

Safeguarding lives: An informational model for communicating wildfire disasters*

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This theoretical article introduces an original model for planning and evaluating risk and crisis communication by public organizations in disasters, with a particular focus on wildfires. Adopting a systemic and integrative perspective, the *Loop Model* synthesizes knowledge from specialized literature and draws upon well-established scientific theories and models to highlight the critical role of communication throughout every stage of forest and wildfire management. Developed through an extensive literature review and applied to the chronological pattern of wildfires in Portugal, the framework demonstrates both theoretical relevance and practical applicability. It may also be adapted as a framework for evaluating and planning communication strategies and messages in response to other climate- and weather-related disasters. The proposed model yields the Informational Quality Indicator (IQI), designed to assess the quality of public organizations' risk and crisis communication. A higher IQI value indicates that the communication prioritizes public protection over political reputation management. By advancing a comprehensive framework, this article contributes to the refinement of crisis and risk communication theory while offering practical guidance for public organizations facing disaster scenarios, which can be further tested in future research.

Keywords: Risk and crisis communication, *Loop Model*, Literature review, Wildfires, Climate change

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Introduction

Climate change is significantly increasing the global risk of disasters, intensifying extreme weather events and altering environmental conditions. The resulting rise in wildfires, heat waves, and droughts in numerous countries is directly attributable to escalating global temperatures. Mediterranean countries have experienced significant challenges regarding wildfires in recent years. In Portugal, particularly, the devastating wildfires of 2017 claimed 117 lives, highlighting the critical need for effective public fire management. A quarter of the area burned in 2025 in Europe was in Portugal. The country's annual struggle with summer wildfires underscores the ongoing challenges of climate change and inadequate forest management.

The increased frequency and severity of disasters demand effective communication strategies. Poorly managed disasters often trigger both public and political crises, requiring a delicate balance between protecting the population and maintaining the public image of organizations and political leaders. This tension, as Frandsen and Johansen (2020b) highlight, reflects the interplay between informational and political perspectives in risk and crisis communication. The informational perspective adopts a rational, optimistic approach, assuming stakeholder consensus on risk assessment to facilitate informed, public-protective decision-making. Conversely, the political perspective is more cynical, recognizing the lack of consensus and the potential for heightened divisions during crises and framing communication as a rhetorical contest for power and legitimacy. This emphasizes the complexity of effective crisis communication management.

The central focus of this theoretical article is to introduce the *Loop of Risk and Crisis Communication on Wildfires* – the *Loop Model*, an original framework developed through an integrative literature review (Snyder, 2019) on risk, crisis, emergency, and disaster communication. The model is grounded in a systemic approach to communication (Plana et al., 2024), with a particular emphasis on the messages disseminated by public organizations regarding wildfires as recurrent events with identifiable chronological patterns. Systemic communication is characterized as strategic, planned, integrated, and structured (Plana et al., 2024). The framework is guided by the informational perspective of risk and crisis communication (Frandsen & Johansen, 2020b), which prioritizes the protection of the population from the consequences of wildfires.

Strategic Risk and Crisis Communication

Risk, crisis, and disaster communication is a highly relevant area within the discipline of strategic communication, ranking as the second most research topic in the *International Journal of Strategic Communication* from 2007 to 2017 (Werder et al., 2018). According to Palenchar and Heath (2007, p. 127), the strategic nature of risk communication lies more in its process than in its content, serving as "a tool for communicating values and identities as

much as being about the awareness, attitudes and behaviors related to the risk itself." Raupp (2015, p. 520) argued that, in the context of risk communication, strategy is an "emergent sense-making and framing activity" that serves different perceptions of danger in an uncertain scenario.

Crisis communication research draws heavily on two prominent theories: Benoit's Image Restoration Theory (IRT) (1997, 1995) and Coombs' Situational Crisis Communication Theory (SCCT) (2022). Rooted in strategic communication and public relations, these represent dominant paradigms in crisis communication research, emphasizing response strategies (Elgueta-Ruiz & Martínez-Ortiz, 2022; Avery et al., 2010). Since Lipset's (1953) seminal *Public Opinion Quarterly* article, crisis communication research has steadily grown (Diers-Lawson, 2020), experiencing significant expansion in the 1990s (Tachkova & Coombs, 2022). Elgueta-Ruiz and Martínez-Ortiz's (2022) meta-analysis of *Public Relations Review* articles (2000-2014) revealed "crisis management and communication" as the dominant topic of 57 total topics, demonstrating growth exceeding the overall increase in published articles.

Early crisis communication research focused on defining crises and best practices. Subsequently, case studies applying crisis response strategies emerged. Only recently has research shifted to analyzing stakeholder reactions and their organizational impacts (Diers-Lawson, 2020). This evolution, according to Diers-Lawson (2020), reflects both the field's maturation since the 1990s (with enhanced theoretical development) and the increased demand for practically applicable, theoretically grounded models. As Tachkova and Coombs (2022) note, the relationship between theory and practice is crucial: theory explains the link between responses and outcomes, while practice validates these relationships, testing the predictability of responses in specific crisis contexts.

The need for further research focused on the theoretical development of crisis communication became evident in An and Cheng's (2010) finding that only 13% of articles published in the *Public Relations Review* and the *Journal of Public Relations Research* posed research questions and/or hypotheses grounded in theory. Another meta-analysis, conducted by Diers-Lawson (2020, 2017), examined 690 crisis communication articles published in the Scimago database between 1953 and 2015. The results demonstrated that crisis communication changed substantially over this period, shifting from best practices to a data-driven approach and moving its focus from organizations to the human aspects of crisis communication.

Risk communication can be understood as an integral part of the risk management process, involving a dialogue between technical expertise and public risk perception. Essential for informed decision-making by stakeholders about potential risks, risk communication aims to promote the adoption of preventive behaviors to avoid risks, trust in risk management organizations and their guidance, and individual and collective preparedness to respond to risks (Toniolo, 2025). On the other hand, crisis communication can be seen as a continuous process of implementing strategies, tactics, and communication actions. It is present at all stages of crisis management and aims to prepare organizations to face crises, respond to crises with agility and transparency, account for

crisis management efforts, and inform about organizational changes resulting from crises. The primary goal of crisis communication is to protect the stakeholders from the negative effects of a crisis and then to preserve the reputation of the organization or public authority (Toniolo, 2025).

Loop Model: A New Approach to Risk and Crisis Communication

The *Loop Model* emerges from the need for a theoretically grounded model to help public organizations in developing effective communication strategies for safeguarding the population against wildfires. The conceptualization of the proposed model was based on an extensive integrative literature review (Snyder, 2019) that encompassed studies on risk, crisis, emergency, and disaster communication. This methodological approach sought to capture a comprehensive and multidisciplinary understanding of the phenomenon of disaster communication.

The selection of theoretical sources that informed the development of the *Loop Model* followed the most established frameworks in risk and crisis communication research (Sellnow & Seeger, 2021), including the Crisis and Emergency Risk Communication (CERC) model (CDC, 2014), the Situational Crisis Communication Theory (SCCT) (Coombs, 2017, 2007), and the Internalize–Distribute–Explain–Act (IDEA) model (Sellnow et al., 2017), among others. In addition, classical communication theories such as Framing Theory, applied to strategic communication (Hallahan, 2005, 1999), also guided the conceptualization of the model. However, these models were not adopted exclusively.

Given the multifaceted nature of risk and crisis phenomena, the selection of references was guided by theoretical approaches capable of capturing their systemic and dynamic interactions, as emphasized by Sellnow and Seeger (2021). While the CERC model offers a stage-based operational framework, and the SCCT focuses on reputation management and crisis response strategies, the IDEA model emphasizes message design, instructional clarity, and stakeholder engagement, particularly through the framing of recommended actions. In contrast, the framework integrates and extends these perspectives by introducing an informational–political *continuum* that explains how the communication of public organizations can oscillate between safeguarding citizens and preserving political reputation.

The informational perspective focuses on citizens' safety, emphasizing clarity, factual accuracy, and practical guidance, whereas the political perspective understands communication as a rhetorical process of contestation over meaning and framing (Frandsen & Johansen, 2020d). Public organizations therefore move fluidly between communication aimed at protecting the population and communication designed to sustain public trust and institutional credibility. In the proposed model, persuasion is oriented toward promoting protective behaviors. Thus, the informational and political dimensions are interdependent rather than oppositional: communication that informs citizens effectively also strengthens

legitimacy, while politically accountable communication enhances informational credibility. This conceptual balance clarifies how responsibility and transparency can coexist with persuasion in the management of risk and crisis communication, while also emphasizing the importance of maintaining *equilibrium* between the two perspectives and ensuring that collective interests prevail over individual ones.

In line with the informational perspective of risk and crisis communication (Frandsen & Johansen, 2020b), communication planned according to the *Loop Model* not only contributes to public safety but may also have the secondary effect of enhancing the reputation of the public organizations and political actors involved.

First, the model synthesizes existing literature and optimizes it specifically for climate- and weather-related disasters, with a particular focus on wildfires in Portugal. At its next stage, the model adopts a normative approach, providing practical implications for planning and decision-making in risk and crisis communication related to various disasters, a topic that remains underexplored (Kuipers & Welsh, 2017). The model identifies patterns that facilitate its adaptation to different phenomena caused and/or intensified by climate change.

The framework integrates multiple validated approaches to risk and crisis communication, combining them to address the unique context of public organizations' communication strategies concerning wildfires. A significant influence on the proposed model is the Crisis and Emergency Risk Communication (CERC) model (CDC, 2014), which is extensively utilized by U.S. organizations to communicate with citizens and the media during risk, crisis and emergency situations. In addition to CERC, the *Loop Model* draws on Coombs' (2017) Situational Crisis Communication Theory (SCCT), Pechta, Brandenburg and Seeger (2010) four-Channel Model of Emergency Communication, Austin and Jin (2017) Social-Mediated Crisis Communication (SMCC) model, Sellnow et al. (2017) Internalize-Distribute-Explain-Act (IDEA) model, and Frandsen & Johansen (2017a, 2017b) Rhetorical Arena Theory (RAT). Furthermore, the model incorporates Hallahan's (1999) framing approach, Olsson's (2014) perspective on the strategic and operational dimensions of public organizations' disaster communication, Bytze's (2008) thematic content categories and Reich, Bentman and Jackman (2011) Crisis Communication Guide for Public Organizations.

The innovation of the framework lies in its ability to integrate, within a single framework, multiple scientifically validated risk and crisis communication theories, establishing a communication approach that prioritizes population protection and is specifically designed for disasters requiring permanent management.

For the development of the 36 key messages that compose the proposed model, we relied on studies by Diers-Lawson (2020); Wukich (2019, 2016); CDC (2014); and Reich, Bentman and Jackman (2011). Thus, the *Loop Model* draws on diverse scientifically validated perspectives on risk and crisis communication to propose an innovative approach to planning and evaluating communication strategies, accounting for the complexity of both the communication process and disasters.

A key outcome of the model is the development of the Informational Quality Indicator (IQI), an aggregated metric for multivariate analysis of messages. This tool enables the evaluation of the quality of information disseminated by public organizations in risk and crisis

communication. Higher IQI values indicate communication that aligns more closely with an informational perspective, emphasizing public protection over political reputation management.

Phases of the *Loop Model*

The *Loop Model* is structured as a 12-month cycle comprising six chronologically defined phases that recur indefinitely: (1) *Prevention*; (2) *Preparation*; (3) *Alert*; (4) *Rescue*; (5) *Recovery*; and (6) *Evaluation*. *Rescue* and *Recovery* phases constitute a second turn of the loop, which is activated only in the event of wildfires. Each phase of the model has specific objectives aimed at addressing the challenges of communication during disasters (Reich, Bentman & Jackman, 2011). When effectively executed in accordance with the model's variables, these objectives lead to the creation of messages that enhance the protection of the population across physical, emotional and material dimensions in the context of wildfires and their aftermaths.

It is important to note that the chronology of the framework phases was established based on the patterns of wildfire occurrences in Portugal, as identified by Novo et al. (2024), in conjunction with the annual engagement level calendar set by Portugal's Special Rural Firefighting Device (Dispositivo Especial de Combate a Incêndios Rurais – DECIR)¹, the national operational system that organizes firefighting resources into seasonal phases, defining the level of mobilization and readiness required at each stage. Each year, the exact operational dates are confirmed in the National Operational Directive (Diretiva Operacional Nacional – DON) No. 2², which coordinates all civil protection entities and strategies during the wildfire season. Since the risk of wildfires can vary annually due to the effects of climate change, "periods of greater or lesser danger depend on meteorological conditions rather than calendar dates" (Viegas, 2024, p. XIII). It is therefore essential to build flexibility into these operational periods, which serve as benchmarks for planning risk and crisis communication by public organizations. Rather than being treated as fixed phases, they should be viewed as adaptable intervals that respond to the evolving duration and intensity of wildfire risks. Accordingly, the proposed model was conceived as a dynamic framework, capable of adjusting its chronological phases in alignment with the updated DECIR structure and other regional operational plans.

The application of the model to the chronological pattern of wildfire occurrences in Portugal is illustrated in *Figure 1*.

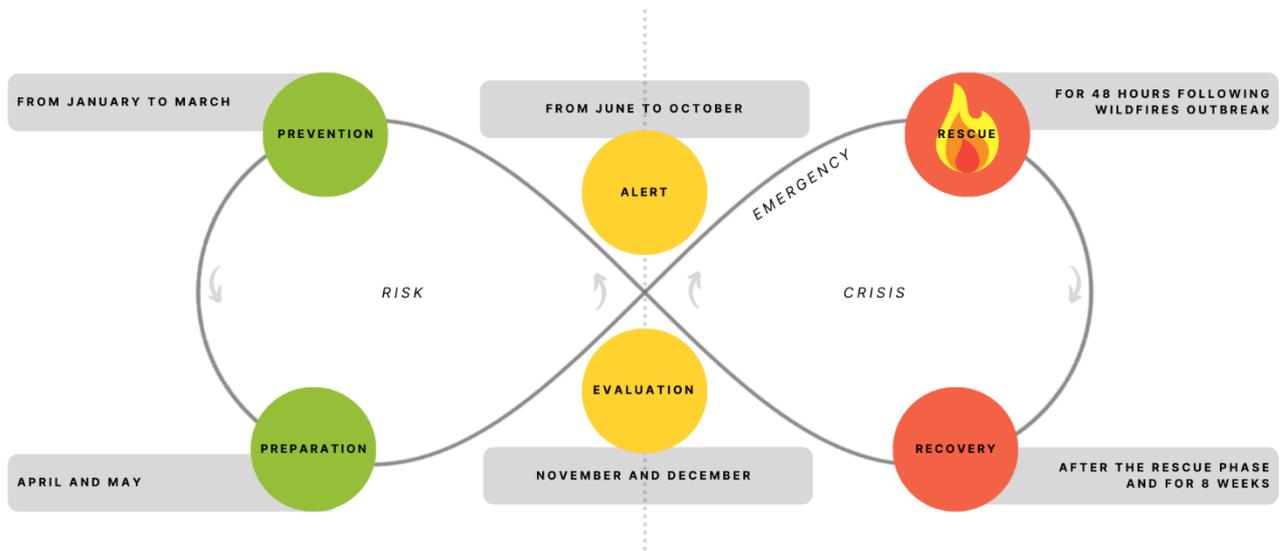


Figure 1- Application of the Loop Model to the chronological pattern of wildfires in Portugal. Source: Elaborated by the authors.

Loop Model Variables

The *Loop Model* includes 12 variables organized within the five dimensions of Lasswell's (1948) model (see *Figure 2*), which are: (1) control analysis (sender); (2) content analysis (message); (3) media analysis (channels); (4) audience analysis (receiver); and (5) effects analysis (reactions). As a message-centered model, the model places greater emphasis on content analysis.

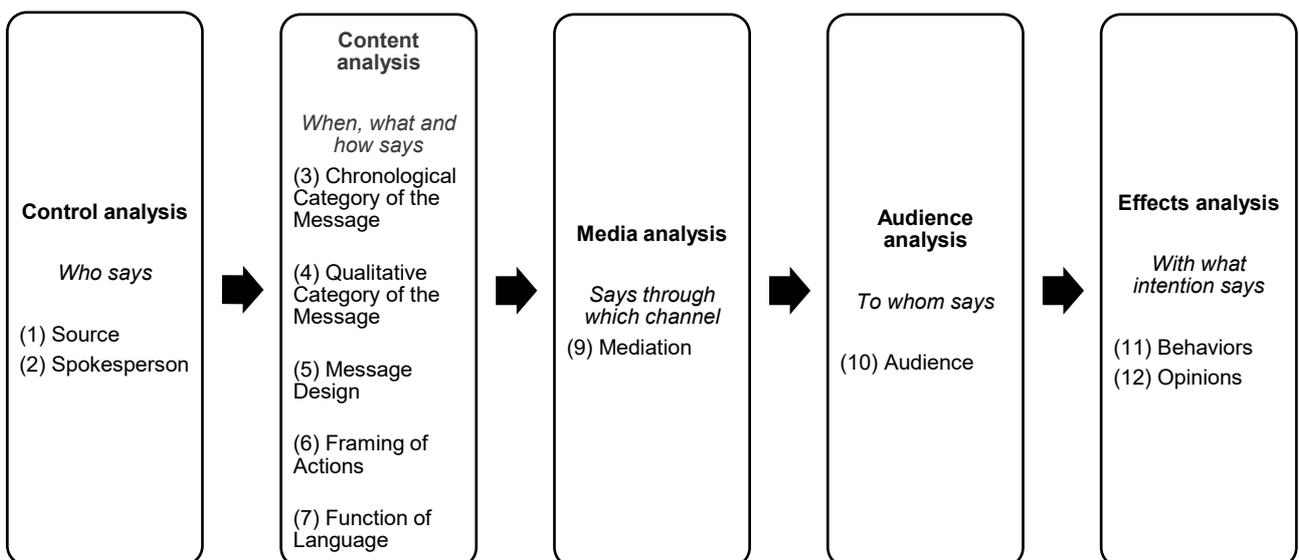


Figure 2 - Diagram of the Loop Model variables applied to the dimensions of the Lasswell Model. Source: Elaborated by the authors.

1. Source

In the communication of disasters, including wildfires, various public organizations serve as primary information sources, disseminating information through their own channels or via journalistic media. When the informational perspective dominates risk and crisis communication, these sources issue messages in accordance with their respective responsibilities for managing the disaster, reflecting the bureaucratic perspective of response coordination (Sellnow & Seeger, 2021).

2. Spokesperson

Risk and crisis communication is characterized by distinct spokesperson roles across different phases: scientists serve as the primary sources during the *Prevention* and *Alert* phases; political authorities act as spokespersons during the *Recovery* and *Evaluation* phases; and technical experts are featured during the *Preparation* and *Rescue* phases (Sellnow & Seeger, 2021; McLean & Ewart, 2015; Seeger, Sellnow & Ulmer, 2003). During the *Recovery* phase, expressing emotions, empathy and support for populations affected by a disaster can significantly enhance the reputation of political authorities among citizens, fostering greater trust in their actions and commitments (McLean & Ewart, 2015; Schnee, 2015; Olsson, 2014). Furthermore, collaborating with media personalities, including artists, athletes and other influencers, is crucial for expanding the reach and enhancing the relevance of the communicated content (UNDRR, 2022).

3. Chronological Categorization

This variable pertains to the period during which the message is disseminated. *Table 1* illustrates the six phases of the framework in relation to the chronological pattern of wildfire occurrences in Portugal, along with their corresponding objectives for risk and crisis communication.

<i>Communication</i>	<i>Phase</i>	<i>Communication's goal</i>	<i>Time frame</i>
Risk	<i>Prevention</i>	To minimize the risk of wildfires by involving the population in adopting precautionary measures.	January to March
	<i>Preparation</i>	To promote public trust in the preparedness of public organizations and the community to respond to wildfires.	April and May
	<i>Alert</i>	When the risk is imminent, warn the population, emphasizing the sense of urgency and the physical proximity of wildfires.	June to October

Risk -> Crisis	<i>Rescue</i>	In the event of wildfires, to protect the population, guiding them to act safely.	From the outbreak of a wildfire until 48 hours later
Crisis	<i>Recovery</i>	Once wildfires are under control, to inform affected communities about available public policies.	Up to eight weeks after the <i>Rescue</i> phase end
Crisis -> Risk	<i>Evaluation</i>	To examine risk and crisis management, involving the affected population and communities in evaluating actions taken for recovery and planned actions to prevent future occurrences.	November and December

Table 1- Application of the Loop Model to the chronological pattern of wildfires in Portugal and communication objectives for each phase. Source: Elaborated by the authors.

The first three phases of the proposed model – *Prevention*, *Preparation* and *Alert* – are primarily associated with risk communication. Prevention involves activities aimed at entirely avoiding the adverse impacts of hazardous events. Although it is not possible to eliminate all risks, prevention strategies serve to reduce vulnerability and exposure to wildfire hazards, thereby minimizing their effects (Plana et al., 2024). During the *Prevention* phase, messages aligned with an informational perspective of risk and crisis communication seek to reduce the occurrence of wildfires by encouraging the population to adopt precautionary measures.

Preparation involves developing the capacities to anticipate, respond to and recover from wildfires. Within the scope of risk management, preparation aims to create the necessary skills to manage emergencies and ensure organized transitions from rescue (or response) to recovery (Plana et al., 2024). In the *Preparation* phase of the *Loop Model*, the purpose of communication is to foster confidence in the capacity of public organizations and communities to effectively respond to wildfires.

In addition to contributing to public confidence in the ability of public organizations to respond effectively to wildfires, as well as promoting compliance with their guidelines, in the model, the *Preparation* phase is related to equipping communities with resources and training for self-protection so that they can respond autonomously to potential rural fires. This has become increasingly necessary, as noted by Almeida, Modarres and Rodrigues (2024), given the large number of annual occurrences and the saturation of civil protection agencies' capacity to respond to multiple events simultaneously.

According to Pechta, Brandenburg and Seeger (2010), to alert presupposes placing the public at the center of a multidirectional communication process, with information exchange among the public, public organizations and mass media. This flow of information, described in the Four-Channel Emergency Communication Model (Pechta, Brandenburg & Seeger, 2010), includes, among other processes, sending periodic updates to the affected public, emphasizing the urgency and imminence of the risk. Thus, when summer approaches and climatic and meteorological conditions favor the occurrence and rapid spread of wildfires, the *Alert* phase of the proposed model begins. The *Alert* phase marks the transition from risk communication to crisis communication and, together with the *Rescue* phase, form part of emergency communication. In the *Alert* phase, risk and crisis communication practiced

by public organizations, primarily aims to warn the population about the imminent danger of new rural fires.

Although some interaction between phases may occur, particularly between *Prevention* and *Alert*, they remain conceptually distinct: *Prevention* focuses on reducing vulnerability and exposure in advance, whereas *Alert* arises from an imminent and localized threat, marked by a heightened sense of urgency and the need for immediate communicative action.

To rescue or to respond consists of carrying out immediate actions before, during and after a wildfire to save lives, reduce health impacts, ensure public safety, and meet basic needs. Focused on the short term, rescue depends on proper preparation and the development of response capabilities at various levels (Plana et al., 2024). The *Rescue* phase marks the realization of risk, or in other words, the crisis itself, and, like the *Alert* phase, is part of emergency communication. In the *Loop Model*, the *Rescue* phase begins only when a wildfire breaks out and lasts 48 hours. During this period, communication efforts must be dedicated to protecting the population, guiding them to act safely, increasing risk perception and likely improving compliance with authorities' instructions.

According to Plana et al. (2024), to recover involves restoring or improving the livelihoods and health, as well as the economic, social and environmental assets of communities affected by wildfires, following the principles of sustainable development and the idea of "building back better" (Plana et al., 2024, p. 62) to prevent future risks. Identified with crisis communication itself, the *Recovery* phase begins after the end of the *Rescue* phase and lasts eight weeks. Depending on the month when the *Recovery* phase ends, the loop returns to the phase corresponding to the current month. *Recovery* is a phase related to crisis communication. In this phase, the purpose of communication is to inform affected communities about public policies they can access to restore themselves physically, emotionally and materially.

Regarding the role of public organizations in wildfire management, to evaluate implies accounting for actions and decisions taken before, during and after the crisis and informing about corrections, changes and improvements implemented as a result of lessons learned (Reynolds & Seeger, 2005). Communication plays a crucial role in this process, ensuring transparency and reinforcing public trust in general and particularly among affected audiences. The *Evaluation* phase is the final phase of the model, when communication should serve to examine the risk and crisis management carried out and inform the public about planned actions for the following year, when the loop returns to its initial phase. *Evaluation* is the phase in which public organizations analyze what worked and what did not in managing wildfires. The model prescribes that this reflection be conducted as a way to learn and correct communication strategies before the next loop begins. *Evaluation* phase marks the transition from crisis back to risk.

4. Qualitative Categorization

Each chronological phase of the framework corresponds to specific communication objectives aimed at safeguarding the physical, emotional and material well-being of individuals and communities affected by wildfires, as outlined in Table 1. These objectives develop into a set of informational components (*Table 2*) aligned with the informational perspective of risk and crisis communication. Drawing from an integrative literature review of Diers-Lawson (2020), Wukich (2019, 2016), CDC (2014), and Reich, Bentman and Jackman (2011), the proposed model prescribes 36 key messages that can be disseminated by public organizations before, during and after wildfires or any other type of disaster, with the necessary adaptations.

<i>Communication</i>	<i>Phase</i>	<i>Qualitative categories of messages</i>
Risk	<i>Prevention - Type 1</i>	<p>The message communicates what has happened in previous similar events and what is expected to happen.</p> <p>The message disseminates the contact details of the emergency communication center.</p> <p>The message informs about practical measures to take to minimize risks (do's and don'ts) and self-protection.</p> <p>The message mobilizes citizens to get involved in prevention and/or self-protection activities.</p>
	<i>Preparation - Type 2</i>	<p>The message addresses knowledge, resources and capacities needed by the community and/or individuals to deal with a potential event.</p> <p>The message makes known measures planned or recently carried out to better prepare public organizations and the community itself to respond to the event (i.e. campaigns; awareness-raising; procurement; hiring; training; simulations; and reinforcements).</p> <p>The message, which is educational in nature, presents a kind of guide for preparing the community.</p> <p>The message informs about training opportunities for the community.</p>
	<i>Alert - Type 3</i>	<p>The message warns of penalties for those do not comply with orders and/or cause risk situations.</p> <p>The message calls on the public to take immediate action to prevent wildfires and/or self-protection and/or to consult the probability of risk for the region.</p> <p>The message says exactly what citizens should do between the emergency alert and the start of the crisis.</p> <p>The message provides follow-up on previously sent emergency information.</p> <p>The message tells citizens what to do when a crisis breaks out.</p> <p>The message informs which organizations are available for assistance.</p> <p>The message instructs on how citizens can protect themselves.</p>
Risk -> Crisis	<i>Rescue - Type 4</i>	<p>The message presents cases of citizens who survived the crisis by following the instructions given.</p> <p>The message gives simple and practical self-defense instructions.</p> <p>The message delivers updates on ongoing events.</p> <p>The message clarifies/disproves rumors and misinformation about the event and its management.</p> <p>The message informs about the provision of resources for victims.</p> <p>The message informs about administrative and operational acts directly linked to the event carried out in the last 48 hours.</p>

		<p>The message informs who exactly should be evacuated, by when and at what distance.</p> <p>The message asks society to help the victims (i.e. crowdfunding, donations and volunteering).</p> <p>The message, or the action it refers to, is empathy-oriented and tries to provide emotional support.</p>
Crisis	<i>Recovery - Type 5</i>	<p>The message addresses better preparation for similar future events, while using the freshness of the participants' experiences and memory.</p> <p>The message presents the new post-crisis reality in relation to various aspects of life (i.e. whether another eruption of the crisis is likely, at least in the short term, and how soon they will be able to resume normal life).</p> <p>The message informs that investigations are being carried out/requires clarification about the event.</p> <p>The message informs about public policies from which the affected communities can benefit and/or about the resumption of services that were suspended.</p> <p>The message provides preliminary clarification on the event that occurred.</p> <p>The message promotes a discussion about future preparedness for the occurrence of similar events.</p>
Crisis -> Risk	<i>Evaluation - Type 6</i>	<p>The message reinforces the resilience of society.</p> <p>The message presents a balance sheet or report on the actions taken during the previous phases.</p> <p>The message speaks of broad organizational; structural; legislative; and financial reforms, including investment in large-scale projects that will lead to better preparedness in the future.</p> <p>The message informs about collaboration with journalistic investigations and even the production of documentary films that examine events from an after-the-fact perspective.</p> <p>The message informs about organizational and inter-organizational procedures and their implementation within the organization and with the public.</p> <p>The message shares documents summarizing the conclusions of the investigations carried out.</p>

Table 2 - Qualitative categorization and key messages of the Loop Model. Source: Adapted by the author from Diers-Lawson (2020); Wukich (2019, 2016); CDC (2014); and Reich, Bentman and Jackman (2011).

These categories were grouped according to their pertinence to each chronological phase of the model, following the functional and temporal logic of the communication process. They are not hierarchically ordered, as each category fulfills a distinct and context-dependent purpose within the cycle of risk and crisis communication. Illustrative examples of key messages aligned with the different phases of the framework are presented in Figures 3 to 8. These examples were collected from the official social media profiles of public entities entrusted with risk and crisis management in Portugal, including the Institute for Nature Conservation and Forests (ICNF), the National Authority for Emergency and Civil Protection, the National Republican Guard (GNR), the National Institute of Medical Emergency (INEM), and the Government of Portugal.



Figure 3: Message, issued in 2017, chronologically and qualitatively associated with the Prevention phase (Type 1). The message informs of practical measures to be taken for self-protection or to minimize risks (what to do and what not to do). Source: ICNF Facebook Fanpage³.

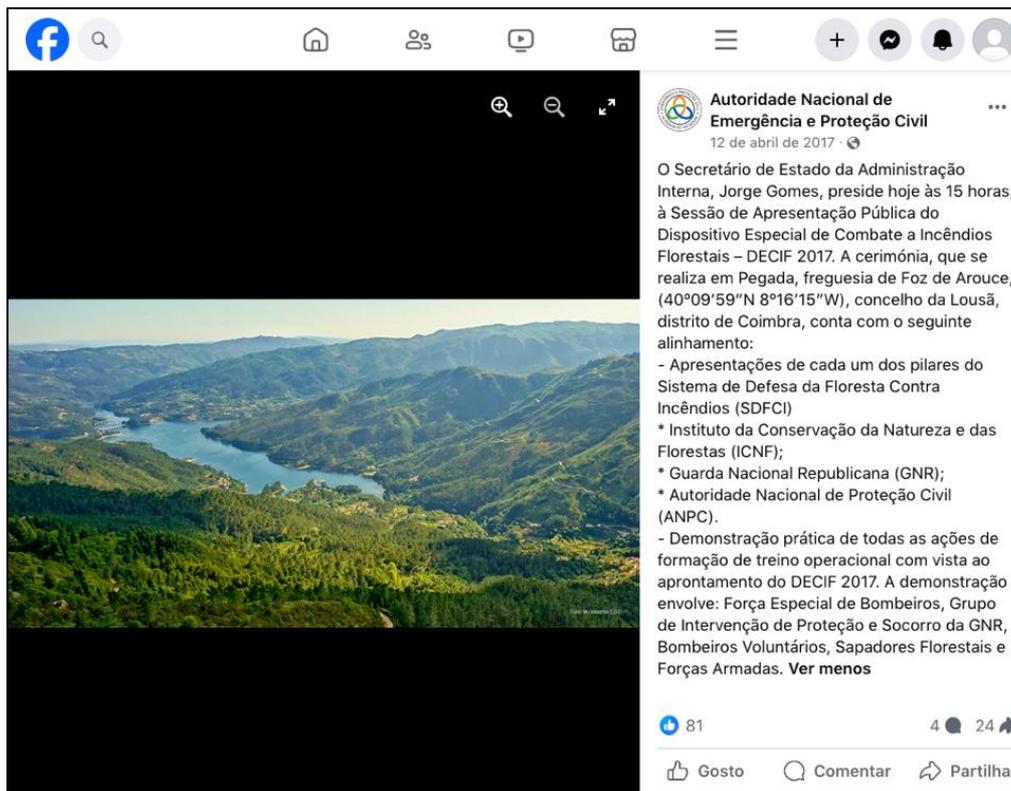


Figure 4: Message, issued in 2017, chronologically and qualitatively associated with the Preparation phase (Type 2). The message publicizes measures planned or recently carried out to better prepare the public administration and the community itself to respond to the event (campaigns, acquisitions, hiring, training, simulations, reinforcements etc). Source: ANEPC Facebook Fanpage⁴.



Figure 5 - Message, issued in 2017, chronologically and qualitatively associated with the Alert phase (Type 3). The message calls on the public to take immediate measures for self-protection and/or consult the probability of risk for the region. Source: GNR Facebook Fanpage⁵.

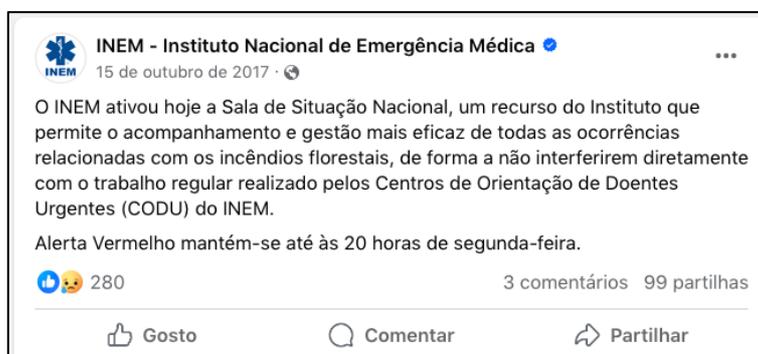


Figure 6 - Message, issued in 2017, chronologically and qualitatively associated with the Rescue phase (Type 4) of the October Fires (15, 16 and 17 October). The message informs about administrative and operational acts directly linked to the event carried out in the last 48 hours. Source: INEM Facebook Fanpage⁶.

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Notícias

Página Inicial > Comunicação > Notícias

2017-07-04 às 14h33

Programa de saúde de apoio às populações afetadas pelos incêndios «pode durar mais de dois anos»



O Secretário de Estado Adjunto e da Saúde, Fernando Araújo, afirmou que o programa de saúde de apoio às populações afetadas pelo incêndio de 17 de junho em Pedrógão Grande, Figueiró dos Vinhos e Castanheira de Pera «pode durar mais de dois anos».

Em Pedrógão Grande, no final de uma reunião com 14 estruturas do Ministério da Saúde, o Secretário de Estado referiu que «esta é uma resposta dinâmica e flexível, disponível para ir às populações mais remotas, às pessoas mais isoladas, de modo a que ninguém fique para trás» e engloba as vertentes da doença orgânica, saúde mental e saúde pública.

As várias etapas previstas no plano de ação estão «programadas, articuladas e coordenadas» e o número de profissionais será o necessário nas várias áreas e especialidades, sendo que no caso da saúde mental pode estender-se para lá do período de dois anos.

«Temos o exemplo da tragédia de Entre-os-Rios, em que na saúde mental foram precisos mais anos de apoio e, portanto, temos de ter a capacidade de ao longo do tempo ir reconhecendo as necessidades», acrescentou.





Reunião do Secretário de Estado Adjunto e da Saúde, Fernando Araújo, com 14 estruturas do Ministério da Saúde, Pedrógão Grande, 4 julho 2017

Foto: Reunião do Secretário de Estado Adjunto e da Saúde, Fernando Araújo, com 14 estruturas do Ministério da Saúde, Pedrógão Grande, 4 julho 2017

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Figure 7 - Message, issued in 2017, chronologically and qualitatively associated with the Recovery (Type 5) of the Pedrógão Grande Fires (20 June to 14 August). The message informs about public policies from which affected communities can benefit and/or about the resumption of services that were suspended. Source: Website of the XXI Portuguese Constitutional Government⁷.

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Notícias

Página Inicial > Comunicação > Notícias

2017-11-28 às 17h08

Relatório do Conselho para a fixação de critérios de Indemnização das Vítimas de Incêndios



Primeiro-Ministro, António Costa, e Ministra da Justiça, Francisca Van Dunem, após reunião com o Comité das Vítimas dos Incêndios, novembro, 28 novembro 2017 (Foto: Clara Azevedo)

Por Resolução do Conselho de Ministros N.º157-C/2017, de 21 de outubro, o Governo assumiu, em nome do Estado, a responsabilidade pelo pagamento das indemnizações decorrentes das mortes das vítimas dos incêndios florestais ocorridos em Portugal Continental, nos dias 17 a 24 de Junho e 15 a 16 de outubro de 2017, e aprovou um mecanismo extrajudicial, de adesão voluntária, destinado à determinação e ao pagamento, de forma ágil e simples, de indemnizações por perdas e danos, não patrimoniais e patrimoniais, por morte das vítimas, aos respetivos familiares, herdeiros e demais titulares do direito à indemnização.

Foi assim constituído um Conselho para fixar, de acordo com o princípio da equidade, os critérios a utilizar no cálculo das indemnizações, bem como os prazos e procedimentos necessários para os titulares do direito poderem exercê-lo, e nomeados como membros do Conselho três juristas de reconhecido mérito e experiência – sendo um indicado pelo Conselho Superior da Magistratura, de entre juízes de tribunal superior, outro indicado pelo Conselho de Reitores das Universidades Portuguesas e o terceiro indicado por associação representativa de titulares do direito de indemnização pela morte das vítimas dos incêndios.

O referido Conselho entregou hoje ao Primeiro-Ministro o Relatório do seu trabalho, com a fixação dos critérios a utilizar para cálculo das indemnizações a pagar pelo Estado aos titulares do direito à indemnização por morte das vítimas dos incêndios que deflagraram em Portugal Continental nos dias 17 de junho e 15 de outubro de 2017.

Caberá agora à Provedora de Justiça a determinação, de acordo com os critérios ora fixados, e mediante um procedimento célere e simples, do montante da indemnização a pagar em cada caso concreto, e o seu respetivo pagamento.

Tags: [incêndios](#), [justiça](#)

Áreas: [Primeiro Ministro](#), [Justiça](#)

Figure 8 - Message, issued in 2017, chronologically and qualitatively associated with the Evaluation phase (Type 6). The message informs about organizational and inter-organizational procedures and their implementation in the organization and with the public

Source: Website of the XXI Portuguese Constitutional Government⁸.

When a message about wildfires, issued by a public organization, does not align with any of the categories outlined in Table 2, it indicates that the message is associated with the political perspective rather than the informational perspective of risk and crisis communication. Consequently, it is classified as a strictly political message.

5. Message Design

Regarding message design, we take into account four well-established paradigms in the field of risk and crisis communication, namely the IDEA Model by Sellnow et al. (2019a, 2019b, 2017, 2015); the dimensions of communication in public organizations during disasters by Olsson (2014), combined with thematic content categories by Bytzek (2008); and the SCCT developed by Coombs (2017, 2007), as detailed in *Table 3*.

<i>IDEA Model</i>
Effective risk and crisis communication during the <i>Alert</i> and <i>Rescue</i> phases must contain at least one of the three message elements - “internalization”, “explanation” and/or “action” - advocated in the IDEA Model.
<i>Dimensions of Communication by Public Organizations in Disaster Situations + Thematic Content Categories</i>
The <i>Rescue</i> phase is when all communication efforts, whether operational or strategic, need to be made to guarantee the safety of the population. For this reason, in this phase messages associated with the operational dimension and the strategic dimension can be issued to the same extent.
<i>SCCT</i>
In the <i>Rescue</i> , <i>Recovery</i> and <i>Evaluation</i> phases and/or when the most important political authority is the spokesperson for the message, the predominant response strategies, alone or in combination, are “excuse”; “justification”; “compensation”; “apology”; and “ingratiation”.

Table 3 - Characteristics of message design in the Loop Model. Source: Elaborated by the authors.

The element Distribution, represented by the “D” in the IDEA Model, is not included in the message design, as it pertains to the channels through which the message is disseminated rather than the content of the message itself.

6. Framing of Actions

Risk and crisis communication is characterized by the predominance of the informational perspective when the messages issued during the phases associated with risk – namely *Prevention*, *Preparation* and *Alert* – frame the potential damages that may arise from citizens either adhering to or neglecting the guidance provided by public organizations (Seeger, Sellnow & Ulmer, 2003). This assertion is consistent with Hallahan's (2005, 1999) framing model of actions, which posits that presenting the consequences of compliance or non-compliance with the recommended actions in either positive or negative terms can significantly influence audience behavior.

7. *Function of Language*

In the *Prevention*, *Alert* and *Rescue* phases, messages utilize the conative (or appellative) function of language (Jakobson, 2003), aiming to connect with the audience through second-person pronouns and verbs (i.e., “you” singular/plural). In contrast, the *Preparation*, *Recovery* and *Evaluation* phases emphasize the referential (or cognitive/denotative) function, resembling news content. The emotive (or expressive) function appears in the *Rescue* and *Recovery* phases, where the spokesperson may adopt a more prominent role, using first-person pronouns and verbs (i.e., “I” and “we”) to enhance rhetorical appeal.

8. *Communication Campaign*

Risk and crisis communication campaigns —defined as concentrated efforts that adapt language for various media and platforms—are highly effective in preparing the population during the pre-crisis period, specifically during the phases associated with risk. Therefore, we should anticipate finding materials produced as part of communication campaigns in the *Prevention*, *Preparation* and *Alert* phases. This aligns with the original formulation of the CERC model, which associates communication campaigns aimed at raising awareness, informing and educating the population more closely with risk communication (CDC, 2014).

9. *Mediation*

When risk and crisis communication is aligned with the informational perspective, public organizations engage in both direct communication—through digital social media—and indirect communication via news media. However, during the *Prevention*, *Preparation* and *Alert* phases, direct communication (e.g., social media posts) predominates over mediated communication. In contrast, during the *Recovery* and *Evaluation* phases, mediated communication takes precedence, with messages primarily aimed at journalists (e.g., press releases and news articles published on websites). During the *Rescue* phase, public organizations utilize both mediated and direct communication equally to achieve their objectives (Liu, Fraustino & Jin, 2015; Olsson, 2014; Reich, Bentman & Jackman, 2011).

10. *Audience*

The way in which the sender addresses the audience—either as a specific or universal audience—can be discerned through the use of pronouns and verb conjugations within the text. When risk and crisis communication adheres to the informational perspective, messages aimed at a specific audience are prevalent during the *Prevention*, *Preparation*

and *Alert* phases. In these instances, verbs are conjugated in the second- and third-person singular (“you”; “the citizen”; “each individual”). Conversely, messages disseminated during the *Rescue*, *Recovery* and *Evaluation* phases target a universal audience, employing second- and third-person plural forms (“we”; “you” plural; “the population”; “everyone”) (Wang et al., 2022; Sellnow et al., 2009; Seeger, Sellnow & Ulmer, 2003), or use an indeterminate subject.

11. Behaviors

Regarding the effects of messages, when risk and crisis communication is associated with the informational perspective, the behavior that the sender intends to elicit from the receiver is compliance with the guidelines provided by public organizations during the risk and emergency-related phases: *Prevention*, *Preparation*, *Alert*, and *Rescue*.

12. Opinions

The *Loop Model* underscores the significance of monitoring the audience's reactions to messages from public organizations, including how these messages are shared and discussed. Interaction occurs through both digital social media and word of mouth, involving peers, influencers, news media and the senders themselves (Austin & Jin, 2017). It is also essential to observe whether the rhetorical arena opened during a crisis reveals multiple voices that may converge, diverge, coexist, or compete, thereby influencing public opinion and adherence to organizational guidelines (Frandsen & Johansen, 2022).

Informational Quality Indicator

As noted by Frandsen and Johansen (2020b), the informational perspective relies on the existence of a rational consensus regarding the perception of risk, whereas the political perspective is characterized by symbolic and framing disputes typical of agonistic models. In scenarios where human lives are at stake, it is evident which perspective should take precedence. While it does not negate the fact that risk and crisis communication developed from an informational perspective can enhance the reputation of public organizations and political authorities (Canel & Luoma-Aho, 2018), it emphasizes the need to prioritize the protection of potentially affected citizens.

To analyze whether the risk and crisis communication from public organizations engaged in wildfire management aligns more closely with the informational or political perspective (Frandsen & Johansen, 2020b), we developed an aggregate indicator derived from the multivariate analysis of the messages, termed the Informational Quality Indicator (IQI). The

ten observed variables in our study yielded thirteen factors, whose presence or absence in the communication from public organizations will be verified. All factors that compose the IQI carry equal weight (1). A summary of these factors is presented in *Table 4*.

<i>Factor 1</i>	Predominance of messages with the framing of actions corresponding to the respective chronological phase.
<i>Factor 2</i>	Predominance of messages with the spokesperson corresponding to the respective chronological phase.
<i>Factor 3</i>	Demonstration of emotions by political authorities during the <i>Recovery</i> chronological phase.
<i>Factor 4</i>	Sending of messages by public organizations with content (qualitative category of messages) corresponding to their respective attributions in wildfire management.
<i>Factor 5</i>	Presence of messages directed at a specific audience in the <i>Prevention</i> , <i>Preparation</i> and <i>Alert</i> chronological phases.
<i>Factor 6</i>	Predominance of messages issued through the channel corresponding to the respective chronological phase.
<i>Factor 7</i>	Presence of communication campaigns in the <i>Prevention</i> , <i>Preparation</i> and <i>Alert</i> chronological phases.
<i>Factor 8</i>	Presence of at least one of the three message elements advocated in the IDEA Model in messages qualitatively identified with the <i>Alert</i> (Type 3) and <i>Rescue</i> (Type 4) phases.
<i>Factor 9</i>	Presence of operational and strategic aspects in messages issued in the <i>Rescue</i> chronological phase.
<i>Factor 10</i>	Predominance of “excuse”; “justification”; “compensation”; “apology”; and “ingratiation” response strategies in messages issued in the <i>Rescue</i> and <i>Recovery</i> chronological phases, as long as they are qualitatively identified with the <i>Rescue</i> (Type 4), <i>Recovery</i> (Type 5), <i>Evaluation</i> (Type 6) phases or strictly political (Type 7) messages; or if the most important political authority is the spokesperson for the message.
<i>Factor 11</i>	Predominance of messages associated with the informational perspective in all chronological phases.
<i>Factor 12</i>	Correlation between the chronological phase and the qualitative category of the message.
<i>Factor 13</i>	Predominance of messages with the function of language corresponding to the respective chronological phase.

Table 4: Risk and crisis communication assessment factors according to the Loop Model. Source: Elaborated by the authors.

The 13 factors must be observed in each phase of the model. The verification of each factor’s presence or absence is assigned values: “-1” (absent), “0” (not applicable or neutral) and “1” (present). The equation that defines the indicator is presented below:

$$IQI = \frac{\sum (f1: f13)}{13 - (n \times \text{value “0”})}$$

The range of variation for the indicator spans from “-1” to “1,” as the factors that comprise it fall within this same range. Consequently, values closer to “-1” indicate lower informational quality, suggesting that risk and crisis communication is more aligned with the political perspective. Conversely, values nearing “1” reflect higher informational quality, indicating a greater alignment with the informational perspective. This equation can be utilized in studies employing content analysis as the empirical research methodology. *Table 5* summarizes the main theoretical constructs and the variables of the framework.

When says		Who says		What says					By which channel says	To who says	With which intention says
Communication	Chronological categorization	Source	Spokesperson	Qualitative categorization	Message design	Framing of actions	Function of language	Communication campaigns	Mediation	Audience	Effects
Risk	Prevention	Executing organizations	Scientific	Type 1	IDEA	Negative	Apellative	Yes	More direct than mediated	Specific	Opinion + Behavior
	Preparation		Technical	Type 2			Referential				
Risk -> Crisis	Alert	Decision-making + Executing organizations	Scientific	Type 3			IDEA + SCTT				
	Rescue		Technical	Type 4	Apellative + Emotive						
Crisis	Recuperation	Decision-making organizations	Political	Type 5	SCTT	Positive	Referential + Emotive	More mediated than direct			
Crisis -> Risk	Evaluation			Type 6			Referential				
IQI Factor	F11, F12	F4	F2, F3	F12	F8, F9, F10	F1	F13	F7	F6	F5	N.A.

Table 5 - Main theoretical constructs and variables of the Loop Model. Source: Elaborated by the authors.

Discussion and Conclusion

The pursuit of models capable of synthesizing the risk and crisis management process is not new and has grown over the past decades. Sellnow and Seeger (2021) cataloged numerous theories that emphasize communication as a central component of this process. However, the inherent complexity of the concepts of risk and crisis render the development of a definitive and universally applicable model unlikely. This complexity is further compounded in disasters, such as wildfires, which constitute crises with distinct and highly specific characteristics.

To enhance risk and crisis communication regarding wildfires from an informational perspective—prioritizing public protection over political objectives—it is crucial for public organizations to embrace the principles of systematic communication. This entails adopting a strategic, planned, integrated, and structured approach, as exemplified by the proposed model, particularly in phases associated with risk communication, such as *Prevention* and *Preparation*, which are often overlooked (Taylor, Johnston & Ryan, 2022).

The accurate application of the model variables – relating to control, content, media, and audience – is essential for enhancing informational quality indicators and, consequently, safeguarding the population before, during and after wildfires.

We believe that establishing continuous communication about wildfires and actively engaging the public, as well as public and private organizations and civil society, in fostering a risk culture (Plana et al., 2024), could not only help mitigate the immediate impacts of wildfires and promote long-term community resilience. This resilience is crucial for addressing an issue that is becoming increasingly challenging and is expected to intensify in the future.

Community engagement and dialogue are central features in several definitions of risk communication, including the classic formulation by the NRC (1989). According to Sellnow and Sellnow (2023), dialogue in risk communication serves to promote public commitment and individual learning about risks, turning communication into a process of shared reflection and social co-responsibility.

As noted by Sellnow et al. (2009), risk communication is an interactive and dynamic process involving multiple, and often competing, messages. Establishing dialogue, pursuing collaborative conflict resolution, and fostering consensus-building are essential for effective communication and for cultivating mutual trust.

From a theoretical standpoint, this chapter contributes by proposing an original model that integrates several well-tested theories and frameworks. Communication strategies based on the *Loop Model* not only can aid in safeguarding the public but also have the potential to enhance the reputation of public organizations and political actors involved. Practically, the framework is useful for planning and evaluating, from a systematic perspective, the communication of public organizations regarding wildfires or any other type of meteorological disaster, provided the model is adapted properly, such as hurricanes in the Gulf of Mexico, typhoons in Southeast Asia, cyclones in Bangladesh, floods in southern Brazil, and wildfires in California, for example. Nevertheless, this article is limited by its theoretical scope. The empirical validation of both the model and the IQI could not be included within the present study due to space constraints and the conceptual nature of the contribution.

The proposed *model* also encourages participatory and community-based approaches, emphasizing the role of citizen engagement and local knowledge in anticipating communication needs and strengthening public trust.

Thus, the framework is inherently normative, as it serves as a prescriptive framework that guides public organizations how to communicate effectively. However, it can also be regarded as an analytical model, when applied to the examination of messages disseminated during wildfire communication management.

Regarding communication theories, our study advances the rhetorical tradition (Craig, 1999) by exploring the persuasive function of communication in risk and crisis scenarios, such as wildfires. We contend that risk and crisis communication should craft messages tailored to the specific phases outlined in the framework to effectively promote public safety and social engagement. To reaffirm the significance of rhetorical discourse, we proposed an evaluation indicator that assesses the risk and crisis communication practices of public organizations regarding wildfires. The capacity to objectively identify areas for improvement in organizational communication aligns with the principles of the rhetorical tradition, which advocates the continuous improvement of communicative practices.

Future studies should focus on empirically testing the predictive and analytical effectiveness of the model and the IQI through quantitative and qualitative methodologies. Pilot applications in different institutional contexts and in other types of climate- and weather-related disasters with other chronological patterns, such as hurricanes and floods, would be useful to assess its broader validity and adaptability across diverse scenarios.

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Notes

¹ Retrieved December, 10, 2025 from <https://www.sgifr.gov.pt/pt/w/diretiva-operacional-nacional-n.%C2%BA-2-decir-2025>.

² Retrieved December, 10, 2025 from <https://prociv.gov.pt/pt/documentacao/diretiva-operacional-nacional-n.%C2%BA-2-decir-2025/>.

³ Retrieved April 23, 2021, from <https://www.facebook.com/InstitutoDaConservacaodaNaturezaedasFlorestas>.

⁴ Retrieved August 19, 2021, from <https://www.facebook.com/AutoridadeNacionalEmergenciaProtecaoCivil>.

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⁶ Retrieved August 24, 2021, from <https://www.facebook.com/InstitutoNacionaldeEmergenciaMedica/>.

⁷ Retrieved August 13, 2021, from <https://www.portugal.gov.pt/pt/gc21>.

⁸ Retrieved August 13, 2021, from <https://www.portugal.gov.pt/pt/gc21>.