not provide risk communication specifically tailored for international travelers, assuming tourists would follow social cues in the case of a necessary evacuation (Arce et al., 2017).

However, it is acknowledged that behavior of tourists during disasters is complex (Cahyanto & Pennington-Gray, 2015). Academic research may positively contribute to this issue from multiple perspectives such as psychology, consumer behavior, and decision-making theories (Mair, Ritchie, & Walters, 2016). The role of academic research is fundamental. In line with the suggestion provided by the Sendai Framework for Disaster Risk Reduction 2015–2030, regarding the

necessity to promote and integrate disaster risk management approaches in the tourism industry, studies on tourism crises and disasters are on the rise (Mair et al., 2016). However, the majority of these studies are still focusing on the recovery stage (Mair et al., 2016). The lack of emphasis on pre-disaster tourist-oriented risk communication shows a gap in the literature (Cahyanto et al., 2016; Cahyanto & Pennington-Gray, 2015). Thus, increasing the number of studies on tourism disaster-preparedness is expected.

Together with local authorities and academics, tourism suppliers play a crucial role during the risk communication process and represent key actors, having the ability to promote non-structural disaster prevention and mitigation initiatives (Ritchie, 2008). Non-structural mitigation initiatives (e.g., risk communication) represent effective, less expensive, and less landscape-impacting (e.g. tsunami sea walls) actions than structural mitigation initiatives (Nguyen et al., 2017). Hotels are expected to contribute to the improvement of tourism disaster preparedness by using common areas to inform tourists about risks and emergency procedures (Nguyen et al., 2017; UNISDR et al., 2015). The role of the hotel staff is crucial, as well, as they are able to influence tourist behavior during evacuations (Cahyanto & Pennington-Gray, 2015). However, hotels need to have a disaster management plan that includes all activities that may assist guests in cases of disaster, such as shelter designation, evacuation routes, and emergency procedures (Cahyanto & Pennington-Gray, 2015). The role of other tourism suppliers such as travel agencies and transportation providers in risk communication for increasing tourist-preparedness has received minimal attention.

After highlighting the important role in disaster risk reduction activities played by stakeholders such as government agencies, academics, and tourism suppliers, it is necessary to identify factors that influence the dialogue between these actors and the success of tourist-oriented risk communication processes. Nguyen et al. (2017) developed a framework, based on a literature review, in order to investigate different stakeholder perspectives toward collaboration during the whole disaster management process. In particular, they analyzed the rationale for collaboration between the hotel industry and the government for disaster risk reduction (Nguyen et al., 2017). Several factors emerged as barriers for an effective dialogue between the two actors. Hotel managers showed a positive attitude toward playing a more effective role during disaster occurrence. However, in addition to the lack of financial and human resources, they also recognized a limitation in understanding their risks (Nguyen et al., 2017). The current study enriches the Nguyen et al. (2017) contribution toward a more in-depth focus on risk communication, including the perspectives of other tourism suppliers (such as travel agents) and academics. In order to reach this target, this study referred to the Mental Models to Risk Communication (MMARC) (Boase, White, Gaze, & Redshaw, 2017).

2.1. The mental models approach

A mental model is a set of principles from which people understand the processes that govern the creation and control of an environmental hazard (Bostrom, Fischhoff, & Morgan, 1992). The people's ability to respond to an environmental hazard is determined, in part, by their understanding of these processes (Bostrom et al., 1992). The Mental Models approach offers the opportunity to identify risk communication gaps and misperceptions. If mental models of different actors, playing key roles in the risk communication process, are organized along the same lines, then communications that are able to generate the structure of the influence diagram might be relatively easy to understand (Bostrom et al., 1992). The influence diagram is a hierarchical combination of node-link-node that portrays an "influence" and captures the relationships needed to structure a decision and estimate its parameters (Bostrom et al., 1992). Content of risk communication needs to fill in the gaps and correct the misconceptions generated by people's different understandings of the influence diagram (Bostrom et al., 1992).

The Mental Models approach needs to be adapted, depending on the setting of the study (Cousin & Siegrist, 2010). According to Morgan, Fischhoff, Bostrom, and Atman (2002), mental models risk communication studies include the initial mental model of respondents, followed by semi-structured interviews with stakeholders and others who might receive messages or be involved in communications. Bostrom et al. (2016) employed a Mental Models approach, including four main steps: "*1) conducting individual mental models interviews with each professional; 2) conducting a group decision-modeling session, to develop an initial model of decisions in the hurricane forecast and warning system and corresponding coding scheme; 3) coding individual interviews, referencing the group-generated decision model to content-analyze the data, augmenting the model as necessary; and 4) analyzing the output of the coding to assess commonalities and differences among interviewees* (Bostrom et al., 2016, p. 113). Mental Models interviews intend to elicit people's beliefs in their own words and format (Bostrom et al., 2016). They are similar to some other semi-structured interviewing techniques, but they have the advantage of being structured to elicit causal thinking about the hazardous process and related risk mitigation decisions (Bostrom et al., 2016).

Boase et al. (2017) outlined a Mental Models approach to risk communication, adapted from Morgan et al. (2002). Boase et al.'s (2017) framework is relevant, as it has been developed as a result of the scoping of the literature, including over 100 articles explicitly applying Mental Models approach. According to Boase et al. (2017), the MMARC framework aims at facilitating the dialogue between different types of stakeholders in order to develop appropriate risk information, based on the user's knowledge and concerns. The classic Mental Models approach takes into consideration the behaviors, beliefs, and knowledge of experts and the general public (Sheppard, Janoske, & Liu, 2012). The experts are recognized as having a more in-depth understanding of the technical aspects of a risk, as well as the hazard development and potential effects (Boase et al., 2017). It is a comparison between two different perspectives (expert vs. not expert) (Boase et al., 2017). The MMARC (Boase et al., 2017) helps to investigate different actors' mental models and consists of five main steps: 1) identify the mental model of "experts"; 2) identify the mental model of non-experts (to be compared with the experts' mental model); 3) develop a confirmatory questionnaire to be administered to a representative group (broader population), in order to estimate the prevalence of those beliefs, emerging from steps 1 and 2; 4) draft risk communication that is able to fill knowledge gaps and correct inaccurate beliefs among the final audience; and 5) evaluate effectiveness of the proposed messages, considering their effect on the final audience (Cousin & Siegrist, 2010).

This study proposes a revised application of the first two steps of the Boase et al. (2017) Mental Models approach, aiming at providing insights, to be used by future empirical researchers, which may include the latter three steps of the framework. In addition, instead of comparing experts' and non-experts' perspectives, this study compares mental models of three different stakeholder categories: members of the local government agencies, academics, and tourism suppliers.

3. Methodology

This study considered three categories of stakeholders involved in the risk communication process. All of them hold different roles during this process. These actors may have different knowledge and perspectives regarding the importance of risk communication to tourists, generating misperceptions and conflicts during the communication. The study, therefore, analyzed and compared the mental models of the above-mentioned stakeholders, regarding the: i) structure of the tourism-oriented risk communication process, actors involved, and their responsibilities; ii) tourists' attitude toward receiving risk information; and iii) perceived barriers and opportunities to improve the risk communication process.

The interview schedule, composed by 26 semi-structured questions, was used for all participants (see Appendix 1). After transcribing all the audio-interviews into text, we started reading the transcripts. First, we browsed through all transcripts, noting our first impressions. We then re-read them carefully, considering the transcripts line by line. We identified and labeled relevant pieces of text, taking into consideration elements that were clearly identified as important by the interviewee, elements emerging from previous studies, and repetitions among transcripts. By putting together several codes, we created and labeled categories, attempting to identify their relevance and inter-connections. All stakeholders' perspectives regarding each labeled category have been analyzed and discussed, in order to identify commonalities and differences (Braun & Clarke, 2006; Kvale & Brinkmann, 2009).

3.1. Sample population and secondary data sources

This investigation has been developed using a case study approach and is in accordance with the qualitative research ethical principles (Orb, Eisenhauer, & Wynaden, 2001; Vanclay, Baines, & Taylor, 2013). Case studies have often been used in tourism studies (Nguyen et al., 2017). Following Arce et al. (2017) and Hein (2014), we carried out interviews, field trips, and then analyzed risk communication strategies. Eighteen practitioners and academics voluntarily participated in the study and were interviewed (see Table 1). Four were from local government organizations including DMOs, based in Okinawa and Tōhoku

Table 1
Participants to the study.

Participant number	Organization	Location	Interviewee's Role	Sex	Age
P1	Government organization	Okinawa	Manager	M	50s
P2	Government organization	Okinawa	Manager	F	40s
P3	Government organization	Tōhoku	Manager	M	50s
P4	Government organization	Tōhoku	Manager	M	40s
P5	Academia	Kansai	Professor	F	40s
P6	Academia	Kansai	Professor	F	50s
P7	Academia	Kantō	Professor	M	50s
P8	Academia	Kyūshū	Professor	M	40s
P9	Tourism industry (travel agency)	Kansai	Manager	M	40s
P10	Tourism industry (travel agency)	Kantō	Manager	M	50s
P11	Tourism industry (hotel)	Kansai	Manager/Reception	M	40s
P12	Tourism industry (hotel)	Kansai	Manager/Reception	M	40s
P13	Tourism industry (hotel)	Kansai	Manager	F	50s
P14	Tourism industry (hotel)	Tōhoku	Manager	F	50s
P15	Tourism industry (hotel)	Tōhoku	Manager	M	50s
P16	Tourism industry (other services)	Kansai	Manager	M	50s
P17	Tourism industry (other services)	Okinawa	Manager	F	30s
P18	Tourism industry (other services)	Okinawa	Manager	F	50s

Fig. 1. Japan map indicating the areas included in the study.

regions; four were academic experts of tourism and/or disaster management from Japanese universities; ten were from the tourism industry. Within the ten participants from the industry, two were travel agents, five were working at hotels, and three were tourism services providers (e.g., transport and museum). The age of respondents is between mid-30s and mid-50s. Nine women and nine men participated in the interviews.

Interviews were carried out in tsunami exposed areas (see Fig. 1). Therefore, we also had the opportunity to make several field visits to document the different tourist-oriented risk communication, adopted in different regions of the country in order to identify differences between regions, barriers that may be faced by tourists, and potential opportunities to improve the local level risk communication. Secondary data such as pamphlets, evacuation route signage, and memorials, have been considered. Pamphlets, in Okinawa, provided multi-lingual suggestions about the necessary behavior to be followed in the case of different types of disasters. Several memorials were installed in Tōhoku, describing the recent GEJET as a lesson to learn to improve disaster preparedness.

4. Results

Table 2 describes commonalities and different stakeholders' perspectives, regarding each labeled category emerging from the coding process.

Table 2 Results from the coding process: Commonalities and different perspectives.

4.1. Tourists' disaster-preparedness in Japan

All stakeholders convey that people's behavior before, during, and after the disaster, mainly depends on individual behavior and previous disaster experience. However, the general level of residents' disaster preparedness in Japan is generally perceived as good. According to the respondents, this aspect may vary prefecture by prefecture, depending on the level of exposure to natural hazards and frequency of disaster occurrences. Therefore, communities located in different areas of the country may have different levels of disaster preparedness. Academics show a more critical approach on this topic, highlighting that, despite the high level of preparedness of residents in the country, risk

communication is sometimes not even effective for residents. As stated by an academic participant: "From kindergarten, residents get information about how to deal with disasters. Local communities' meetings are organized to better understand risks and increase disaster preparedness. Despite this familiarity with disaster risk reduction activities, disasters such as the Kobe earthquake in 1995; the 2011 Great East Japan Earthquake and Tsunami (GEJET) disaster; and the recent flooding in Honshū, Kyūshū, and Shikoku, causing 225 fatalities in 2018, suggest that disaster preparedness always needs to be improved. (P6)".

Focusing on tourists, the perspectives of the respondents change. The optimistic perception of the government agencies is in contrast with the perception of academics and tourism suppliers. Both feel that there is no structured plan for tourist-oriented risk communication. Government agencies highlighted the efforts that have been made to improve the system but seemed to be conscious that further improvements may be required. In effect, the actions adopted by governments, at the national and the local levels, are perceived as not comprehensive and effective by academics and tourism suppliers. Academics highlight the necessity to improve their communication with the government (at national and local levels). The effect is that many of the activities that have been realized by governments, in order to increase tourists' disaster-preparedness, are weakly perceived by other stakeholders. For instance, an academic respondent stated that "an important role to facilitate risk communication to tourists is played by convention bureaus, but it seems that their activity is limited to brochures. (P8)".

Nevertheless, this negative perception held by academics and tourism suppliers tends to change, considering some specific areas of the country. For instance, all the respondents including those based in different prefectures of the country, mentioned Okinawa as a good example for tourist disaster preparedness. This finding has been confirmed considering the results emerging from the field visits in Okinawa and Tohoku. Okinawa is characterized by a high number of domestic and international tourists. Tohoku has been strongly affected by the 2011 GEJET and is currently investing resources to develop the tourism industry. Tourism is considered one way to "revitalize" the region while also to supporting the local economy. As explained by a local government member in Tohoku in July 2018: "Tohoku will host the Rugby World Cup, starting in September 2019. Our main target is to get ready to host a large number of international tourists. At the same time, we are creating evacuation routes close to the stadium. We plan to put up signage, in English, and make an evacuation drill. (P3)" The local government's main goal is to create infrastructure in order to host tourists. The second target refers to the emergency and risk communication plan to be adopted during the forthcoming sport event. The same attitude emerged among tourism suppliers operating in the area. The main focus is to attract tourists; the second will be on increasing their disaster preparedness. Once at the destination, tourists will be informed about previous tsunami occurrences, due to the presence of memorials. Fig. 2 shows an example of a memorial and the poor condition of tsunami evacuation route signage, at a hotel in Tohoku in July 2018. Memorials and evacuation route signs have been installed, following the GEJET. It was observed that some of them are not well-maintained. In fact, some evacuation route signs were not clearly visible.

In contrast to Tohoku, emergency and risk communication to tourists in Okinawa, is constantly present in all touristic areas. The tourist-oriented risk communication pamphlets, that have been developed by the local convention bureau, are available at hotel reception areas, tourist attractions (e.g., aquarium), and ports (see Fig. 3), and clear signage about evacuation routes, in case of tsunami alert, are in front of bus stations and at beach entrances (see Fig. 4). Tourists are exposed to tsunami hazard maps, which are located in strategic places. This strategy, adopted by the local government, is supported by local tourism suppliers in Okinawa, but it differs with the perspectives of tourism suppliers that have been interviewed in other prefectures:

Table 2
Results from the coding process: Communalities and different perspectives.

Category	Code	Governmental Agencies	Academics	Tourism Suppliers
Disaster Preparedness	High level of local disaster preparedness	Strongly agree	Agree	Strongly agree
	Varying Prefecture by Prefecture	Strongly agree	Strongly agree	Strongly agree
	Influenced by exposure	Strongly agree	Strongly agree	Strongly agree
	Influenced by frequency	Strongly agree	Strongly agree	Strongly agree
	Tourists disaster preparedness is low	Strongly agree	Strongly agree	Strongly agree
(Emergency Behaviour)	Individual Behaviour	Strongly agree	Strongly agree	Strongly agree
	Previous Experience	Strongly agree	Strongly agree	Strongly agree
(Risk communication to tourists)	Structured and Comprehensive	Neutral	Strongly disagree	Strongly disagree
	Varying Prefecture by Prefecture	Strongly agree	Strongly agree	Strongly agree
	Importance to inform tourists about risks	Strongly agree	Strongly agree	Disagree
	Importance of warning system	Strongly agree	Strongly agree	Strongly agree
Barriers	Lack of people and budget	Strongly agree	Neutral	Agree
	Language	Strongly agree	Strongly agree	Strongly agree
	Interaction with local community	n/a	Strongly agree	n/a
	Benchmarking between Prefectures	Strongly disagree	Disagree	n/a
(Tourists seeking intention)	Tourist want to be informed	Strongly agree	Strongly agree	Strongly agree
	Tourists will for risk information	Disagree	Disagree	Disagree
Risk communication process	Multi-level approach	Strongly agree	Strongly agree	Strongly agree
	Responsibility is not an issue	Strongly agree	Strongly disagree	Neutral
Mobile applications	They are effective tools	Strongly agree	Disagree	Disagree
	Good as part of multi-sources approach	Strongly agree	Strongly agree	Strongly agree
Timing for providing risk information	Hotel (during check-in and in the room)	Strongly agree	Strongly agree	Strongly agree
	In the airport to access Wi-Fi	Agree	Agree	n/a
	During the flight	Strongly disagree	Strongly disagree	Strongly disagree
Cross-country risk communication	It is important	Strongly agree	Disagree	Disagree

Legend:
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

"Would you like to receive information about emergency shelter during vacations? No! It will totally destroy your idea of vacations. (P15)". This aspect shows that, depending on the location of the tourism supplier, there are different levels of awareness surrounding disaster risk.

4.2. Additional barriers that are able to influence the success of risk communication to tourists

Several other barriers influence the success of risk communication efforts to tourists. From government agencies' perspectives, the main barrier to improve risk communication to tourists is linked to a lack of human resources and their organization's budget. However, it seems that the general level of awareness, regarding the importance of informing tourists about risks, is high.

All tourism suppliers that were interviewed described their fear that providing risk information to tourists may undermine their business. They recognize the importance of having an efficient warning system but tend to forget the importance of informing tourists about how to recognize them in order to activate the correct behavior in case of emergency: "Tourists come for leisure. We do not need to scare them by providing too much information. Issuing a warning during the emergency is enough. (P9)" In addition, government agencies, tourism suppliers, and academics think that tourists may want to be informed about risks, but it is unlikely that they will make an effort to get risk information before visiting Japan. Both academics and tourism suppliers agree that seeking out information about risks in tourism destinations will be influenced by the individual perception of risks at the destination. As stated by respondents, "somebody that will go to Japan has already put some risks into consideration (P5)", and "tourists have a [way of] ranking information that they need during their vacations;

Fig. 2. Examples of memorials and tsunami evacuation route signs.

tsunami and disaster education will be almost the last one they will look for. (P7)" Additionally, the country, according to all interviewed stakeholders, is generally perceived as safe, and tourists may seek risk information only after a recent disaster occurrence. This over-estimated safety may be problematic. Academics show a more critical approach, highlighting that the current system is not fully tailored for English speaking people. For instance, "during the first 48 hours, it is expected that individuals will be able to increase their preparedness following some specific procedures (e.g., equipment and stock of food and water, etc.). Tourists are less informed and will be more vulnerable. (P5)" Information is already available, but tourists need to make an effort to find it. The risk is that they will not, and they will feel safe, even if extremely vulnerable. As a respondent suggested, "there are unwritten rules (e.g., emergency shelters are usually the nearest school) that are normal for Japanese people but are unknown to tourists. (P8)".

In addition to the perceived negative motivation of tourists to seek risk information, other barriers emerged from the respondents. A barrier is represented by the language. Information for tourists is usually provided in English, Chinese, and Korean. These languages have been selected, taking into consideration the inbound tourism flow. Risk information and evacuation signage (when available) is often provided only in English. Therefore, the main problem seems to be the language barrier in interacting with the local community, and this may be

Fig. 4. Example of tsunami temporary evacuation area information map in Okinawa.

Fig. 3. Examples of tourist-oriented risk communication pamphlets, presented in Okinawa.

relevant during the emergency. This aspect mainly emerged during the interview with academics, which, again, highlight a lack of systematic approach, especially in those areas that are not used to hosting tourists: "Local people in smaller cities and rural areas will probably try to interact with tourists in cases of emergency. However, this is just an assumption, as there are no strategies that have been applied to facilitate this behavior. (P8)" From this perspective, the role of accommodation providers seems to be fundamental: "Hotels are very important, because they can definitely get in contact with tourists, remedying the lack of connection with local community. Therefore, it is necessary to empower the people that are in connection with both, locals and tourists. (P7)".

All the respondents are conscious that the basic law of disaster preparedness in Japan is composed of different levels. The national and prefecture governments have their own disaster management plan; then, based on those plans, each local city government has its own plan in place. According to the perspectives of the members of government agencies, the local governments' role consists of developing their own disaster management plan. They are responsible for directly interacting with tourists by providing signs and other tools such as risk information pamphlets and online information sources. At the same time, they are in charge of gathering risk information and providing accurate emergency information to tourism suppliers, who give that information to tourists. Again, it emerges that the Okinawa tourism-oriented disaster management plan is perceived by the study participants, as one of the best practices. The local convention bureau organizes annual meetings with tourism suppliers and provides seminars, inviting tourism suppliers' associations in each city of Okinawa. The aim of these meetings is to coordinate and give the roles to each actor by promoting a collaborative approach. However, according to the respondents, the interaction within prefectures, and the activities to spread the knowledge among the whole country, are limited. This trend seems linked to the fact that each prefecture has different characteristics and disaster management experiences: "At the moment, the national government did not invite us to have seminars in Tokyo, even if the city will hold the Olympic and Paralympic Games in 2020. This is because different areas have different contexts, so it is hard to inform local authorities from other places about our activities. (P1)".

Despite this lack of dialogue between prefectures, tourism suppliers' perspectives, regarding their roles and responsibilities, seem to be constant among different regions in the country Tourism suppliers do not expect that the government will proactively contact tourists to provide information about risks and evacuation procedures. They are conscious that, in case of an emergency, they need to provide information to tourists. However, some critical issues emerged from the interviews. For instance, hotel managers tend to feel that they need to independently develop an emergency plan in order to protect tourists in case of disasters, but the local government will have the main responsibility. Regarding hotel managers, their responsibility increases, considering international travel agencies usually expect that "it is the responsibility of the management of the hotel to protect the safety of the guests of the hotel. (P10)" However, the effectiveness of these plans will depend on the awareness of the tourism manager.

4.3. Opportunities and limitations of using mobile applications

In order to improve the connection between the risk information source and tourists, disaster information mobile apps, such as Safety Tips, have been developed by the government. These applications provide warnings and basic information regarding the correct behavior in case of disaster occurrence. Despite the importance of the contents provided through the applications, and the opportunity to provide risk information and emergency procedures in the pre-disaster phase, several critical issues emerged regarding the perspectives of academics and tourism suppliers. The first issue refers to the fact that mobile applications may not work during disasters, due to lack of electricity.

Secondly, it is difficult to inform tourists about these applications, and (according to all academics and tourism suppliers that have been interviewed) most tourists probably do not know about them. Third, it is also challenging to convince tourists to download the application. Both academics and tourism suppliers suggested providing risk information and emergency procedures via applications that tourists already use, such as WhatsApp, Facebook, and Twitter, rather than developing new applications. Finally, mobile applications cannot be a stand-alone initiative; it should be part of a multi-source, organic, and coordinated risk information system. It is interesting to note that both academics and tourism suppliers suggest providing risk information, together, with other tourist information about the destination. This approach is considered important to reducing the effect of negative information on tourist behavior. However, the attitude toward the opportunities provided by mobile applications changes depending on the selected timing the information is delivered.

4.4. Best timing to deliver risk information

Despite the necessity of a multi-source risk information system, these tools are generally considered useful, by academics and tourism suppliers, in order to potentially increase tourists' disaster preparedness. Tourism suppliers identify hotel check-ins as the best moment to deliver risk information and emergency procedures. Hotel managers show a positive attitude toward promoting the mobile applications, as part of risk information for customers. This information may also be provided in the information package available in the room. Government agencies' representatives and academics suggest that public Wi-Fi access and specific airport operations (e.g., baggage claim), may represent good moments to inform tourists about these applications. All interviewed stakeholders agreed that providing risk information about the destination during the flight to the pertaining country is not an ideal strategy. This is because airlines are responsible for transportation to the country; they already provide risk information and emergency procedures linked to the flight: "Air companies are always putting effort forward on safety information. The last information in the mind is the most important. Therefore, information is always the same during flight. Additional information may undermine the effectiveness of the current system. (P8)".

4.5. Cross-country tailor-made risk communication

Regarding the need to create tailored risk communication products, depending on the nationalities of the tourists, respondents showed similar attitudes. Government agencies admit that this aspect has been poorly considered, given that tourists from different countries may react differently to disaster events. Their behavior may depend on the frequency of disasters in their home countries and the response that is commonly expected there. One respondent mentioned "Chinese will tend to leave the buildings even if it is safer to stay inside in Japan. (P1)" Despite the presence of potential benefits linked to tailored risk communication, the perspectives of academics and tourism suppliers are similar and negative. They suggest that the risk communication and evacuation procedures should be the same for all international tourists; otherwise, there is the risk of creating confusion. It is considered more important to identify clear, simple, and effective messages. However, as discussed in the following section, this position seems linked to the respondents' attitude to focus more on communication during the emergency, rather than provide risk information to tourists in the pre-disaster phase.

5. Discussion

There were several common elements that emerged from the interviews with the stakeholders (i.e., government agencies, academics, and tourism suppliers). Regarding disaster preparedness of residents

and tourists in Japan, the perspectives of all stakeholders were similar. The general level of disaster-preparedness of the country was perceived as good. However, several gaps and misconceptions emerged from the Mental Models analysis. The findings suggest that government agencies should take into consideration the negative perception of academics and tourism suppliers regarding the general risk communication system to tourists. The main problem is that the current tourist risk communications are perceived as neither systematic nor comprehensive. Academics suggested promoting additional disaster risk reduction initiatives and conduct further studies, in order to improve local disaster preparedness (both for residents and tourists). However, the dialogue between academics and government agencies is weak. This aspect seems to be very important, due to the rise of studies on tourism crises and disaster risk management (Mair et al., 2016). Important findings and suggestions should be taken into consideration, during the development of disaster risk reduction and risk communication strategies adopted by the governments.

Collaborative planning requires dialogue between stakeholders (Nguyen et al., 2017). Despite the case study of Okinawa, that includes monthly meetings between local government and tourism suppliers to discuss disaster risk reduction initiatives, it seems that the tourism risk communication system is based on a mono-directional top-down communication. The national government gives general instructions to protect tourists, and these instructions become more specific at the local level. Finally, the tourism suppliers (usually hotel managers) will act following these instructions. However, their decisions, and disaster management plans, will often depend on their personal awareness. This mono-directional top-down communication style seems to be in contrast with the collaborative planning that requires dialogue between stakeholders, mutual and social learning, and voluntary participation (Gray, 1989). The government should put forward increased effort to consider other stakeholder mental models in order to improve the current risk communication system. Considering the Japanese case study, and the different level of disaster preparedness of each prefecture, dialogue between prefectures needs to be considered as much as the dialogue between stakeholders. There is a general common awareness, among all the stakeholders, that the level of disaster preparedness of a destination will be influenced by the level of hazard exposure and level of frequency of disaster occurrences. Therefore, different prefectures having different levels of disaster preparedness is commonly accepted by all stakeholders. However, this approach does not support a collaborative and effective approach for disaster risk reduction. A benchmarking activity between prefectures, to share knowledge and a leading practice (such as Okinawa) among the country, is required. Even if local government agencies are conscious that it is necessary, they perceive that these intra-prefectures dialogue is still limited due to different characteristics (e.g., hazard, vulnerability) of each area. In addition, tourism suppliers do not show particular interest on this aspect, highlighting a less-proactive approach. This attitude may be influenced by the limited availability of time and resources. In this study, only academics recognized the importance in promoting interactions between prefectures. The real challenge, from an academic perspective, seems to be the development of a dialogue with government agencies in order to highlight the importance of sharing disaster risk reduction and risk communication knowledge between prefectures, even if their level of exposure and vulnerability changes depending on the territory.

Academics highlighted the issue of responsibility as one of the barriers during the risk communication process. This perspective is in contrast to the perspectives of government agencies and tourism suppliers. In particular, government agencies tended to believe that the current system of responsibilities is clear, and tourism suppliers seem to be conscious that, during the emergency, they own the full responsibility of tourist's safety. Tourism suppliers tend to consider warning systems as key elements for disaster risk reduction (Arce et al., 2017). However, as with Rittichainuwat (2013), the attitude of tourism

suppliers is also a critical barrier for risk communication. They tend to underestimate the importance of increasing tourists' preparedness in the pre-disaster phase. They believed that providing risk information in advance will certainly scare the clients. However, it is important to inform tourists before the event occurs because only an informed tourist will be able to recognize the warning (Cahyanto & Pennington-Gray, 2015).

A step forward, in that sense, is emerging from some suggestions provided by tourism suppliers and academics. These suggestions are linked to disaster risk information and warnings provided by mobile applications. These applications are currently available in Japan, but tourism suppliers seem generally unaware of these tools. Importantly, a previous study implies that the majority of tourists are also not aware of these tools (Nagai et al., 2019). If requested by the government, they declared their ability to provide information about these applications to their clients. The key to facilitate this process seems to be linked to the development of a multi-media, integrated, and "light" risk communication. Risk information needs to be included in the general information about the destination, in a simple and noninvasive way.

Risk information needs to be effective, and one of the main problems that is emerging from the current study is that, despite the presence of tourist-oriented risk communication initiatives in Japan, there is a lack of time and tools to measure their effectiveness. In that sense, further academic studies should empirically investigate and evaluate different risk communication actions in order to provide important information to the actors in charge of developing risk communication strategies at the national and local levels. Additionally, these studies may consider the role of other tourism suppliers, including airline companies. Although participants in this study did not consider airline companies as appropriate agents for delivering destination risk information, further investigating these dynamics are necessary.

6. Conclusions

This study contributes to the understanding of the causes behind under-investigated potential gaps and misperceptions within risk communication to tourists in Japan. We explored the perspectives of government agencies, academics, and tourism suppliers regarding risk communication, and several gaps and misconceptions emerged from the mental models analysis.

a) The general evaluation of the current risk communication system was negative, especially among academics and tourism suppliers.
b) Academics highlighted the need for a more constructive dialogue between stakeholders.
c) Academics considered the lack of intra-prefecture dialogues and benchmarking activities as key issues.
d) Academics believed that the identification of each stakeholders' responsibility during the risk communication process should be improved, a view that contrasts with that of government agencies.
e) With respect to other stakeholders, tourism suppliers had a weaker perception regarding the importance of providing risk information to tourists.
f) Tourism suppliers and academics believed that existing mobile applications are not effectively working as they should, a view that is in contrast with that of government agencies.
g) Tourism suppliers and academics believed that tailored cross-country risk communication as unnecessary, a view that is in contrast with that of government agencies.

The findings of this study indicate the need to improve the dialogue between stakeholders. In particular, dialogue should focus on the reasons for the generally negative perceptions of academics and tourism suppliers regarding the structure and effectiveness of the current tourist-oriented risk communication strategy. From this perspective, government agencies are encouraged to work with academics to

scientifically improve their risk communication strategies. They also need to further empower tourism suppliers and facilitate a dialogue between practitioners and academics in order to improve tourism suppliers' awareness of the importance of not only focusing on the emergency phase but also of providing risk information and emergency instructions to tourists before disaster occurs. Further empirical academic investigations may contribute to identifying effective risk communication initiatives that can inform tourists while maintaining the tourism appeal of the destination. The results suggest that natural hazard-prone destinations, which have a long-term tradition of working with inbound tourists, tend to show more knowledge of tourists' behavior and thus tend to more effectively prepare tourists for disasters. Sharing knowledge and leading practices among different regions may contribute to speeding up improvements in risk communication in emerging natural hazard-prone tourism destinations.

This study contributes to the current body of literature on risk communication, but it is not without its limitations. First, the study focuses on the risk of tsunami in Japan. Future research may enrich the discussion by considering other tourism destinations and other hazards, such as typhoons and volcanoes. Second, the nature of the study is explorative, and the results are grounded on the perspectives of the respondents, thus suggesting caution in generalizing the findings. Further studies conducting similar investigations but involving a larger number of respondents are encouraged. Lastly, this study only used the first two steps of Boase et al.'s (2017) mental models approach in the analysis. Future empirical research needs to consider the last three steps of the framework. For instance, experiments comparing the effectiveness of risk communication provided by different sources at different time periods, such as before the trip, during the trip, or upon arrival at the destination, may be conducted. Lastly, future tourism investigations may include more in-depth focus on additional risk communication tools, such as the Earthquake Early Warning System (EEWS) and social networks.

Author contribution statement

All the authors contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

Giuseppe Aliperti was the coordinator of the project and the corresponding author.

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Appendix A. Supplementary data

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