

Enhancing risk governance by addressing key risk communication barriers during the prevention and preparedness phase in South Tyrol (Italy)

Fabio Carnelli | Lydia Pedoth

Centre for Climate Change and Transformation, Eurac Research, Bolzano, Italy

Correspondence

Fabio Carnelli, Centre for Climate Change and Transformation, Eurac Research, Viale Druso 1, 39100 Bolzano, Italy.

Email: fabio.carnelli@eurac.edu

Funding information

Funding programme Interreg Italia-Österreich – European Regional development Fund, Grant/Award Number: ITAT3015

Abstract

Different European policies emphasise that good risk governance can only be achieved through effective communication between the different risk governance actors. It is well known, that effective risk communication should be set up as part of risk prevention and risk preparedness, long before a potentially hazardous event or process occurs. To address this issue, our paper, as part of the results of the Interreg project RiKoST, presents an exploratory study to identify what types of challenges and barriers can be recognised in risk communication related to risk prevention in South Tyrol, Italy. As a first step we identified a wide range of key actors, who, in different ways, already have or could potentially have a role in risk communication. Subsequently, we undertook 20 semi-structured interviews with institutional actors, key informants, and practitioners. Our main findings could inform both policy recommendations and academic research to improve risk communication, acting on risk training/education and risk culture as aspects to be addressed to enhance risk governance in the prevention and preparedness phase.

KEYWORDS

RiKoST, risk communication, risk governance, risk prevention, South Tyrol

1 | INTRODUCTION

Over the past two decades, the focus on risk governance has grown both in academia (Klinke & Renn, 2021) and in international and European policies (UNISDR, 2015; Permanent Secretariat of the Alpine Convention, 2019; Bruinen de Bruin et al., 2020). The concept of risk governance (Renn, 2008) transferred into the field of risk prevention a notion widely spread in political and sociological sciences, where the idea of governance was introduced to 'enlarge the perspective on policy and politics by acknowledging that government is not the only, and may be not even the most important, actor in managing and organizing society as a response to new challenges' (Aven & Renn, 2010, p. 5). With the concept of 'risk' we refer to the IPCC AR6

definition of risk, being it 'the potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems' (IPCC, 2022, p. 2921). We assume a social constructionist approach (Lupton 2013) to risk: 'risk sources are not objective, 'out there', rather they are designated as risky through a social act embedded in a network of practices, discourses and representations' (Carnelli et al., 2020, p. 384). Following this constructivist approach, risk communication can be conceived as all the 'meaningful interactions in which knowledge, experiences, interpretations, concerns, and perspectives are exchanged' (Renn et al., 2011, p. 242) to make risk management effective, by facilitating a 'holistic understanding of risk at different levels' to include 'different kinds of risk communications such as risk assessments, risk

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *Sustainable Development* published by ERP Environment and John Wiley & Sons Ltd.

information generation, and dissemination, risk awareness programs, forecasts, early warning, and crisis communication' (Khan & Mishra, 2022, p. 2563). In these terms, any exchange of information relating to framing, understanding, evaluating/assessing, managing and reducing the potential for consequences, or anything that has an impact in the process of attributing value to something 'at risk' (Boholm, 2003), must be considered in risk communication. Effective communication of risk should be therefore treated as the core of any activity towards risk reduction (Renn, 2008).

Furthermore, disaster risk reduction has been also emphasised as a pillar for achieving the SDGs, for example, related to targets under SDGs 4 (Education), 9 (Building resilient infrastructures), 11 (Sustainable Cities and Communities) and 13 (Climate Action) (United Nations, 2015): effective disaster risk communication can contribute to those SDG's acting on awareness raising, information sharing and understanding, preparedness enhancement, and cooperation development in different risk management phases. In addition, the Sendai Framework for Disaster Risk Reduction (SFDRR, UNISDR, 2015) pinpointed the need to improve the understanding of risk in all its dimensions (Imperiale & Vanclay, 2020; Volenzo & Odiyo, 2019), also acting on the social dimensions of risk (Imperiale & Vanclay, 2021) like governance, social learning, local knowledge integration, and risk and environmental awareness. A change of paradigm from 'managing impact' to engage all relevant actors in knowledge co-production and local capacity building (Claassen et al., 2020) should be pursued through 'a culture of community wellbeing and resilience' (Imperiale & Vanclay, 2021, p. 902). To do this, we need risk communication to 'facilitate that various actors from different backgrounds succeed in interacting meaningfully in the face of uncertainty, complexity, and/or ambiguity' (Renn et al., 2011, p. 242). Additionally, effective risk communication should be planned before a disaster happens and cannot be improvised at any stage of risk management (Pedoth et al., 2021).

For these reasons, this paper presents an explorative study to identify what kind of challenges and barriers exist (a) in the internal risk communication (among institutional actors) and (b) in the external risk communication (between institutions and the public). The work focuses on the prevention and preparedness phase and was carried out in South Tyrol, Italy. The study is part of the Interreg Italy-Austria project RiKoST (Risk Communication Strategies), which aimed at developing targeted risk communication tools, contents, and strategies to improve the collaboration within the public administration and with external experts dealing with risk management (mainly about hydro-geological risk) in South Tyrol and Carinthia. The basis of this project is the assumption that a stronger understanding both of risk perception in the population, and of gaps in risk communication, in terms of strategies, targeted contents/messages, and instruments can enhance risk governance and improve community resilience. The project was coordinated by the Agency for Civil Protection of the Province of Bolzano. It was structured in six Working Packages (WP's), which included a representative survey on risk perception in South Tyrol and Carinthia, a series of interviews to design and implement the official Platform of the Province of Bolzano to inform on natural hazards,¹ an empirical research on the barriers of risk communication (object of this contribution), and many different actions to communicate

risk, understand the role of hazard zone planning in risk communication, and engage with different kind of stakeholders to enhance risk governance (Gallmetzer et al., 2021; Pedoth et al., 2021).

2 | RISK COMMUNICATION BARRIERS IN THE GOVERNANCE OF RISK

Disaster risk communication is fundamental to effective disaster risk governance, as it enables the understanding and sharing of important information and warnings to the public, as well as the coordination of prevention, response, and recovery efforts (Pedoth et al., 2021; Renn, 2008). Effective communication can also support people reacting in the event of a disaster (Carnelli & Anselmi, 2018) and can empower communities to take action to protect themselves and their assets. It encompasses a wide range of activities such as: developing emergency plans and procedures, providing information to the public through various channels, coordinating the response and recovery efforts of various organisations and agencies, facilitating communication between emergency responders and the public, providing training and education, and raising awareness on risk preparedness and response (Alexander, 2014; Árvai, 2014, Link & Stötter, 2014; Pedoth et al., 2021; Renn, 2008). Consequently, risk communication should be recognised neither as a sole phase of risk management (Pedoth et al., 2021) nor as a 'one-way information flow for disseminating hazard forecasts, disaster warnings, alarms, risk messages' (Khan & Mishra, 2022, p. 2562). It is essential throughout the whole risk-handling cycle (Renn, 2008). A good risk governance can only be achieved through effective communication among different actors 'working together to build trust, common understanding and alignment in an open, timely and problem-solving mode' (Claassen et al., 2020, p. 533). Risk communication is indeed essential throughout the whole risk-handling cycle (Renn, 2008). Indeed, effective disaster risk communication can play a key role in long-term risk reduction efforts by increasing hazard awareness and promoting risk-reducing behaviours (Bruinen de Bruin et al., 2020). This is aligned with the SFDRR (UNISDR, 2015) priorities: 'Understanding risks in all its dimensions' and 'Strengthening disaster risk governance to manage disaster risk'. Indeed, the SFDRR urges more people-centred approaches to engage and enhance dialogue with multiple stakeholders (UNDRR, 2022), to avoid conventional 'technical, passive, one-way risk communication' which are usually 'poorly interpreted' and 'often misunderstood' (UNDRR, 2022, p. 157) resulting in command-and-control approaches, which fail to understand, manage and reduce risk in all its multiple dimensions (Imperiale & Vanclay, 2020). Efficient communication must thus support inclusive risk governance, which should both include the relevant stakeholders according to the different levels of complexity, uncertainty, and ambiguity (Renn et al., 2011). According to the Sendai priorities, it should be noted that there is 'no perfect medium, tool or style of communication; the most appropriate are

¹This is available on line in Italian and German languages at the following link: <https://pericoli-naturali.provincia.bz.it/home>.

those that the targeted audience is receptive to' (Claassen et al., 2020, p. 552): local contexts, with their socio-cultural, institutional, networks, and governance structures and practices are what we should consider for integrating risk communication into the prevention and preparedness phases (Adger et al., 2013; Abunyewah et al., 2018). Disaster risk communication needs to be tailored to local contexts, which are incredibly important because disasters are socially constructed in different ways (Quarantelli, 1985). Then, when disaster risk is communicated across different actors and levels, effective disaster risk communication must thus take these local factors into account to promote effective risk reduction and preparedness. In addition, different communities have different levels of trust in government agencies, which can affect the effectiveness of disaster risk communication. For example, some vulnerable communities may have experienced being ignored by government agencies, leading to a lack of trust in their communications (Lindell & Perry, 2012).

Finally, the local context can influence the way people perceive risk and what motivates them to take action to reduce risk (Carnelli et al., 2020; Claassen et al., 2020). For instance, a community that has already experienced a disaster may have a heightened awareness of risk, while a community that has never experienced a disaster may have lower risk awareness and perception. Even if 'risk perception is only part of the picture' (Bruinen de Bruin et al., 2020), understanding these local risk perceptions, values, and motivations can help to make risk communication messages more effective (Bruinen de Bruin et al., 2020). In parallel, risk governance for disaster risk reduction (DRR) can be deemed as effective only when the different parties (institutions, stakeholders, affected, and general public) can understand their role and risk dimensions, trust each other, and are proactively included in the risk-handling chain (Renn, 2008; UNDRR, 2022). Risk communication actions should therefore raise awareness about risks by enabling the different actors to recognise and understand risks, identify their roles and jointly engage in disaster risk reduction efforts (Volenzo & Odyio, 2019). To this extent, Lundgren and McMakin (2013) proposed a framework to assess and therefore overcome what they identify as the most common barriers to effective risk communication. They distinguish constraints both from risk communicators and from the audience. According to them, we could expect from the public the following constraints: cultural alignment due to group thinking among peers or groups, hostility and outrage due to different reasons influencing risk perception (e.g., trust in institutions, level of familiarity with risk, perceived false reassurances, etc., see Covello, 1998); panic and denial in case of extreme life-threatening hazards lack of perceived control or breakdown of coping mechanisms; apathy in case of divergent risk assessments; mistrust of risk assessment and disagreements on the acceptable magnitude of risk, which is also linked to risk perception biases; lack of faith in science and institutions, which threatens the credibility of risk messages; and learning difficulties, which hinder the understanding in risk contexts, which are inherently characterised by levels of ambiguity, uncertainty and complexity. On the communicator side, both organisational and emotional barriers could be pointed out. At the organisational level, main factors are as follows:

- Inadequate resources for effective risk communication (staff, tools, funding).
- A management apathy or hostility, from who should support or foster risk communication.
- Potential roles dichotomy in the perception (self-perception and from the audience) of its own role as actor the governance of risk communication.
- Difficult review and approval procedures that hinder the risk communication flow.
- Corporate protection requirements that can also hinder the risk communication flow.
- Conflicting organisational requirements, 'by having policies, however well-intentioned, that conflict with the goals of risk communication' (Lundgren & McMakin, 2013, p. 52).
- Insufficient information to adequately plan and set schedules.

Furthermore, similarly to some challenges to be faced by the public, three main constraints have been identified at the emotional level:

- The unwillingness to see the public as an equal partner, sometimes derived from techno-centric believes and optimistic biases
- The inability to see differing value systems, which drive our intentions and behaviours, according to what each one of us consider relevant
- The belief that the public cannot understand science and its methods/contents.

Based on the characteristics of our case study and of the RiKoST project needs (e.g., to analyse both internal and external risk communication), as the purpose of our research was both context-specific and explorative, we adapted this framework to the local context of our research with the aim to acknowledge the main challenges and barriers of risk communication in the prevention and preparedness phase to improve risk governance in South Tyrol.

3 | CONTEXT AND METHOD

The South Tyrolean context, case study of this research, was identified as relevant due to some special features. First of all, it is an Alpine area, where space for development is limited (Link & Stötter, 2014) and natural hazards and extreme events are probably going to be more impactful, due to climate change (Burkett et al., 2014; Zebisch et al., 2018). Secondly, it is characterised by a strong civil protection tradition, with over 300 volunteer fire brigades for 116 municipalities, which means an average of almost three local associations per municipality, most of which have less than 5000 inhabitants. Thirdly, a survey administered as part of the project revealed that the local population generally has confidence in local institutions in the field of risk management and prevention, for example, 80% stated that existing measures are sufficient to protect the population from natural hazards. Fourth, according to the Italian law, risk communication is mainly managed at local level, by the Provincial Functional Centre, within the

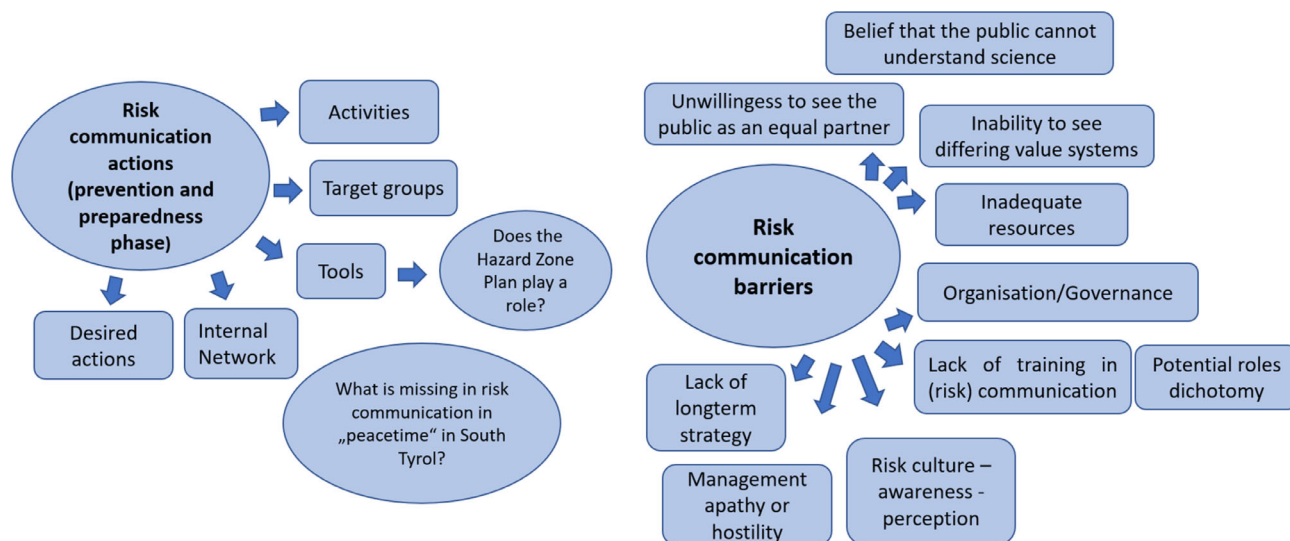


FIGURE 1 Our conceptual framework adapted from Lundgren and McMakin (2013). These themes were used both as an interview guide and for coding the interviews.

Provincial Agency for Civil Protection, which is responsible for monitoring, forecasting and alerting on natural and man-made hazards. The centre was created in 2004 by the Provincial Council and is always operational, providing early warning and coordination, by gathering all South Tyrolean institutions working in the fields of meteorology, geology, hydrology, data collection, avalanches and emergency planning (Province of Bolzano, 2022). In the event of an alarm or emergency, a structured crisis communication procedure is activated, including local media, press releases, alert states, siren activation or specific procedures, with predefined levels of coordination. It provides the so called ‘Situation centre’ with all important data to predict and study the development of events. Then, the Situation centre creates the technical and scientific basis for efficient decision-making in emergencies and disasters (Province of Bolzano, 2022). Contrarily, it is not yet clear what kind of structure or plan should have risk communication in the prevention and preparedness phase, nor who should be engaged in or not.

On the one hand, this context has made possible a comprehensive view of disaster risk communication involving all stakeholders, on the other hand, the lack of a general plan or structure has facilitated the application of the framework developed by Lundgren & McMakin (2013): we adapted it to our context and to our aim to assess current risk communication constraints in strategies and practices in South Tyrol, by,

- Identifying risk communication activities in South Tyrol, which include targets, tools, desired activities, and the role of hazard zone planning (which was one key aspects addressed in our project) for risk communication;
- Identifying the main barriers in risk communication, adapting and clustering Lundgreen and McMakin's framework to our local context

Figure 1 shows the adapted framework we used for our study:

Based on these assumptions, we mapped all main stakeholders which have or could have a role in meaningful exchanges about risk communication in South Tyrol. Our mapping was carried out as a two-stage desk analysis: first, the main stakeholders were identified by examining both the local disaster risk reduction governance structure and the various risk communication initiatives; then, the identified stakeholders were discussed and validated with the help of some local experts, including the director of the Provincial Functional Centre. As listed in Table 1, to choose our stakeholders, we considered two different scales (provincial and local), four different fields (risk prevention, emergency management, public communication, education), and three different typologies (institutions, associations, private stakeholders).

Based on these criteria we selected and contacted stakeholders; we also included the three main provincial authorities for schools. Even though at the moment they are not active in the field of risk communication, they could have an important role in terms of risk education and risk communication towards children and young adults.

During winter 2020–2021, we carried out 20 semi-structured online interviews (in Italian and German, depending on the interviewee) with representatives of the listed actors (usually the managers), using an interview guide based on the adapted framework of Lundgren and McMakin (2013) (Figure 1). They were interviewed as representatives of their agency, they had to sign the privacy consensus, according to the EU GDPR. We then transcribed the interviews and undertook a thematic analysis using NVIVO V11 software to code the texts based on our analytical framework. Given the exploratory and project-based nature of our research, the number of stakeholders interviewed covered our research aim and worked as a good sample for analysing the local risk communication governance in the prevention and preparedness phases of disaster risk reduction. Our findings cannot, however, be transferred to other case studies, but, on the one hand, our methodology and framework can be easily adapted and replicated in other contexts, on the other hand, our

TABLE 1 The list of the interviewees

Ref.	Organisation	Level	Field	Type
1	Press and Communication Agency	Provincial	Public Communication	Institutional
2	Press and Communication Agency – Civil Protection Ag.	Provincial	Public Communication	Institutional
3	Civil Protection Agency	Provincial	Risk prevention	Institutional
4	Civil Protection Office	Provincial	Risk prevention	Institutional
5	Office for Mountain Basins	Provincial	Risk prevention	Institutional
6	Office for Geology	Provincial	Risk prevention	Institutional
7	Office for Urban planning	Provincial	Risk prevention	Institutional
8	Department for Forest Management	Provincial	Risk prevention	Institutional
9	Functional Centre	Provincial	Risk prevention, emergency management, public communication	Institutional
10	Volunteer Fire Brigades Union	Provincial	Emergency management	Association
11	Fire Brigade	Local	Emergency management	Institutional
12	White Cross	Provincial	Emergency management	Association
13	Red Cross	Provincial	Emergency management	Association
14	Mayor (large municipality)	Local	Risk prevention, emergency management, public communication	Institutional
15	Mayor (small municipality)	Local	Risk prevention, emergency management, public communication	Institutional
16	Italian School Authority	Provincial	Education	Institutional
17	German School Authority	Provincial	Education	Institutional
18	Ladinian School Authority	Provincial	Education	Institutional
19	Communication Manager for river management plans	Local	Risk prevention	Private
20	Architect for Hazard Zone Planning	Local	Risk Prevention	Private

findings can be exploited to strengthen risk governance, and enhance community resilience in similar contexts, following the SFDRR.

4 | RESULTS

Coming to the results of our research, they will be discussed according to the themes (Figure 1) of the analysis undertaken. In terms of communication activities carried out before an event occurs, those most frequently reported on an ongoing basis by respondents are: information events organised by (7) institutional actors (e.g., when protection measures are implemented or as part of national awareness-raising campaigns), press releases (by 6 actors – e.g., issued when hazard zone plans are drawn up); then, training courses or exercises for volunteers (sometimes also in the form of excursions, mainly organised by the rescue associations); the following activities were only mentioned by single actors: school events, fairs or festivals organised to convey information on risk. Other activities are carried out as part of ongoing or one-off projects, for example, in the form of information events (by 7 actors), or in the context of the implementation of river basin management plans, educational initiatives in schools, training courses, workshops, and surveys. As for the means used for communication, those include face-to-face presentations (7 interviewees, mainly institutional ones), press

releases (6 interviewees, mainly Civil Protection offices and media agencies, since they have a more official role in communicating risk information to the public), hazard zone plans as tools of information, websites, social media, conferences, newspaper articles, and video contributions. To a lesser extent, also publications, web platforms, brochures or posters, infographics, or art installations, depending on the role, sensibility and commitment of the different actors.

With regard to the target of the risk communication activities, the main one is the local population: targeted by more than half of the interviewees, representing almost all types of organisations, except for associations in charge of emergency management and schools. More than one-third of the actors are also addressing students, including Civil Protection offices and private consultants. Journalists are also targeted by some provincial organisations and, of course, the Provincial Press Agency.

Regarding the risk communication barriers we identified, one of the most meaningful results is the less relevance given to emotional constraints, that is the public is always considered as an equal partner. Alternatively, eight actors (both local and provincial, private and public, but all in the field of risk prevention) reported that for the public it is difficult to understand scientific methods and content, or that who share information has difficulty understanding and embracing alternative value systems that guide people's intentions and

behaviour. For example, it is difficult to make people understand hazard zone planning or awareness-raising when there is no alert in progress:

'I see the difficulty for the citizens in case they are not completely affected, i.e. communication in a town where an avalanche or a landslide has occurred or citizens who experienced a flood: in those cases, the communication of the risk of an event is quite easy. Whereas in other cases, communicating in a municipality where ...we only have - in quotes... "only" - the hazard zone plan in hands, but where for years there hasn't been an event there, in my opinion, the population and the citizens do not have this sensitivity and this feeling with respect to natural events... and very often it happens to me as well, that is, if I have nothing to do in my area with avalanches, then the hazard is quite far away. So, I repeat, the difficulty of making the citizens see or understand a certain hazard' (I9).

A quarter of the respondents, especially institutional and private risk prevention respondents, claimed that these difficulties are due to the complexity of language and techno-centrism inherent in official and established risk assessment and management practices (something which can also be found in the literature, e.g., Albris et al., 2020; Carnelli et al., 2020; Imperiale & Vanclay, 2020). Interviewee n.19, an expert in communication, states that:

'then we absolutely must work with documentation that is digestible by the citizen. Nobody can read the Hazard Zone Plan, not even us, we struggle! When I read it, when I look at something in the back I have to see what's in the front ... so we have to transform the content of complex documents into digestible content, I think it's a pedagogical issue' (I19).

The second most significant result in terms of risk communication barriers, is 'risk culture': more than half of the respondents brought this topic as the most important barrier. The concept of risk culture was pointed out in several ways. The most mentioned one is the partial absence, especially in urban communities, of risk awareness, sometimes linked to a lack of local ecological knowledge or to a low perception of risk, as clear from these words:

'The relationship between the private individual and the territory that surrounds him, and the responsibility that everyone has for the territory that surrounds him, in my opinion is very weakened, everything is delegated to the administrations' (I20).

In order to address this partial lacking of risk awareness, which can be both linked to a delegation towards the institutions (as it will

be argued later in the analysis) and to a changing relationships with one's own environment in urban contexts, public institutions are asking themselves how to build a communication strategy, which can leverage on risk culture:

we have a lot of material, we have exceptional archives to promote the culture of risk! I.e. for some phenomena that occur maybe every 3-4 years, I have photos that I can put in a row, I mean, because pictures are needed in risk ... many images are needed, the risk is difficult to be perceived through words' (I16).

Here, the reference is both to the need for a shared language between communicators and the audience (which is one other component of the framework), and to the lack of content in external risk communication that can act on the emotional level of risk awareness and perception, reactivating a relationship with one's own surrounding environment. The third reference to risk culture is linked to another key component of risk communication, trust. Indeed, as anticipated by the aforementioned quote and the results of our survey on risk perception in South Tyrol, I6 pointed out that 'citizens are taught that there is always a person in charge, so we have procedures and when there are procedures there is a person in charge, so there is also a person in charge for risk management' (I6). This widespread sense of delegation and empowerment to the authorities had been pointed out by institutional actors as obstacle to being willing to accept risk-related messages when there is no evidence of events taking place, as one of the rescue associations clearly stated:

'we are in a perhaps fortunate area where the risk is very limited and the presence of the rescue forces is very, very present so even an intervention, let's call it a big one, happens ... We are on the spot within minutes, right? Where perhaps in other regions of Italy or even in Austria or Germany a fairly large machine has to move around and, until it is alerted, some time passes. Here they are very present, capillary even, even though the territory is very complex and therefore 'we don't feel the risk' (I13).

This is associated with a perceived feeling of safety, due to the lack of major disasters in recent times and a consequent low-risk perception across different levels, as one of the Mayors reported: 'in my opinion perception is missing: if everything goes well I honestly don't think about what could happen to me, what could happen' (I15); this resulted in the lack of a specific figure at local level, who could be responsible for dealing with risk communication in the prevention phase.

The fourth reference to risk culture as linked to risk communication barriers, according to our framework, was linked to a more classical approach (Imperiale & Vanclay, 2020) to risk management, driven by authorities, which put risk governance, and thus risk communication and stakeholder involvement, more in the background:

'in my opinion, in risk management so far in South Tyrol, we have focused above all on structural works... we are able to protect, we are able to build, we are able to manage emergencies. But the prevention aspect and also risk communication and... increasing perception and the stage, that is, preparing ourselves in peacetime for critical situations that may occur: this aspect has not been considered, for reasons that we have not focused on so far. In my opinion it is that, what it lacks, that we have treated that aspect of the risk cycle in a secondary way ... it is a cultural aspect, in my opinion' (I9).

It emerges here the relevance of not considering non-structural aspects, such as risk communication in the prevention phase or the target of common understanding in the context of inclusive risk governance.

This point is strictly correlated to two other perceived barriers by respectively almost half of the interviewees: the lack of adequate information and the lack of professional training to manage risk communication. The first aspect does not meet the institutions in charge of risk or emergency management, which are well-connected and have lots of data and information to share. This is more linked to a broader range of stakeholders, the ones with a big potential for raising awareness, but still underrepresented in the governance of risk communication: school authorities, which are not really involved in risk prevention activities, except for one-off labs/classes and excursions, which are usually targeting scholars in a one-way direction. From the side of local institutions, there is still some doubts about the opportunity to have a permanent network of contact persons, which can have a proactive role to spread information while no emergency is at stake. The same applies to the Press Agency: everything follows clear approving procedures for contents and targets, but there is nothing such strategy for risk communication to enhance risk prevention through a broad risk dialogue with the aim of acting on mutual understanding (at different scales) of risk awareness, perception, and engagement. This is interrelated with the perception, by one third of the actors (mainly provincial institutions and associations) that they do not work beyond their own role, and therefore have neither resources nor training to invest in communication strategies. To make an example, I8 pointed out that most citizens does not really know what a forest officer is really doing, his/her role in risk prevention and management – except for (from time to time) presenting on public occasions engineering structural measures to mitigate risk.

With regard to the themes identified, another hot topic is the need for at least a general training on risk communication, in order to be able to manage communication tools and be more aligned with the public's different views:

'I think it would be really useful to go on a course, to give a tip to all those in communication: 'how should I behave at a press conference? How do I prepare, I don't know, a 10-minute text?...'. I think this would be

important. I have done these courses myself, several times, and they are very useful so that one understands what one has to do, what one must not do, so it is very useful' (I6).

This is also correlated with the lack of some more specific/expert pieces of training, such as being competent or having strategies in the use of social media, which contributes to the spread of a rapid flow of unchecked information, which can stem from uncertain sources or not really verifiable:

'The thing that I think needs to be improved is to have a more univocal flow of information, in the sense that I see that when there are emergencies - with the fact that there are social networks available - everyone tries to create their own channel of information: I see many mayors who use their Facebook profiles to communicate things about civil protection that perhaps have not yet been approved or endorsed by those in charge, and which can also be a problem because things come out that perhaps should not come out. And so there we should perhaps be able to channel the information in a more centralized manner, given that it is then obviously up to the media to go to the site and look for the news' (I1).

The last statement goes hand in hand with the general low acknowledgment of the professionalism of risk communicators in the different organisations, whose training is often spontaneous and not well codified, if associated with the prevention phase. An exception we found is about the volunteer fire brigade, who developed their own strategy to engage with the public all over the year. One of their members is in charge of it, but he is available only when on duty and he obviously built a communicative narrative based on their emergency interventions, their symbolic values, and daily routines: he is a volunteer and does it out of passion, but creates a network of trust with the population and stakeholders. Furthermore, this narrative is not associated with a precise internal (among institutions/associations) or external risk communication strategy, with specific aims and targets.

To conclude, as explicitly mentioned by the interviewees, the biggest barrier identified across the various topics analysed, it is the lack of a crosscutting and integrated strategy of risk communication. Content planning and tools are more event-driven, except for some specific projects or experiences (e.g., some river management plans run by the Agency for Civil Protection, together with some private consultants in charge of stakeholder engagement and risk communication), therefore it is needed:

'a common communication strategy, so that brings together eh ... the communication activities of the different offices. So, the activities of the Functional Centre may well be close to the activities of the weather

office or the civil protection office or the [office to manage] mountain basins and, at the moment, a lot of communication activities are also done, but in my opinion not following a real strategy in a certain direction' (I9).

5 | DISCUSSION AND CONCLUSION

As shown in the results of our explorative analysis, we identified the main barriers in risk communication during the preparedness and preparation phase in South Tyrol, as part of the RIKoST INTERREG project. Our analysis reveals what kind of good practices are in place and which challenges are still to be addressed in risk communication to improve community resilience by acting on risk governance.

First of all, trust is clearly acknowledged as a key pillar in risk communication (Renn, 2008; Sturloni, 2018; Attems et al. 2020) and risk awareness (Bubeck et al., 2012) to stimulate positive feedback and behaviours in the public. From the analysis of our interviews, diffuse trust and reciprocal support among the different actors in the risk communication arena and between the audience and the communicators have been reported as positive factors for risk communication in general terms. If we correlate this point with strong informal relationships existing among the institutional actors (due to the small operational scales of our contexts), this generally results into smooth internal or external communication activities. Those aspects, coupled with a general delegation of risk management to institutions by the public, excellent emergency management, and a lack of major emergencies/disasters in the recent past, have paradoxically led to potential obstacles to a risk communication strategy in the prevention phase in the past, due to a general sense of safety and, linked to this, an unperceived need for further investment in risk communication. Similar to the levee effect (Wachinger et al., 2013), good procedures and strategies in emergency communication and risk management can have potentially negative consequences in strengthening risk communication in the risk prevention phase. It has also been acknowledged that it is very difficult to communicate to the public in the absence of imminent events or threats (Renn, 2008; Wachinger et al., 2013), in the case of a lack of local knowledge (Carnelli et al., 2020) or a tendency to delegate much to institutions (Bankoff et al. 2015).

Those aspects are also interrelated with the role of risk communication both in raising awareness and in empowering communities, as core conditions for a solid effective and inclusive risk governance (Renn, 2008): if face-to-face information events or press releases, event- or project-related communication activities aimed at the local population are the most widespread, the need for a shared, more understandable language (Albris et al. 2020) that can also act on emotions and practices must also be promoted. Tools and contents of risk communication should integrate other worldviews, reflecting 'what matters to people in their lives, the contexts in which they make decisions about risk, the barriers and incentives to change, and how people [and institutions] communicate about risk' (UNDRR, 2022, p. 130). Some examples put forward by the interviewees are the role of primary

and secondary school education in raising awareness, the use of pieces of local knowledge through historic and current images taken from local neighbourhoods, the relevance of sharing what the different actors in risk prevention and management are doing and what are their roles, the importance of learning how to understand maps and plans, the improvement of excursions, simulations, and training for risk preparedness. The sharing of transparent information on risks, and the understanding of other's people views/perceptions/values/knowledge are indeed basic principles of risk communication (Sturloni, 2018), and they can act on knowledge, which is not static as information but 'dynamic, built through social interaction and experience' (Weichselgartner & Pigeon, 2015, p.109). One of the significant barriers identified is indeed the complexity of language and techno-centrism inherent in official and established risk assessment and management practices. This barrier can be addressed by transforming the content of complex documents into digestible content. To this extent, an 'all-of-society approach to risk communication' (Claassen et al., 2020) is recommended to enhance risk governance: this requires 'people who understand risk, from a technical perspective or otherwise, and who also connect, communicate and collaborate with others about it' (UNDRR, 2022, p.127). This is a key to leveraging the still-lacking transition from a command-and-control approach to a governance of risk (Imperiale & Vanclay, 2020), where social dimensions of risk are addressed by challenging existing institutional, political, and cultural barriers in risk management (Imperiale & Vanclay, 2021). From one side, only in this way can the various actors be actively included in risk governance (UNISDR, 2015, priority 2) and overcome technocentric and one-way risk communication, which has negative effects on the entire risk information exchange. From the other side, effective communication can also encourage cooperation among communicators and institutional members. This can include sharing data and resources, which is sometimes problematic, and working together to enhance preparedness, and supporting each other during the different phases of risk management.

The aforementioned conditions are in line with the need to leverage on risk culture to promote a culture of resilience (Imperiale & Vanclay, 2021) and/or a culture of prevention (Weichselgartner & Pigeon, 2015) as a cross-cutting basis for increasing risk awareness, achieving a shared iterative understanding of risk (Bruinen de Bruin, et al., 2020) and producing understandable and malleable risk narratives to better understand risk (UNISDR, 2015), co-produce knowledge (Leano et al., 2021), and enhance community resilience. This can hinder a paternalistic attitude in risk governance (Imperiale & Vanclay, 2020) and push the different actors to be trained to communicate, understand and share risk knowledge.

Indeed, in terms of challenges, after the role of risk communication is recognised, the need for more professional training has strongly emerged, also within institutions, because sometimes it is not present or is left to individuals and not always structured. It therefore emerged from the interviews that an effective tool for improving risk governance through risk communication could be the creation of a shared risk communication strategy in the prevention phase. To do this, it would be necessary to involve and train various actors not usually included in this field (such as schools or journalists) in order to

create a risk communication ecosystem in which to experiment with shared, interactive content and media that can leverage local knowledge, emotions and comprehensible messages, despite the absence of imminent threats. This requires an integrated, cross-sectoral risk communication strategy or the establishment of a working group or staff specialised in the field of risk communication, which is integrated into risk governance throughout the entire risk management chain (Renn, 2008) and acts as a network of mediators between different institutions/organisations and with the public (Albris et al., 2020). This goes in the direction of the first Sendai priority (UNISDR, 2015), by producing and transmitting risk knowledge in training and along the risk-handling cycle.

To conclude, those findings could then inform both policy recommendations and academic research to improve risk communication in Alpine areas, acting on the governance of risk communication by investing resources in risk training/education, fostering risk culture, and developing new content and tools, by designing a risk communication strategy that is anchored in the prevention and preparedness phase (defining roles and competences). As previously mentioned, the limits of our explorative research are obviously determined by the single case study analysed, and by the set of stakeholders involved, who are, anyway, the main actors of the local risk communication arena.

ACKNOWLEDGEMENTS

The authors would like to thank Willigis Gallmetzer, Pierpaolo Macconi, and Nicola Marangoni from the Agency for Civil Protection of the Autonomous Province of Bolzano for their support in carrying out the described activities. The research leading to these results has received funding from the Funding programme Interreg Italia-Österreich – European Regional development Fund, under Grant Agreement ITAT3015, RiKoST – Risk communication strategies. The authors thank the Department of Innovation, Research and University of the Autonomous Province of Bozen/Bolzano for covering the Open Access publication costs.

CONFLICT OF INTEREST STATEMENT

The authors confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work nor financial or non-financial interest in the subject matter or materials discussed in this publication that could have influenced its outcome.

REFERENCES

- Abunywah, M., Gajendran, T., & Maund, K. (2018). Conceptual framework for motivating actions towards disaster preparedness through risk communication. *Procedia Engineering*, 212, 246252. <https://doi.org/10.1016/j.proeng.2018.01.032>
- Adger, W., Barnett, J., Brown, K., et al. (2013). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, 3, 112–117. <https://doi.org/10.1038/nclimate1666>
- Albris, K., Lauta, K. C., & Raju, E. (2020). Disaster knowledge gaps: Exploring the interface between science and policy for disaster risk reduction in Europe. *International Journal of Disaster Risk Science*, 11(1), 1–12.
- Alexander, D. (2014). Social media in disaster risk reduction and crisis management. *Science and Engineering Ethics*, 20(3), 717–733. <https://doi.org/10.1007/s11948-013-9502-z>
- Árvai, J. (2014). The end of risk communication as we know it. *Journal of Risk Research*, 17(10), 1245–1249. <https://doi.org/10.1080/13669877.2014.919519>
- Attems, M. S., Thaler, T., Snel, K. A., Davids, P., Hartmann, T., & Fuchs, S. (2020). The influence of tailored risk communication on individual adaptive behaviour. *International Journal of Disaster Risk Reduction*, 49, 101618.
- Aven, T., & Renn, O. (2010). Risk management. In *Risk management and governance. Risk, governance and society* (Vol. 16). Springer. https://doi.org/10.1007/978-3-642-13926-0_8
- Bankoff, G., Cannon, T., Krüger, F., & Schipper, L. F. (2015). Exploring the links between cultures and disasters. In F. Krüger, G. Bankoff, T. Cannon, B. Orłowski, & L. F. Schipper (Eds.), *Cultures and disasters. Understanding cultural framings in disaster risk reduction*. Routledge.
- Boholm, A. (2003). The cultural nature of risk: Can there be an anthropology of uncertainty? *Ethnos: Journal of Anthropology*, 68(2), 159–178. <https://doi.org/10.1080/0014184032000097722>
- Bruinen de Bruin, Y., Vetere Arellano, A. L., Begg, C., Dechy, N., Donovan, A., Kalinowska, K., Petrenj, B., Resch, C., & Tulonen, T. (2020). Linking actors, sectors and governance levels. In A. Casajus Valles, M. Marin Ferrer, K. Poljanšek, & I. Clark (Eds.), *Science for disaster risk management 2020: Acting today, protecting tomorrow*, EUR 30183 EN. Publications Office of the European Union. <https://doi.org/10.2760/571085>
- Bubeck, P., Botzen, W. J., & Aerts, J. C. (2012). A review of risk perceptions and other factors that influence flood mitigation behavior. *Risk Analysis*, 32(9), 1481–1495. <https://doi.org/10.1111/j.1539-6924.2011.01783.x>
- Burkett, V. R., Suarez, A. G., Bindi, M., Conde, C., Mukerji, R., Prather, M. J., St. Clair, A. L., & Yohe, G. W. (2014). Point of departure. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, et al. (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part a: Global and sectoral aspects. Contribution of working group II to the fifth assessment report of the intergovernmental panel on climate change* (pp. 169–194). Cambridge University Press.
- Carnelli, F., & Anselmi, G. (2018). Social media and disaster governance: Twitter use in recent floods, social media and disaster governance in Italy. In G. Forino, S. Bonati, & L. Calandra (Eds.), *Governance of risk, hazards and disasters: Trends in theory and practice* (pp. 169–185). Routledge.
- Carnelli, F., Mugnano, S., & Short, C. (2020). Local knowledge as key factor for implementing nature-based solutions for flood risk mitigation. *Rassegna Italiana di Sociologia*, LXI(2), 381–406. <https://doi.org/10.1423/97838>
- Claassen, L., Sapountzaki, K., Scolobig, A., Perko, T., Górski, S., Kaźmierczak, D., Anson, S., Carnelli, F., Bossu, R., Sousa Oliveira, C., & Laurikainen, H. (2020). Citizen participation and public awareness. In A. Casajus Valles, M. Marin Ferrer, K. Poljanšek, & I. Clark (Eds.), *Science for disaster risk management 2020: Acting today, protecting tomorrow*, EUR 30183 EN. Publications Office of the European Union. <https://doi.org/10.2760/571085>
- Covello, V. T. (1998). Risk perception and communication. *Proceedings of the North American Conference on Pesticide Spray Drift Management*, 161–186.
- Demeritt, D., & Nobert, S. (2014). Models of best practice in flood risk communication and management. *Environmental Hazards*, 13(4), 1–16. <https://doi.org/10.1080/17477891.2014.924897>
- Gallmetzer, W., Baumann, W., Carnelli, F., Koboltschnig, G., Krenn, P., Macconi, P., Marangoni, N., & Pedoth, L. (2021). RiKoST. *Strategie di comunicazione del rischio. Relazione Finale*. Interechopen.
- Imperiale, A. J., & Vanclay, F. (2020). Barriers to enhancing disaster risk reduction and community resilience: Evidence from the L'Aquila disaster. *Politics and Governance*, 8(4), 232–243. [10.17645/pag.v8i4.3179](https://doi.org/10.17645/pag.v8i4.3179)

- Imperiale, A. J., & Vanclay, F. (2021). Conceptualizing community resilience and the social dimensions of risk to overcome barriers to disaster risk reduction and sustainable development. *Sustainable Development*, 29, 891–905. <https://doi.org/10.1002/sd.2182>
- IPCC (2022). Climate change 2022: Impacts, adaptation and vulnerability. In H.-O. Pörtner, D. C. Roberts, M. Tignor, E. S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, & B. Rama (Eds.), *Contribution of working group II to the sixth assessment report of the intergovernmental panel on climate change* (p. 3056). Cambridge University Press. <https://doi.org/10.1017/9781009325844>
- Khan, S., & Mishra, J. (2022). Critical gaps and implications of risk communication in the global agreements—SFDRR, SDGs, and UNFCCC: 3 select case studies from urban areas of tropics in South Asia. *Natural Hazards*, 111, 2559–2577. <https://doi.org/10.1007/s11069-021-05148-z>
- Klinke, A., & Renn, O. (2021). The coming age of risk governance. *Risk Analysis*, 41(3), 544–557. <https://doi.org/10.1111/risa.13383>
- Leano, R. P., Emdad Haque, C., & Berkes, F. (2021). Co-production of risk knowledge and improvement of risk communication: A three-legged stool. *International Journal of Disaster Risk Reduction*, 64(102), 508. <https://doi.org/10.1016/j.ijdr.2021.102508>
- Lindell, M. K., & Perry, R. W. (2012). The protective action decision model: Theoretical modifications and additional evidence. *Risk Analysis*, 32(4), 616–632.
- Link, S., & Stötter, J. (2014). Internal communication a prerequisite for risk governance: Hazard zone planning in South Tyrol, Italy. *Environmental Hazards*, 14(2), 87–102. <https://doi.org/10.1080/17477891.2014.993580>
- Lundgren, R. E., & McMakin, A. H. (2013). Constraints to effective risk communication. In R. E. Lundgren & A. H. McMakin (Eds.), *Risk communication: A handbook for communicating environmental, safety, and health risks*. Wiley 10.1002/9781118645734.ch4
- Lupton, D. (2013). *Risk* (2nd ed.). Routledge.
- Pedoth, L., Carnelli, F., Koboltschnig, G., Krenn, P., Rudloff, A., Gallmetzer, W., Macconi, P., & Marangoni, N. (2021). Improving risk communication strategies through public awareness and engagement—Insights from South Tyrol and Carinthia. In M. Reich, et al. (Eds.), *Protection forest as ecosystem-based solution for disaster risk reduction (Eco-DRR)*. IntechOpen.
- Permanent Secretariat of the Alpine Convention. (2019). *Natural hazard risk governance—Report on the state of the Alps*. Alpine Convention, Innsbruck, Alpine Signals Special Edition 7.
- Province of Bolzano. (2022). Lo stato di Protezione Civile. Retrieved July 29, 2022 from <https://www.provincia.bz.it/sicurezza-protezione-civile/protezione-civile/lo-stato-di-protezione-civile.asp>
- Quarantelli, E. L. (1985). *What is disaster? The need for clarification in definition and conceptualization in research*. University of Delaware <http://udspace.udel.edu/handle/19716/1119>
- Renn, O. (2008). *Risk governance. Coping with uncertainty in a complex world*. Earthscan.
- Renn, O., Klinke, A., & van Asselt, M. (2011). Coping with complexity, uncertainty and ambiguity in risk governance: A synthesis. *AMBIO*, 40, 231–246. <https://doi.org/10.1007/s13280-010-0134-0>
- Sturloni, G. (2018). *La comunicazione del rischio per la salute e per l'ambiente*. Mondadori.
- UNDRR. (2022). *Global assessment report on disaster risk reduction 2022: Our world at risk: Transforming governance for a resilient future*. UNDRR.
- UNISDR. (2015). Sendai framework for disaster risk reduction 2015–2030. Retrieved from online July 7, 2021 https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf
- United Nations. (2015). Resolution adopted by the general assembly on 25 September 2015, transforming our world: The 2030 agenda for sustainable development.
- Volenzo, T. E., & Odiyo, J. O. (2019). Linking risk communication and sustainable climate change action: A conceptual framework. *Jamba: Journal of Disaster Risk Studies*, 11(1), a703. <https://doi.org/10.4102/jamba.v11i1.703>
- Wachinger, G., Renn, O., Begg, C., & Kuhlicke, C. (2013). The risk perception paradox—Implications for governance and communication of natural hazards. *Risk Analysis*, 33(6), 1049–1065. <https://doi.org/10.1111/j.1539-6924.2012.01942.x>
- Weichselgartner, J., & Pigeon, P. (2015). The role of knowledge in disaster risk reduction. *International Journal of Disaster Risk Science*, 6, 107–116. <https://doi.org/10.1007/s13753-015-0052-7>
- Zebisch, M., Vaccaro, R., Niedrist, G., Schneiderbauer, S., Streifeneder, T., Weiss, M., Troi, A., Renner, K., Pedoth, L., Baumgartner, B., & Bergonzi, V. (2018). *Rapporto sul clima—Alto Adige 2018*. Eurac Research.

How to cite this article: Carnelli, F., & Pedoth, L. (2024). Enhancing risk governance by addressing key risk communication barriers during the prevention and preparedness phase in South Tyrol (Italy). *Sustainable Development*, 32(2), 1538–1547. <https://doi.org/10.1002/sd.2687>