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## The Role of Media and Communication Research in Risk Communication

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# **The Role of Media and Communication Research in Risk Communication**

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**Abstract.** This paper explores the field of risk communication through the lens of media and communication studies, adopting a sociological framework. It investigates how the methods and thematic concerns typical of media and communication research are applied to the study of risk communication by analyzing the findings of a scoping review of international literature on the applied dimensions of this field. The definitions and theoretical frameworks of risk communication reveal a limited but focused incorporation of concepts and tools from media and communication research. The review highlights several areas that warrant further exploration, including the development of more audience-tailored communication strategies, a renewed attention to the organizational dimensions of risk communication, and a more systematic application of classical media theories – such as agenda-setting and audience studies – to the analysis of risk-related discourse.

**Keywords:** risk communication, scoping review, communication theories, media

## **1. Introduction: considering risk communication in a complex media environment**

This paper examines risk communication through the lens of media and communication theories. We explore how communication research methods and themes apply to studying risk communication, discussing findings from a scoping review of international literature on this topic. Conducted within the RETURN project<sup>2</sup>, this review is part of a larger effort involving universities, institutions, and private partners to enhance knowledge of various risks.

Working on an interdisciplinary project has demanded considerable reflection, especially regarding the sociological contribution of media and communication studies to the field of risk

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communication, by integrating media analysis with broader social processes. Collaborating with a multidisciplinary team on a dynamic and complex topic such as risk communication has also posed several challenges. The first challenge pertains to *integration*, viewing communication as an element that necessarily interacts with other disciplinary resources. For instance, communicating natural risks requires understanding those risks and establishing cooperative relationships with experts whenever possible. The second challenge, by contrast, involves *differentiation*: it is necessary to establish boundaries regarding the practices, research strategies, theoretical tools, and interpretative approaches that define the discipline and distinguish it from related fields.

Then, a sociological approach to media and communication studies emphasizes the role of communication processes within all spheres of social life, including cultural, economic, and political dimensions.

This paper examines how the theoretical and methodological approaches developed within media and communication studies can contribute to a deeper understanding and more effective practice of risk communication. Rather than treating communication as a mere conduit – the so-called “last mile” in risk governance – this contribution draws on media and communication studies to unpack the symbolic, institutional, and strategic dimensions of how risk is communicated. When approached from a sociological perspective, media and communication studies offer valuable tools for framing risk communication as a set of socially mediated practices. Power relations, institutional logic, and cultural representations are deeply intertwined in these processes. Applying a sociological lens to media and communication studies enables us to critically examine these complex interdependencies and gain a deeper understanding of how risk is constructed, conveyed, and contested in society.

Acknowledging the communicative dimension in understanding risks and their perception entails validating (though not unconditionally) constructivist approaches, which highlight how some risks can be selectively amplified through visibility or cultural resonance. Treating communication as integral to the sociological study of risk allows the application of traditional fields of inquiry.

Studying risk communication – especially within today’s complex and constantly hybridized ecosystem – enables us to explore key dimensions for understanding the social domain and how material artifacts (media as infrastructures or mediating agents) shape representation, and thus influence understanding and perception.

Then, it becomes essential to integrate the following areas.

1. Communication as a social process: Investigating how communication contributes to constructing identities and social problems, fostering social cohesion, or amplifying the fractures characterizing social conflicts.
2. Structures of communication: Considering media as institutions capable of mediating and directing communication flows within societies. This perspective also considers media as apparatuses with specific organizational structures. Observing these structures enables the integration of production logic as socially and culturally situated phenomena, as evidenced by numerous analyses that describe the logic of media, journalism, and digital tools.
3. Communicative practices: Analyzing how individuals and communities produce, disseminate, and interpret messages. This analysis must account for “positionality” factors,

encompassing broader cultural milieus, social norms, and power disparities in content production and distribution.

4. The relationship between media and society: Examining the impact of broadcast or digital media on society. In this sense, media (including their material components as artifacts) and the representations they convey are considered significant for studying phenomena that affect public opinion, including transformations in the public sphere and democratic participation.

In this sense, risk communication can be interpreted as a cultural object, as defined by Wendy Griswold (1994) (see also Mangone, 2022). Like cultural objects, risk communication represents a shared meaning encapsulated in a form that owes much to social contingencies and media practices. However, it is also a form of communication in which relationships between creators and audiences are fundamental, involving essential dimensions such as trust (Renn & Levine, 1991; Bonfanti et al., 2023), credibility (Peters et al., 1997; Trumbo et al., 2003), and collaboration (McComas & al., 2020).

This analysis draws on a scoping review conducted to develop a database of tools and applications employed in risk communication. While the review primarily focused on operational tools and practices, it became evident that the underlying theoretical frameworks guiding these analyses and descriptions were not consistently grounded in media and communication studies. This observation led us to critically examine the extent to which concepts, theories, and classical analytical tools from media and communication research are essential for capturing the complexity of risk communication processes.

While this approach may seem recursive, the underrepresentation of communication disciplines as an interpretive tool, even for practical experiences, is worth discussing. Several hypotheses can be formulated. The first concerns *normalization*: even in such a specific field of study, references to the theoretical foundations of media and communication studies may be taken for granted as the scientific community shares them. The second hypothesis considers *fragmentation*: the phenomenon is being analyzed from so many perspectives that media and communication research struggle to establish as the protagonists of these analyses. Finally, the third hypothesis emphasizes the ongoing centrality of *expert knowledge*, which differs from that of communicators, who may only be involved in the final stages of the process. This suggests that the perspectives of the hard sciences and experts involved in risk governance are particularly relevant in developing the theoretical framework for risk communication.

This paper will discuss these hypotheses based on a large body of international literature. First, we will describe what we mean by risk communication. Next, we will briefly summarize the investigative techniques and findings of a scoping review, as described more extensively in Massa & Comunello (2024).

We will then discuss two aspects: risk communication definitions and which theoretical frameworks may be relevant for understanding contemporary risk communication. In the concluding section, we will draw together our arguments, outlining potential future research areas that could be strengthened through the cognitive tools of media and communication studies from a sociological perspective.

## 2. Risk Communication: An Overview

This paragraph examines the central role of risk communication within the broader framework of risk management. Rather than being treated as a peripheral or secondary component, risk communication should be recognized as a core element of policy development. Its effective implementation entails the establishment of dedicated spaces for dialogue and engagement with diverse publics. Such an approach is the outcome of an ongoing and complex process of negotiation among scholars, policymakers, and practitioners, aimed at fostering shared understandings and developing effective communicative practices.

Standard definitions describe risk communication as a “process of exchanging information among interested parties about the nature, magnitude, significance, or control of a risk” (Covello, 1992). This definition involves sharing details on the nature, extent, significance, and management of risks (Covello et al., 1986; Covello, 2021). The exchange concept enhances the understanding of risk communication as a relational process. From this perspective, messages that describe risks and the best practices to address them should foster a relational dimension rather than focusing solely on the transmission of information. This relational component, essential for turning risk communication into a genuine sharing of meanings, also impacts the content. Indeed, effective risk communication informs and educates the public, encourages protective behaviors, disseminates alerts, and facilitates collaborative problem-solving to address conflicts around risk management (Covello et al., 1986).

The interactive and discursive nature of risk communication – emphasized in most international guidelines – emerges from a broader process of innovation and a growing understanding of the dynamics that underpin it. Informed by ongoing research, contemporary practice has progressively moved away from *deficit-based models* (Hilgartner, 1990), which rely on unidirectional information flows. These earlier models assumed a structural asymmetry, particularly in terms of knowledge, between experts, policymakers, and the public. Within this framework, the public was positioned as a passive recipient of information, with little or no agency in interpreting or responding to the messages conveyed. Over time, this linear model has been gradually replaced by more circular approaches, grounded in participatory strategies and feedback loops.

Leiss (1996) describes risk communication as a continuous flow of information between experts, academics, political and administrative regulators, interest groups, and the public. However, significant disagreements can arise among these actors, often due to various factors, including differences in approaches and principles, disparities in the information available to each group, and difficulties understanding others’ perspectives. Moreover, the risk communication process can become a source of conflict and controversy. Some obstacles to effective communication include media bias, distortions in source selection, hidden or strategically driven agendas, the amplification of viewpoints perceived as irrational, and difficulties on the part of responsible institutions in adopting language that is accessible and comprehensible to the public. These factors can undermine the ability of risk communication to be truly inclusive and effective.

Despite these persistent challenges – sometimes exacerbated by the disorder of contemporary information systems – theoretical reflection has developed evolutionary approaches to risk communication. A significant example is the phase-based model proposed by Leiss as early as 1996. This framework identifies different stages based on the scientific community's evolving understanding of how to make risk communication engaging for the public.

1. *The Expertise Phase.* In this initial phase, risk communication is characterized by a one-way approach, assuming that scientists, by virtue of their authority and expertise, can legitimize risk communication simply through the rigor of the scientific method.
2. *The Persuasion Phase.* As the field evolves, there is a growing awareness that merely providing information with a “scientific touch” is not enough; it is also necessary to convince the public of the reliability and relevance of the information conveyed. In this phase, persuasive techniques – often borrowed from marketing – are employed to enhance the effectiveness of communication. Institutions must demonstrate their technical expertise and tailor their messaging to the characteristics of different audiences, fostering greater understanding and awareness of risks.
3. *The Trust Phase.* The final phase shifts the focus to the social context and the relationships among the various stakeholders involved in risk management. Persuasive strategies alone are no longer sufficient; building a shared consensus through dialogue with stakeholders and maintaining transparency in decision-making becomes crucial. Governments and institutions must actively engage in risk literacy and prepare the population for potential crises. For risk communication to be effective, it must be structured, coordinated, and oriented toward the active participation of all involved actors.

Determining whether changes in practice stem from shifts in theoretical frameworks remains complex; nonetheless, the relationship between the two appears increasingly interdependent. The evolution of risk communication is closely linked to broader transformations in the conceptualization of risk itself (Balog-Way, McComas, & Besley, 2020). Scholarly literature has articulated multiple definitions of risk, frequently emphasizing its probabilistic nature, wherein events of varying likelihood and impact may occur. As noted by Palenchar and Heath (2007), both deliberate actions, such as prevention and education strategies, and situational factors – whether carefully managed or accidental – can serve to amplify or mitigate perceived risk. Science, along with the communicative processes through which it is conveyed, plays a critical role in shaping these dynamics. In the absence of proactive and coordinated communication by institutional and scientific actors, media narratives and public discourse may influence policy debates, thereby redefining the perceived scope and urgency of risks.

Consequently, trust in the institutions responsible for managing risks, as well as their perceived credibility, may be undermined. These issues align with constructivist perspectives on risk, particularly those concerned with the social amplification of risk. Such approaches underscore the centrality of communication, to the extent that some scholars advocate for its integration into risk assessment processes and policy design (Gabrill & Simmons, 1998; Árvai, 2014). Traditionally, research in risk communication has relied heavily on case studies and the identification of best practices (Sheppard, Janoske, & Liu, 2012). However, more recent developments reflect a growing emphasis on conflict resolution, public engagement, and the establishment of bidirectional communication channels (Aakko, 2004).

Against this backdrop, the following analysis turns to media and communication studies, understood as a composite repertoire of theoretical frameworks, research methodologies, and cognitive challenges. Our point of departure is an examination of the practical tools used in risk communication. The next section outlines the rationale for this investigation and presents the research questions that guide our study.

### **3. Research questions and methods**

The reflections presented in this paper are grounded in the analysis conducted through a scoping review. This methodological approach is particularly effective for exploring the breadth of existing literature on a given topic, enabling researchers to assess the volume and distribution of studies and to identify key thematic areas. Scoping reviews are especially useful in the preliminary phases of research, where the goal is to gather foundational knowledge prior to developing more focused research questions, such as those guiding systematic reviews or meta-analyses. Unlike these more rigid methodologies, scoping reviews offer greater flexibility in terms of inclusion criteria and analytical scope (Munn et al., 2018; Tricco et al., 2016; Pham et al., 2014; Peterson et al., 2017).

This method was selected for its capacity to reduce selection bias through the systematic identification and analysis of literature via database searches. As outlined by Anderson et al. (2008), scoping reviews serve multiple functions, including mapping relevant literature, identifying key concepts, informing policy debates, and supporting stakeholder engagement.

The review represented a central component of our research project and significantly informed the development of the associated communication campaign. Accordingly, our analysis focused primarily on risk communication tools, with particular attention to their application contexts, intended audiences, and media strategies. In parallel, we aimed to critically examine the theoretical underpinnings that support the practical implementation of risk communication. However, the literature reviewed revealed that theoretical discussions were often fragmented and inconsistently integrated. Nonetheless, even these dispersed insights offered a valuable foundation for a broader conceptual reflection on risk communication from the perspective of media and communication studies. To further explore this topic, we will address two key research questions:

- RQ1:** What insights from media and communication research emerge from the review?
- RQ2:** What conceptual tools enhance research on risk communication?

To answer the first question, we will analyze how risk communication is defined in the reviewed papers to clarify the scope of the field and its practical applications. For the second question, we will identify the main research frameworks discussed in the literature and examine how they are applied in risk communication.

## 4. Some insights on the scoping review

### 4.1 Keywords and search string

We identified keywords to retrieve articles on risk communication and its key components. These were developed through a brainstorming process that combined theoretical concepts with empirical indicators, integrating both inductive and deductive approaches. This process led to the creation of a search string structured around three thematic areas.

The first area focuses on natural and environmental hazards, based on key literature providing an overview of such risks. The second targets risk communication, with keywords selected to capture studies relevant to the communicative dimension. The third area includes terms related to communication campaigns and practices, partly inspired by McGuire's input-output model for persuasive message design (2013).

The search string was executed across primary databases, including Scopus, Web of Science, EBSCO, ACM, and IEEE Xplore. No filters were applied to selecting articles, except for language (English) and publication format. In total, 1387 papers are included in the final dataset. Articles have been retrieved in June 2023.

As the database was being organized, specific inclusion and exclusion criteria were defined to guide the screening of abstracts and the subsequent selection of articles for in-depth analysis. Due to the substantial volume of articles, we focused on the concept of *intentionality*, considering the academic definition of a “communication campaign” as theoretical insight.

Hence, the selected elements conformed to the abovementioned criteria, implying a certain degree of intent in production and/or direction. The following were encompassed: a) communication campaigns with clearly identifiable promoters and goals; b) case studies detailing strategies, actions, and approaches of specific institutions; c) tools employed in communication and risk awareness (e.g., visual graphics, specific formats, using of social networking sites for information dissemination, communication tools involving participatory projects, etc.).

The initial dataset was analyzed in consideration of the specified criteria. A researcher from the team read the abstracts of all collected articles ( $N = 1387$ ) to evaluate whether they were suitable for the subsequent phase, which involved reading the full texts. The guiding principle was the identification of specific campaigns, tools, and case studies.

Following this review, 200 articles were identified for full-text reading. Then, after retrieving the papers and reading the complete text, 75 articles were eliminated. The final pool of documents comprises 125 papers that have been thoroughly read and analyzed. In the following paragraph, we summarize the main results.

#### 4.2 Literature characteristics

The 125 selected papers were published between 2006 and 2023<sup>3</sup>. Of the 125 articles analyzed, 110 adopt a single-risk approach, focusing on a specific risk, while 15 explore multi-risk scenarios. Flooding and hydrogeological risks are the most frequently discussed topics.

Out of the 125 papers reviewed, 120 specify the geographic context in which the risk communication tool or action is implemented. Considering the geographical distribution of papers, it can be observed that the results confirm a tendency toward an American focus on risk communication. This distribution demonstrates that, even though current risks may have global implications, each geographical context faces specific and unique risks compared to the region in which it is situated, and attention to risk communication remains uneven.

The final set of reviewed papers is categorized into three macro-thematic areas identified in the literature: (1) 73 papers focusing on risk communication tools, (2) 45 papers addressing risk communication experiences in specific contexts, and (3) 7 papers summarizing risk communication campaigns. This distribution suggests that the research predominantly emphasizes either micro aspects, such as specific or targeted tools, or broader dimensions, as evidenced by the substantial number of risk communication experiences illustrating the connection between ongoing communication efforts and specific social or applied contexts.

### 5. Risk communication definitions

To verify whether there was a critical reflection on the delimitation of the study's object, we examined the presence of explicit definitions of risk communication.

Only 18 papers clearly state what risk communication is. To avoid misinterpreting the authors' directions, we included only the definitions of risk communication when explicitly expressed. So, only clear definitions of risk communication were included (e.g., when introduced by phrases such as "Risk communication is...").

We may suppose that such underrepresentation of basic definitions of risk communication is because most of the papers in our study are published in highly-specialistic journals, with natural and environmental risks as the main topic. Therefore, a scholarly definition of risk communication would probably be deemed unnecessary, as it may be considered common knowledge among reading communities. References are listed in *Appendix A*.

Although limited in number, the definitions of risk communication identified in the literature help delineate both the core concept and the communication models underpinning its practice. Most definitions incorporate key elements common across various theoretical frameworks: the source, message characteristics, objectives, communication flows, and audiences. This structure closely aligns with classical models, such as Lasswell's (1948) formulation, which analyzes

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<sup>3</sup> The results of these review are discussed extensively in Massa & Comunello (2024).

communication by addressing five key questions: “Who says what, through which channel, to whom, and with what effect?” Each component offers a lens for examining specific aspects of the communication process. This model also reflects the mass communication paradigm, as many tools and practices examined are designed for broad, general audiences and rely on integrated media strategies aimed at maximizing public reach.

Some aspects help clarify the underlying vision of risk communication. Indeed, the question regarding who communicates is most often answered by specifying the role and nature of the communicators. These can be considered “mediators” (Bica et al., 2020), “academic experts, regulatory practitioners, interest groups” (Link & Stotter, 2020), “experts” (Herovic et al., 2020); “risk managers” (Matti et al., 2022) or generic stakeholders (Agrawal et al., 2020; Badri et al., 2020).

However, the recipients of these communication processes are seldom detailed: they are primarily generic stakeholders, broadly understood audiences, and the characteristics of the receivers are not specified. The more technical aspects of risk communication (such as media and how communication occurs) remain largely implicit. Nevertheless, there is a notable frequency of references to dialogical and bidirectional processes, implying transmission models of communication, based on the exchange of information. Summarizing all the definitions, we may state that:

*Risk communication is an interactive and dialogical process expected to involve general audiences. Experts, practitioners, and significant stakeholders are the primary sources of risk communication. Risk communication must be informative, meaningful, systematic, and grounded in a scientific method and the principle of parsimony. It may include significant information about the probabilities and potential outcomes of an event that may or may not occur. To be effective, it may use graphical and visual tools. Risk communication aims to exchange information in a high-concern environment. It may explain potential threats, share warning messages, and make post-event recommendations. Risk communication relies on the audiences' feedback because it may build repertoires of experiences, interpretations, and concerns about risks.*

## 6. Theoretical Frameworks

To better understand how research tools specific to media and communication studies, viewed from a sociological perspective, can contribute to advances in risk communication, we have reviewed the theoretical frameworks adopted in the selected papers. The resulting list highlights potential applications for enhancing our understanding of risk communication.

The guiding principle behind the identification and synthesis of theoretical frameworks was the link between insights from theory and the tools or actions outlined in the papers. As a

methodological safeguard against overinterpreting theoretical frameworks or arbitrarily attributing meanings disconnected from the empirical focus of the papers, we included only those frameworks explicitly linked to the case studies under analysis. More precisely, we excluded frameworks when (a) they were not clearly relevant for interpreting the empirical research presented, or (b) they consisted merely of generic summaries of risk communication attitudes. The theoretical frameworks retained predominantly originate from sociological research. When frameworks from other disciplinary domains were included, it was because they offered meaningful insights into the social dimensions of communication processes, thereby aligning with the overall analytical perspective of the review. This process identified 52 papers containing at least one explicit theoretical framework.

The *risk society* perspective has been explored in three papers. Beck (1986) argues that modern risks are reflexive and self-induced, emerging as unintended consequences of human activities. In the era of high modernity, risks primarily stem from technological advancements, including nuclear power, pollution, and land grabbing. In this context, science and technology play a dual role: they contribute to generating risks while simultaneously being relied upon to diagnose and mitigate them. Although communication is not explicitly central to this perspective, it remains essential for understanding media representations of risk. Notably, this approach highlights the pervasive uncertainty surrounding risks and recognizes conflict as an inherent element in their negotiation and interpretation.

Canonical approaches underlining the sociological roots of risk communication research can be found in the *social amplification of risks (SAR) frameworks or constructivism*. Eight papers analyze risks using the SAR framework or a social constructivist perspective. SAR suggests that risks are shaped not only by actual hazards but also by social and cultural processes. According to Kasperson et al. (1988), information processes, institutional structures, social behaviors, and individual responses contribute to the social risk experience, influencing risk consequences. Risk is socially constructed and influenced by expert definitions, social perceptions, and processes.

Approaches to *risk knowledge and information presentation* include cognitive heuristics, mental models (n = 6), and framing (n = 5). Heuristics help individuals process complex information by simplifying it into accessible judgments, contributing to the formation of mental models – internal representations of reality shaped by personal experience, external knowledge, and contextual data. These models, in turn, guide how individuals interpret and respond to risk.

Framing introduces a sociocultural dimension, situating risk perception within psychological, organizational, and political contexts. As Entman (1993) argues, framing selects and emphasizes certain aspects of reality, influencing how problems are defined and addressed. By portraying an issue as urgent or threatening, communicators can shape public responses, institutional trust, and behavioral outcomes.

These mechanisms carry significant implications for risk communication. Heuristics and mental models affect how messages are interpreted, underscoring the need for strategies aligned with audience perceptions. Framing, meanwhile, steers public discourse by legitimizing certain risks over others and shaping competing narratives. Far from being neutral, framing is inherently

political: it determines visibility, priority, and credibility in public debate. Understanding these cognitive and discursive processes is essential in a context where communication shapes risk governance and collective decision-making.

*Media and communication perspectives* are characterized by a fragmented set of frameworks, including communication theories (N = 5), communication models (N = 8), and digital media theories (N = 2). Communication theories address the complexity of media systems through which risk-related information is produced and perceived. For example, the mediatization approach (Couldry & Hepp, 2013) emphasizes the media's central role in mediating everyday social interactions, including risk perception. Media Ecology (Broad et al., 2013) considers the media environment as a whole, stressing how the ecosystem influences risk communication. Other frameworks, such as Norman's *The Design of Everyday Things* (2013), focus on how the design of media interfaces shapes information accessibility and usability, thereby affecting public understanding of risk. Similarly, Actor-Network Theory (Latour, 2007) explores how human and non-human actors – such as technologies and media – interact to shape the circulation and interpretation of risk information.

Communication models help explain how information circulates and how audiences engage with it. While some studies adopt one-way models to describe the top-down dissemination of official information during emergencies, most favor two-way models that incorporate audience feedback as a key component. Hall's encoding/decoding model (1980), cited by de Leon (2021), highlights the gap between institutional message production and audience interpretation, shaped by power and cultural dynamics. Similarly, VanDyke et al. (2021) draw on Katz and Lazarsfeld's (1954) two-step flow model to emphasize the role of interpersonal mediation in spreading information.

Digital media theories – such as digital positivism (Fuchs & Mosco, 2016) and networked publics (boyd, 2010) – provide critical insights into how digital affordances influence risk communication, particularly through the shaping of networked relationships and the circulation of information on social platforms.

Several papers (N=5) are based on well-established *models for understanding risk and its communication*<sup>4</sup>. The Protective Action Decision Model (PADM) integrates environmental and social cues with information transmitted through communication channels to guide the public's processing of risk-related information. Another model, the information-deficit model (Stephens & Richards, 2020), posits that citizens are often unaware of risks due to a lack of scientific knowledge, and therefore, experts must communicate critical information to the public through mass media in a linear manner.

Six papers focus on *public relations and organizational communication theories*, which examine how organizations engage with the public during crises and risks. Organizational communication encompasses internal and external communication, including interactions between organizations and their stakeholders. Public relations techniques are frequently employed to strategically

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<sup>4</sup> While the dimension of risk perception was excluded from the review for the sake of consistency, these approaches were recorded when deemed relevant by the authors to understanding the instruments or describing the research findings.

enhance trust and foster meaningful relationships with the public during crisis events. For instance, Coombs's (2007) Situational Crisis Communication Theory (SCCT) evaluates an organization's ability to manage communication effectively during crises.

Five papers apply *social movement and collective action theories* to explain how individuals engage in coordinated efforts to address risks. Benford and Snow (2000) argue that framing is crucial in mobilizing individuals for collective action, particularly in resource mobilization and persuading people to address risks. These framing processes help define situations that require public attention and encourage participation in problem-solving efforts.

Finally, five papers present specific or *ad hoc theories* tailored to risk communication contexts. For example, Holmes and McEwen (2020) employ the Sustainable Flood Memory (SFM) theory to investigate how memories of past floods affect citizens' reactions and preparedness in high-risk situations. Similarly, Rainear et al. (2018) utilize uncertainty reduction theory to enhance risk communication strategies.

## 7. Discussion and Conclusion

This literature review, based on an in-depth analysis of 125 papers, highlights the value of a sociological approach to studying applied risk communication. We focused on practical tools, as they offer a lens through which to explore the link between theoretical frameworks and communication practices.

The analysis centers on the U.S. context, where much of the research on operational tools is concentrated. This focus does not suggest that other experiences are marginal but rather invites reflection on their visibility in international journals. Such journals may unintentionally privilege English-speaking contexts and overlook cases perceived as too context-specific, thereby limiting the diffusion of less generalizable but nonetheless significant practices.

Another relevant aspect concerns the alignment between the practical tools described and the more theory-oriented insights emerging from the literature. A central theme in risk communication is the need to reach the widest possible audience by tailoring messages to individuals with specific needs and characteristics (e.g., people with physical or cognitive disabilities, older adults, children, adolescents ...). Equally important is the promotion of two-way communication, which entails not only receiving feedback but also integrating it into more structured co-participation strategies. While the limited definitions of risk communication generally acknowledge this latter dimension, the practical applications reviewed seldom reflect it, and the theoretical frameworks discussed often fall short of capturing its full complexity.

Many aspects emerge as worthy of further exploration, inspired by the principles of communication research. For example, the tendency to describe generic tools aimed at undifferentiated audiences leads to the need to reflect on the potential for personalization and the ability to reach specific audience niches more effectively. At the same time, the analyzed papers

highlighted the role of institutions and public-sector actors in producing content and disseminating risk communication messages (and not just during crises). Closely related to this point is the recognition that social media and social network sites are now frequently used by public actors for risk communication. However, few studies emphasize the organizational dimension, understanding how these institutions function, what bureaucratic and organizational resistances they face, or how red tape impacts the cultures of organizations. These aspects – often raised by professionals responsible for crisis and emergency communication (Lovari et al., 2024) – still find limited space in the literature. Yet, understanding their limits and potential would be crucial for designing tools that institutions can apply.

A series of theoretical and practical tools can help refine our understanding of contemporary risk communication. For instance, focusing once again on reception, knowledge would certainly be enriched by applying qualitative theoretical frameworks (and corresponding empirical applications). One can imagine, for example, the contribution that audiences and reception studies could provide in understanding risk communication messages. What happens when a message is received, how much does the context of consumption and the relational network with which the experience is shared matter, and in what way does “domestic security” mediate and interact with messages (even skillfully) sent by institutions remain points to be clarified, possibly through participant observation or ethnographic tools. Further on the processes of reception and interpretation, a complex environment like the contemporary one could benefit from revisiting a perspective such as encoding/decoding. Perspectives like this recognize the existence of power—and therefore knowledge—differentials and the importance of the situated nature of both sources and recipients, emphasizing the complex mix of personal and contextual factors that interfere with the interpretation desired by the risk communication transmitters.

Moreover, in a hybrid media environment like the contemporary one, issues concerning agenda setting, particularly inter-media agenda setting, resurface strongly. Topics such as the risks related to climate change are increasingly tied to their representation through mainstream media and the knowledge or actions of users through digital media. Agenda setting, framing, and priming are necessary to understand the role of the media in risk communication, from how they help trigger attention around specific topics to how the framing of these topics helps define some issues as riskier (or at least more urgent and impactful) than others, and how audiences use risk management and identification as a measure for civic and political judgment.

Then, many aspects could be discussed and explored in depth so that the tools of communication sociology can better help us understand the complexity of risk communication. To provide a few examples, one can consider themes (not only concerning natural risks but also well-suited for exploration regarding health or anthropogenic risks) closely related to how information is produced and disseminated in the crowded media and communication landscape. Among other things, it would be worthwhile to explore certain issues related to complexity. Among these issues, we can count the relationship between sources, power, production, and reception, the communication and understanding of uncertainty factors, the popularization of scientific knowledge and risk communication, and the link between skepticism and media coverage.

In conclusion, we are faced with an ambivalence. On the one hand, risk communication is already a specialized field of inquiry, with its authors and reference literature, consolidated investigative methods, rhetoric, and “writing styles.” On the other hand, there is a suspicion that media and communication research currently play a limited role despite its high heuristic capacities.

Risk communication is a field with significant multidisciplinary potential. Communication studies have proven capable of engaging with other disciplines, while at the same time, fields such as psychology increasingly claim spaces traditionally associated with communication. For instance, the selection criteria presented in this paper were primarily designed to identify applied experiences and tools in risk communication, with the aim of building an archive to support the project’s future goals. This choice also reflects an awareness that key communication-related topics, such as public perceptions and the relationship with information sources, are often examined in the literature using methodologies rooted in other disciplines. It is also worth remembering the necessity of dialogue with other sociological disciplines: the sociology of territory, urban studies, and political sociology are just a few tools that can enrich our understanding of risks and their communication in tumultuous times.

In sum, an in-depth review of literature on risk communication tools reveals a somewhat paradoxical picture. Despite focusing on communication, many analyses of applied experiences seem to resist what British sociologist Nick Couldry (2012) calls the “myth of the mediated centre” – the belief that all social processes necessarily pass through media systems. As a result, communication media are often treated instrumentally, with limited attention to their constitutive role in shaping social reality.

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## Appendix A. Risk communication definitions

Authors	Source	Aims	Flow	Audience
<b>Agrawal; Hana; Debadutta; Neelakshi (2022)</b>	Stakeholders	Exchange of information regarding environmental risks	Exchange	Unspecified
<b>Badri; Lubis; Susanto; Suharjito (2018)</b>	Stakeholders	Exchange of assessments, forecasts, and opinions on hazards and risks	Exchange	Unspecified
<b>Bica; Weinber; Palen (2020)</b>	Unspecified	Describe risks	Interaction	Unspecified

<b>Bird; Gísladóttir (2020)</b>	Unspecified	Disaster warning and hazard education	Unspecified	General audience
<b>Charrière.; Junier; Bogaard; Mostert; Malet; van de Giesen (2017)</b>	Unspecified	Favors the expansion of social capacities, such as the knowledge, skills, and networks needed to successfully manage hazard occurrences	Dialogical	Unspecified
<b>Cool; Claravall; Hall; Taketani; Zepeda; Gehner; Lawe-Davies (2015)</b>	Unspecified	To cope with crisis or emergency management	Unspecified	Unspecified
<b>Heidenreich; Masson; Bamberg (2020)</b>	Unspecified	Exchange of information	Feedback loop	Unspecified
<b>Herovic; Sellnow; Sellnow (2020)</b>	Experts	Searching for potential threats, preparing the audiences via warning messages and post-event recommendations	Dialogical	Various Publics
<b>Hicks; Armijos; Barclay; Stone; Robertson; Cortés (2017)</b>	Unspecified	Prevent and mitigate harm from hazards by informing and empowering people	Unspecified	Unspecified
<b>Jiang; Zhang; Guo; Cheng; Peng (2022)</b>	Unspecified	Communicate effectively in a high-concern, high-stress environment	Unspecified	Unspecified
<b>Kinsky; Chen; Drumheller (2021)</b>	Unspecified	Identify the potential for crisis	Unspecified	Unspecified
<b>Link; Stötter (2015)</b>	Academic experts, regulatory practitioners, interest groups	Exchange knowledge, experiences, interpretations, concerns, and perspectives	Interaction; feedback	General audience
<b>Matti; Ögmundardóttir; Aðalgeirsdóttir; Reichardt (2022)</b>	Risk managers	Notify people of the probability of a hazard and its consequences, mitigation actions, raise and understand concerns	Interactive flows; two-way dialogue	Unspecified
<b>Rowel; Sheikhattari; Barber; Evans-Holland (2012)</b>	Unspecified	Inform decision-making and reduce uncertainty	Iterative process, feedback	Unspecified

<b>Salvati; Pernice; Bianchi; Marchesini; Fiorucci; Guzzetti (2016)</b>	Unspecified	Exchange information of	Two-way exchange	Unspecified
<b>Shepherd; van Vuuren (2014)</b>	Unspecified	Allow people to make better decisions about their well-being	Unspecified	Individuals, stakeholders, or an entire community
<b>Shrestha; Gurung; Khadgi; Wagle; Banarjee; Sherchan; Parajuli; Mishra (2021)</b>	Stakeholders	Communication and exchange of information and opinion about risks	Two-way communication, interactive process	Individuals, groups, and institutions
<b>Yudarwati.; Putranto; Delmo (2022)</b>	Unspecified	Reduce or prevent damages, ensure assistance, rebuild infrastructures	Unspecified	Victims