



HAL
open science

Working paper on the use of social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication

Caroline Rizza

► **To cite this version:**

Caroline Rizza. Working paper on the use of social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication. 2023. hal-04575122

HAL Id: hal-04575122

<https://hal.science/hal-04575122>

Preprint submitted on 14 May 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Working paper on the use of social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication –

Caroline Rizza – *13-Telecom Paris (UMR 9127), Institut Polytechnique de Paris, France*
caroline.rizza@telecom-paris.fr

- Introduction..... 3
 - The working paper’s EU framework..... 3
 - Structure 4
- Part 1 - Making the case through examples 4
 - The 2011 Genoa’s flood (Italy) 5
 - ☞ Issues to be addressed by policymakers: 5
 - The 2017 Hurricane Irma (Cuba)..... 6
 - ☞ Issues to be addressed by policymakers: 7
 - Flash flooding in November 2019 in the Alpes-Maritimes in France: An example of affiliated volunteers..... 7
 - ☞ Issues to be addressed by policymakers: 9
- Part 2 - Opportunities and challenges to be faced in the field of disaster risk communication..... 9
 - Social media and crisis management: state of the art 9
 - An informational dimension..... 10
 - A communicational dimension 11
 - An organisational dimension 12
 - Citizens' initiatives..... 12
 - Professional practices mobilising social media..... 12
- Part 3 - Discussion..... 14
 - About misinformation, disinformation and communication on social media at the time of a crisis 14
 - Misinformation is not disinformation..... 14
 - Toward policy guidelines..... 15
 - Different information cultures..... 15
 - Toward policy guidelines..... 15
 - Taking into account and integrating citizens' initiatives in crisis management..... 16
 - Two opposite systems..... 16
 - Towards policy guidelines..... 16
- References..... 18

Introduction

Social media platforms have become a feature of everyday lives of millions of people and can play a vital role in saving and safeguarding people's lives and livelihoods. Platforms such as Facebook, Twitter, Wikipedia and other social media sites are useful tools to: educate populations on natural and technological disaster prevention and preparedness (*e.g.* preparedness checklists, behaviour to be adopted, information on where key survival items are available); provide live updates of the impact of disasters people witness as it or simply inform about individuals' whereabouts and conditions; communicate about ongoing events and their impact. While they have been becoming a tool of communication for official crisis managers and rescuers, they require specific competences and raise challenges related to citizens' expectations and new uses. We will see in that working paper that, as a new public space of expression and organization, they indeed offer to citizens new ways of expressing their solidarity and organize self-help. At the same time, they complicate the management of the event and the coordination of the response. They also pose new challenges because of their viral reach. While rumours have always been part of crises and require special attention from official authorities, disinformation campaigns are launched to destabilise states by provoking panic and fear and undermining the already fragile trust between citizens and public institutions. This raises the question of the appropriate use of social media platforms by public authorities and other institutional actors, which will be addressed in the conclusion of this working paper.

The working paper's EU framework

Two recent European contributions have addressed part of these questions. They constitute a framework to this working paper.

First of all, (SAPEA, 2022), part of the Scientific Advice Mechanism to the European Commission, has provided an evidence report to support policy recommendations to improve crisis management frameworks. While highlighting a number of environmental, social and technological trends and developments, which have fundamentally changed the type, and nature of risks and crises, the report focuses on three global trends that pose significant challenges and require a fundamental change in the way the EU prepares to manage risks and crises:

- Increasing frequency and severity of hazardous events;
- Increasing vulnerability;
- Increasing complexity.

The report identifies four typologies to better distinguish and target different types of crises, in understanding the underlying mechanisms and providing guidance on how to prepare and respond appropriately, based on:

- Scale (magnitude and frequency of a crisis)
- Risk (different types of risks/threats, such as extreme weather, terrorism, pandemics, cyber security, etc.)
- Time (sudden or prolonged crises and creeping crises).
- The level of governance (local, national or cross-border crises).

The report also provides insight regarding trust and disinformation campaigns at the time of a crisis – both dimensions this working paper will address and discuss. Because of their uncertainty, crises carry rumors, official institutions are used to deal with. We will

underline in this working paper that social media have exponentially increased their numbers, which requires new strategy of communication to cope with. At the same time, disinformation campaigns are deliberately launched to destabilized States. Disinformation campaigns constitute in that sense an additional risk to deal with at the time of a major event. The combination of these two elements (i.e. the exponential increase of rumors associated with the risk of disinformation campaigns) have led institutions to distrust, despise and disregard social media while they should make their room in this new public space to better monitor, respond and fight both rumors and disinformation campaigns. Consequently, part of the challenges driven by social media is finding ways to build or re-build trust between public institutions and citizens, trust put at stakes at the time of a major event.

“The Handbook of Computational Social Science for Policy” (Bertoni et al., 2023) constitutes the second recent document published at the EU level. Computational Social Science (CSS), brings together the power of computational methods and the analytical rigor of the social sciences. According to (Bertoni et al., 2023), CSS has the potential to revolutionize policymaking by supporting governments to take advantage of large-scale data on human behavior and provide policymakers with insights into where policy interventions are needed, which interventions are most likely to be effective, and how to avoid unintended consequences. The authors map the so-called demand side of CSS across several areas of policymaking by sourcing thematic questions at the interface between policy and research that CSS methods be address, among which crisis management. Key messages concerns: opportunities raised by multiple formats and sources of citizen-generated content in terms of contextualization and understanding of the event as well as decision-making and response engagement; social network analysis as a relevant tool to reveal and understand the ongoing dynamics in the case of disinformation campaign; challenges in terms of professional practices; social media as a relevant infrastructure of communication; recognition of citizens as the first link of the crisis management operational chain; the constitution of relevant networks of experts easily mobilised from a local to a European level to provide data and monitor citizen-led initiatives.

Structure

These two publications highlight the up-to-date and relevant questions to be addressed in this working paper for the European and Mediterranean Major Hazards Agreement. The working paper offers an analysis of the above issues. First, it gives specific examples of both the beneficial and malevolent use of social media and of positive examples of engagement of the public, public authorities and other institutional operators. Second, it provides a rigorous and accurate state of the art that allows discussing in a third part the stakes raised, today by social media in crises management for the member states of the Agreement.

Part 1 - Making the case through examples

This first section aims at illustrating potentialities, challenges and threats raised by digital tools such as social media through concrete examples we have studied in our research activities. Each of the case has been presented in the literature or during conferences in the field. For more details about these cases, please refer to the bibliography at the end of this report.

The 2011 Genoa's flood (Italy)

On 4 November 2011, floods touched violently the City of Genoa (Italy) as a consequence of a strong precipitation that registered over 500 mm spikes in a few hours in different parts of Genoa and Province. Authorities extended the alert status for several days. During and after the flooding, social media were used to respond to this emergency. More specifically, a volunteer group of students created a Facebook page "Gli Angeli col fango sulle Magliette" ("Angels with mud on T-shirts") in order to communicate with citizens and organise support and rescue activities. Rapidly the Facebook page became the node of communication between citizens, local authorities and rescue teams during both the disaster and the post-event.

In their paper, (Rizza & Guimarães Pereira, 2014) first look at the story of the 2011 Genoa floods through the eyes of the news media. Hence, they look at what the media coverage echoed and commented on at the time of the floods, in order to gain insights about their imaginaries behind the use of social media such as Facebook in situations of natural disaster. Second, the authors analyse some posts published on the Facebook page "Gli Angeli col fango sulle Magliette" using (Dufty, 2012) resilience building framework in order to deepen the understanding of social media's potentials in crisis situations and above all the current expectations about these types of media to perform in crisis situations, as portrayed by the news media.

In this first case, whether the types of function that up until recently were tacitly expected from traditional institutions (including relevant agencies but also the media), are now being shifted to bottom up initiatives and hence, whether there are grounds to consider that there is abrogation of responsibility from the part of the institutions, or if on the other hand spontaneous partnerships like the one in Genoa are to be cherished and nurtured.

The events during and after the 2011 Genoa floods are an illustration of how social media allowed citizens to answer competently to a situation of crisis, hence supporting community disaster resilience building. In Genoa, social media constituted a virtual space of care for citizens to exercise their citizenship, care and solidarity by organising rescue activities, reconstructions, etc. through such a space. Even if the Facebook page 'Angeli col fango sulle magliette' was first a private initiative of a well-intentioned Genovese citizen, the community, comprising the local authorities formally in charge of tackling such situations appropriated it. Hence, through the virtual space both local authorities and citizens became empowered actors to address the crisis, even if they were from the onset legitimate social actors. Nevertheless, the endorsement of a citizen initiative by the public authorities has further reinforced the authority of such activity. A trustful relationship has developed amongst all, *a sine qua non* condition for respected cooperation, shared understanding of preparedness and of what is needed for building community resilience. All this was strongly mediated by the technology: online and offline social media that implement each other.

☞ *Issues to be addressed by policymakers:*

What are the function and value of what the authors call “do-it-yourself crisis management” in building resilience in society by empowering citizens and communities? It is important to deepen the understanding of the implications of public authorities embracing bottom-up initiatives such as this one.

What are the pros and cons of the volunteering citizens’ use of social media in crises such as natural disasters?

The 2017 Hurricane Irma (Cuba)

On Friday, 8 September 2017 the eyewall of the hurricane Irma moved over Cuba from the South east. Initially, meteorologists had not predicted a direct hit for this Island. As prevention, nearly one million people from low-lying areas, including thousands of Canadian and European tourists were evacuated mostly in the Peninsula of Varadero (province of Matanzas), the northernmost point of the island of Cuba. The intensity of the hurricane was varying between categories 4 and 5 while moving through the island. By late morning on 9 September, Irma had weakened to Category 3 but continued to cause significant damage for the next 24 hours while heading to the North, affecting all the northern Coast-Cayes and the provinces of Sancti Spíritus, Villa Clara and Matanzas (where authorities relocated tourists) until reaching Havana. In a couple of days, all means for families and friends to connect with the tourists were down, leaving them without any information about the on-site situation.

In their paper, (Batard et al., 2018a) focus on the volunteer citizens’ initiative to take advantage of social media, to enhance their own situational awareness in the Varadero area, supporting fellow citizens to identify and localize their relatives. In particular, the authors look at two Facebook groups that were created at the time are analyzed and their messages’ content and objectives categorized. They show that once more, social media constituted opportunities for citizens to engage a specific response to the crisis, but at the same time raised specific ethical and social issues. On one hand, social media constituted a virtual space of care supporting self-help and psychological help between citizens, fostering at the same time community resilience. On the other hand, its use did also put at stake governance, responsibility, equity and privacy principles.

First, the way these volunteers created and updated the lists of hotels illustrates their amateurism, which might have led to misinformation. These lists were useful for worried people, supporting them in the idea to act to find their relatives; but they presented errors and may have also lead to more concerns. Furthermore, in the case of the public group, personal information about tourists and their family was posted and consequently available for third parties (Watson and Finn, 2013). Secondly, if the two Facebook pages have clearly constituted backchannels supporting peer-to-peer communications to overcome the absence of official or formal communication to the public about the crisis in Cuba (Sutton et al., 2008), they also called for more, or for a specific attention from part of the crisis managers. From Monday, 11 September, people started to call official authorities to report their relatives as missing persons or to support authorities to establish their localization. Reactions when they were explaining from where they got news or specific information demonstrate that mistrust with regard to social media remains despite advantages they present. Thus, since social media support affected communities to organize a specific and immediate response to a crisis, they should be considered by crisis managers as a means to co-construct this response.

👉 *Issues to be addressed by policymakers:*

Does the integration of social media in the crisis management process support a co-responsibility and a more agile response to the disaster?

Looking at what was going on social media when Irma impacted Cuba might have supported authorities to identify distress from fellow citizens who were worried about their family and friends (even if their lives were not endangered).

Do social media support local authorities in defining a more adequate and inclusive answer?

Flash flooding in November 2019 in the Alpes-Maritimes in France: An example of affiliated volunteers

Violent storms hit the Alpes-Maritimes department in France on 23 and 24 November 2019. The heavy rainfall caused flooding and landslides throughout the department, leading the authorities to recognise the state of natural disaster for the victims. During the event, the digital volunteer association “VISOV” was “activated” by authorities. They communicated through social with citizens about the situation or behaviors to complain with, and kept answering to their questions.

Digital volunteer associations, such as the Volontaires Internationaux en Soutien Opérationnel Virtuel (VISOV) in France or its international equivalent Virtual Operations Support Teams (VOST) illustrate the gradual structuring of citizen communities formed during crisis events and recognised, in some cases, by the authorities.

For instance, in the case of the flash flooding in the Alpes-Maritimes, the VISOV kept updating map the area where people could find a shelter to spend the night and stay safe (see Illustration 1).



Illustration 1: Screenshot of the Visov Facebook page the 23rd of Nov. 2019 at 17:38 identifying shelters to welcome citizens

Citizens' comments can be classified into three types of contributions (Illustration 2):

- Updating of the opened crisis shelters to welcoming citizens (e.g. citizen “*In Brignoles, there is also the Marie-Curie school - press release from the town hall*” ; VISOV’s answer “*Thanks we are updating the map*”)
- Proposals to welcoming fellow citizens (e.g. citizen “*If necessary I can accommodate up to 4 people, please contact me in PM*”; Visov’s answer “*please contact your town all, they will register your proposal and ask you if required*”)
- Direct questions to friends possibly in difficulties (e.g. citizen “*Have you been evacuated dear [name of the person]?*”).



Illustration 2: Screenshot of the VISOV Facebook page - Citizens' comments

As (Batard, 2021) explained in his PhD thesis, the operating mode of VISOVs or more largely VOSTs can be broken down into two timeframes: day-to-day monitoring and one-off mobilisation during major events, known as “activation”. While the day-to-day monitoring phase constitutes the bulk of VISOV's activity, the activation phase is the most important.

Whether on a day-to-day basis or in the activation phase, the missions of VISOV volunteers can be presented in two types:

- Information feedback for crisis managers, to help them improve their knowledge of the situation, to take decisions and act with the knowledge of a maximum of elements of the crisis. This feedback can be passive, corresponding to the daily presence of volunteers on digital social media, or active, during an activation phase for a specific event.
- Communication with the general public, which can involve a number of actions: informing citizens of the best practices to adopt, giving advice on how to be cautious, stopping the spread of false information or unverified rumours, or disseminating official communications and factual information.

In this sense, the term of SMEM (Social Media for Emergency Management) have been spread and become established in the crisis management community. The term SMEM conveys two assumptions. Firstly, SMEMs constitute new channels for the circulation of

crisis information, which are more delicate to take into account. The relevant information is hidden in a large and constantly changing stream of information in multiple formats, the veracity of which is not guaranteed. VOST's ambition is therefore to make a fleet of volunteers available to professional actors to sort and analyse this information in order to facilitate its integration into the crisis unit. In addition, local citizens become key players in civil protection by having precise knowledge of the terrain. As the first responder on the scene of a crisis, they are the first link in the response chain.

☞ *Issues to be addressed by policymakers:*

Social media have been changing the crisis management processes and picture for authorities. Beyond the complexification they bring, what are their added values for authorities?

When looking at VOSTs' activities and their specific partnership with authorities, is their genesis and organization reproducible for other types of relevant citizens' communities in the field of crisis management?

Part 2 – Opportunities and challenges to be faced in the field of disaster risk communication

Social media and crisis management: state of the art¹

The uses and challenges of social media in crisis management have been discussed for the last twenty years in the specific field of "crisis informatics". Crisis informatics" studies how networked digital technologies, in particular social media from the 2000s onwards, interact with crisis management, with a sensitivity that comes from both social sciences and computer sciences, in particular through data sciences (Palen et al., 2020). It is therefore a field that has been built up over the course of issues and uses by different actors of these digital tools during crises, whether natural (e.g. earthquakes, forest fires, floods), technological (e.g. chemical explosions, nuclear incidents, plane crashes), or urban crises (e.g. terrorist attacks, riots). In the literature, the terms emergency, disaster and crisis are often used as synonyms (Hiltz et al., 2011). Like (Batard, 2021), we assimilate the crisis to the notion of disaster by its magnitude and consequences, while attributing to it the organizational dimension highlighted by (Lagadec, 1984). Furthermore, the approach to crisis can be seen from a continuum perspective, i.e., integrating acculturation to risk (Courant et al., 2021).

Social media are Web 2.0 platforms or applications that allow their users to create content online, exchange it, consume it and interact with other users or their environment in real time (Kaplan & Haenlein, 2010; Luna & Pennock, 2018; Reuter et al., 2020). In recent years, the use of social media has increased considerably and its nature has changed, becoming more collaborative, especially during crises (Reuter et al., 2020).

Social media allow their users to communicate and interact in different and often combined ways: the creation and dissemination of information, relationship

¹ The state of the art presented in this section is part of the book introduction written by (Rizza, 2022b) in (Rizza & Bubendorff, 2022) "Gérer les crises avec les media sociaux: une approche pluridisciplinaire et professionnelle", Presses des Mines, Paris, 2022.

management, communication and self-expression. On the basis of these activities, (Reuter et al., 2011) distinguish:

- Wikis: for information gathering and knowledge creation according to a collaborative logic ;
- Blogs and micro-blogs: for publishing information and/or self-expression;
- Social networks: for relationship management, self-expression and communication, and information gathering; and
- Content sharing and indexing systems: for the creation and exchange of multimedia information (photos, videos).

Platforms specialised in crisis management and run by communities of volunteers exist and allow collaborative mapping, on-site and remote contribution, as well as public-private-citizen partnership (Wendling et al., 2013).

This categorisation allows differentiating social media according to their main functions: Twitter as a micro-blog allows for the dissemination or collection of information; Facebook is a social network that allows for interaction between "friends" or within a "group" community; Wikipedia is a platform for collaborative knowledge creation (Kaplan & Haenlein, 2010). However, the context of crisis facilitates specific uses of social media with a combination of the main functions of a platform with other functions needed in the moment: for instance, during a crisis, the discussion pages of Wikipedia become the place of exchanges within the community of contributors in the same way as a social network (Bubendorff & Rizza, 2020, 2021, 2022b)

An informational dimension

Social media have been quickly credited with facilitating the creation and sharing of information about an ongoing event. For (Eismann et al., 2016) sharing and obtaining factual information remain the primary function of social media in all disasters. Much of the literature has focused on studying 'micro-blogging' activities, *i.e.* the use of social media by citizens to report on what is happening during a major event. These activities have been documented based on real events: they cover the creation and distribution of information, communication and response to requests for help (Palen et al., 2009; Palen & Vieweg, 2008; Reuter et al., 2011; Tapia et al., 2013). Due to their increasing ubiquity in everyday life, their speed as a relay of information and communication, and their accessibility via different platforms, social media have been considered early on as a crisis management and communication opportunities, constituting a place where collecting real-time information about an event (Palen et al., 2010; Vieweg et al., 2010).

There are two ways of using information from social media (e.g. Reuter et al., 2020):

- To refine situational awareness;
- To initiate action on the ground with "actionable information" (Coche et al., 2019). In that respect, Coche et al. 2022, raise also the question of the automatic exploitation of information published on social media during a crisis around the following three key dimensions: the usefulness of information posted on these media, its automatic collection and its format.

The question of the quality of the data circulating on social media constitutes a challenge for their integration into the crisis management processes based on their own internal

verification mechanisms and their various channels of reception. Thus, many questions arise, particularly in terms of:

- Reliability, quantity, attention required, effective interpretation and contextualization (Grant et al., 2013; Ludwig et al., 2015; Moore et al., 2013; Tapia et al., 2013);
- Verification, accountability, credibility, information overload and resource allocation issues raised by the integration of social media information into these processes (Hughes & Palen, 2014);
- Format, as data from social media does not have the standardised format that allows emergency or crisis management institutions to make a decision (Tapia et al., 2013).

In other words, this information does not benefit from the same processing mechanisms that guarantee accuracy, security, and the usual legitimacy of the source of the information by the institution managing the crisis. Thus, establishing trust as the expectation of a reliable or good outcome despite vulnerabilities and imperfect knowledge and relying on the idea that citizens have the capacity, benevolence and integrity to report true information (Alpern, 1997; Tapia et al., 2013), combined with a process of data control and standardisation, would address this issue (Camozzi et al., 2020). To address the question of trust in social media data by command and control cells, (Castagnino, 2022) describe the mechanisms of verification and legitimisation of these data within institutional practices.

A communicational dimension

Social media is commonly represented as an infrastructure that both clarifies the status of an event by pushing information upwards from the citizen ('bottom-up') in order to initiate a response if the information is confirmed (actionable information), and disseminates or pushes official institutional information to the citizen ('top down'). (Reuter et al., 2011, 2014; Rizza, 2020). When they are used as a way for authorities to alert the public and relay official institutional communication (Reuter & Kaufhol, 2018), literature distinguishes two ways of interacting with citizens. These are either to inform in real time through notifications (e.g. Twitter) or to engage in more personal communication with communities (e.g. on Facebook). Two types of practices are thus possible (Denef et al., 2013; Reuter et al., 2020; St Denis et al., 2014):

- An 'instrumental usage', characterised by a formal and depersonalised communication about the situation and on the actions carried out in the field, which corresponds to classic institutional communication;
- An 'expressive usage', characterised by informal language and personalised, direct responses to citizens, support and reassurance.

According to (Denef et al., 2013) these two ways of interacting with citizens, constitute two different communication strategies. These strategies echo the expectations of citizens that institutions should use these digital tools to respond to their own informational needs about an ongoing event (Reuter et al., 2020). In this respect, the mutual misunderstanding between institutions and citizens on social media due to language elements such as the use of irony, puns or ambiguities makes sense (Bubendorff et al., 2019a; Reuter et al., 2020). (Bubendorff et al., 2019a) underline the gap in digital culture and ways of acting on social media between institutions and citizens. Although public

actors are now aware of this gap, good practice guides do not seem to be sufficient to bridge it. Recruiting competent agents (i.e. aware of this digital culture) for assuring these specific positions and tasks is required. (Bubendorff & Rizza, 2022a) also illustrate how social media constitute new channels of communication and interaction with citizens beyond a simple top-down information channel. Their results underline the need to rethink these tools and their use well in advance of a crisis and as a lever for rebuilding mutual trust between public institutions and citizens.

An organisational dimension

Social media also constitute a virtual public space for the expression and organisation of citizen actions. Their integration requires that institutions reorganise their services and redefine their doctrines and methods.

Citizens' initiatives

Major events generate citizens' initiatives, most of the time spontaneously. Spontaneous volunteers are private citizens who work together in pursuit of collective goals to deal effectively with disasters, which have occurred or are about to occur, but whose organisation is not yet institutionalised (Stallings & Quarantelli, 1985). They are often the first to act on site (Reuter et al., 2013) and may or may not have the required skills (Drabek & McEntire, 2003). The arrival of social media has enriched this range of initiatives by allowing them to manifest and organise themselves online to complement the actions that usually arise spontaneously on the ground. The case studies presented in the first part of this report underline this aspect (e.g. the 2011 Genoa flash floodings). The distinction between "real volunteers" present on the ground and "virtual volunteers" acting online (Reuter et al., 2013) underline how social media have become a place for expressing and organising solidarity (Batard et al., 2018b; Bubendorff et al., 2019a). Finally, the notion of affiliation ("affiliated"; "unaffiliated") with a crisis management authority raises the question of the recognition of these initiatives (Batard et al., 2019; Stallings & Quarantelli, 1985; Zettl et al., 2017). In the case studies presented part 1, the role of the VOST constitute an illustration, as well as other communities such as the WAZE community mobilized by some firefighters departments in France for instance. Batard (2022 and 2021) explains precisely how crisis management processes can benefit from the citizen contributions facilitated by the use of social media.

Professional practices mobilising social media

Despite the profusion of the state of the art on the use of social media during a crisis, it must be emphasised, as Reuter et al. did (2020), that there are very few quantitative studies about professional practices, and even fewer in Europe.

Although qualitative studies make it possible to grasp the wealth and abundance of cases in which social media were mobilised during a major event (see part 1 of this report), they make it difficult to generalise the results. Nevertheless, the obstacles to their integration have been documented.

The literature insists on the complexity of crisis management processes due to the pressure on emergency teams and their difficulty in processing an overwhelming quantity of information in the middle of an event in order to:

- Find precise and relevant information within a suitable timeframe (Coche et al., 2022; Kaufhol et al., 2019; Kavanaugh et al., 2011) ; or

- Respond to the new expectations of the public, which is now accustomed to the speed and instantaneousness of communication by means of these media (Bubendorff & Rizza, 2022a; Hughes & Palen, 2012).

This limitation is all the stronger as it is combined with the mistrust of information circulating on social media (Castagnino, 2022; Hiltz et al., 2014). The excess of calls on the same event, the "too much information to process", the seriousness of the situation requiring to focus on the essential, are declensions of the "tunnel effect" as described by (Batard, 2021, p. 20; Rizza, 2022a). Furthermore, the lack of resources, competent and trained staff, and time to integrate these tools into practices are also pointed out (Hiltz et al., 2014; Kaufhol et al., 2019; San et al., 2013). Finally, the lack of a clear doctrine or doctrine, of good practice guidelines, of training is also deplored (Bubendorff and Rizza 2022). This organisational dimension as well as the role played by or attributed to VISOVs (see case studies Part 1) is at the heart of the questioning of the digital strategies of institutions in charge of crises management (Rizza, à paraître).

Last but not least, institutional actors' testimonies are also relevant when understanding the opportunities and the challenges raised by social media and other digital app. in crisis management.

Part 3 – Discussion

Both the case studies and the literature presented in this working paper highlight the opportunities that social media offer in terms of communication and organisational tools for crisis managers and rescue teams. Despite these opportunities, social media also pose challenges and threats that require special attention.

First, social media have enabled the exponential spread of false information in a very short time. We will argue in this discussion that it is important to distinguish between rumours and disinformation campaigns and we will advocate the need for public institutions to become accustomed to social media. This will enable them to prevent or stop rumours and combat disinformation.

Second, social media enable citizens to act "on site" or "online" to prepare or organise themselves before or after a disaster. As this working paper shows, these citizen-led initiatives have always existed, but are becoming more numerous and more present (in the sense that they cannot be ignored). We will argue that, despite the complexity of crisis management processes that they bring, these initiatives can be fully part of the crisis management cycle through the constitution of a specific collaboration that social media have initiated.

About misinformation, disinformation and communication on social media at the time of a crisis

The question of the veracity of information circulating on the Internet in general and on social media in times of crisis in particular is central. We propose below some key-elements to keep in mind and go beyond the state of the art.

Misinformation is not disinformation

Disinformation, as misleading content presented in the form of journalistic information, can be conveyed on social media such as Facebook, Twitter, 4chan or Reddit (Mercier, 2018): disinformation or 'fake news' is "journalised", *i.e.* designed to resemble information as journalists produce it'. Moreover, the dissemination of this type of information on social media has to be understood in the light of a broader distrust of the authorities and the spokespersons of official information. It would thus take place in a context of mistrust towards those who are authoritative, *i.e.* journalists, professors, experts, etc. (Mercier, 2018).

In their report regarding the use of Twitter and Wikipedia during the Bataclan attacks in 2015 in France, (Bubendorff et al., 2019b) highlight two key elements on the subject. On the one hand, on Twitter, users give credibility to the historical authorities (historical media and official institutions) and are careful to deny any rumour. On the other hand, on Wikipedia, the contributors do not present the rumour on the encyclopaedia page but debate it in the discussion space associated with the page. Looking at the Covid crisis, (Bubendorff & Rizza, 2021) show how Wikipedia contributors use the mechanisms specific to crisis management to reduce the uncertainty of the COVID-19 pandemic. Its magnitude leads to specificities in their ways of doing. The analysis of the construction of articles and pages related to the pandemic shows the two-step dynamic adopted by the contributors. "Making sense" in the face of the pandemic successively involves archiving events and then documenting their analyses in various parts of the public arena (media and academia). The pandemic has implied shifts in the way information is processed on

the encyclopedia. On the one hand, the particularly uncertain climate requires an increased mobilization of the vigilance tools traditionally used on Wikipedia; on the other hand, the construction of meaning around it obliges contributors to deal with the issue of disinformation in an unprecedented way. While the encyclopedia usually focuses on providing a state of knowledge and narratives around a single event, the COVID-19 pandemic, with its controversies and debates, leads lay citizens to push the platform's information processing mechanisms to the extreme.

We argue here, that it is necessary to keep in mind that disinformation is radically different from the misinformation or rumours, which can emerge in times of crisis and uncertainty: as it has been shown in this report, disinformation campaigns are political, have their own forms of rationality, and are self-perpetuating. Consequently, the management of rumours or conspiracies does not follow the same argumentative logic.

Toward policy guidelines

From a lexicological point of view, the term rumours should be preferred to “false information” or “disinformation” when it is not a specific campaign. Rumour says what it is: a sort of outgrowth inherent to moments of crisis (Morin, 1969) false information or disinformation is created with the aim of being disseminated.

From the point of view of institutional practices, we advocate the systematic use of social media to fight the spread of rumours and disinformation campaign. The presence and rapid dissemination of information, on these media is indeed, for academics and practitioners in the field of crisis management, one of the best ways to curb rumours and fight against destabilization campaigns.

Different information cultures

Fighting against “disinformation campaigns” and acting to avoid dissemination of rumours on social media, require improving the official authorities information cultures.

The state of the literature underlines the discrepancy in the ways crisis management practitioners use social media and the communication these media promote. Indeed, official institutions often reproduce on social media a vertical mode of communication pushing information and behavioral advices to citizens. Their adoption of such media is slow and do not fit with the expectations of citizens, hoping for more interactions and instantaneous responses to their questions in case of major events. As demonstrated by (Bubendorff et al., 2019b) the culture and primary mission of crisis managers is still, for the meantime, out of step with the culture and ways of doing things on social media.

Toward policy guidelines

Guidelines on the use of social media in crisis management have been published for practitioners in order to solve difficulties outlined here. However, these guidelines do not seem to be sufficient to transmit a social media culture to official bodies.

This cultural gap highlights the question of the means dedicated to the use of social media in such institutions. As suggested by (Bubendorff et al., 2019b) we propose the appointment of an agent who is already familiar with social media and their communicating tone. In their opinion, this double acculturation would make it possible to establish a first bridge between the horizontal culture promoted by social media and the

institutional culture of crisis where the chain of (vertical) validation of information is essential.

However, as underlined in this report, social media constitute an additional tool for information feedback from the field where citizens are the first to be involved. The position dedicated to social media should therefore enable both top-down communication to citizens at key moments of crisis management (including the peak of the crisis) but also to provide bottom-up feedback to decision-makers based on information circulating on social media.

By doing so, social media integration will be relevant to crisis management and response. consequently, the development of specific teams using social media for emergency management within institutions in charge as well as official partnerships with the VOST have to be encouraged and supported.

Taking into account and integrating citizens' initiatives in crisis management

The study of the use of social media during natural disasters raises the central question of the place given by state institutions to citizen participation and initiatives. Understanding the ways in which citizens use social media in times of crisis allows us to understand their expectations and to perceive how institutions can respond.

Two opposite systems

According to (Batard, 2021) thinking about coordination between professionals and citizens implies to make interacting two systems that are in conflict. The author adopts the analogy formulated by (Raymond, 1999) about software development structures and applies it to the civil security environment, which would be a cathedral - rigid, with a vertical organizational structure and operating rules linked to its constitutive professions. Citizen involvement would take then the form of a bazaar - a flexible structure, horizontally distributed and decentralised within multiple citizen communities. He shows that the varying degrees of citizen affiliation make this system a continuum between complete absence of structure, represented by spontaneous and informal citizen mobilisation, and the rigidity imposed by civil security institutions.

Towards policy guidelines

The challenge of interacting with citizens on social media lies in the establishment of a genuine collaborative space where citizen action is recognised and taken into account. This interaction would indeed allow us to go beyond the consideration of social media as simple monitoring sites to constitute virtual spaces of collaboration between the State and its citizens.

To do this, the question of horizontality in exchanges between citizens and institutions becomes central to enable uses that are both expected by citizens and possible (to be implemented) by institutions. It also raises the issue of trust between official institutions and citizens, which the Covid-19 crisis has particularly affected (Rizza, 2020, 2022a).

In this respect, we propose to work specifically with official institutions to help them use and integrate social media in their entire crisis management cycle, *i.e.* not only at the time of the crisis and during the recovery phase, but also in the prevention and preparation stages. In our view, this should enable official institutions to be recognised as relevant in terms of communication (and verification of online information) when a disaster occurs

and, at the same time, to acculturate their agents to social media and their specific communication. On this basis, new processes and guidelines can be defined because they are proven in practice.

References

- Alpern, K. D. (1997). What Do We Want Trust to Be ? Some Distinctions on Trust. *Business and Professional Ethics*, 39-45.
- Batard, R. (2021). Intégrer les contributions citoyennes aux dispositifs de gestion de crise : L'apport des médias sociaux. I3-Telecom Paris, Institut Polytechnique de Paris et IMT Mines Albi-Carmaux.
- Batard, R., Rizza, C., Montarnal, A., & Benaben, F. (2018a). Ethical, legal and social considerations surrounding the use of Facebook groups during Hurricane Irma in Cuba. *ISCRAM 2018-15th International conference on Information Systems for Crisis Response and Management*, p-268.
- Batard, R., Rizza, C., Montarnal, A., & Benaben, F. (2018b, mai). Ethical, Legal and Social considerations surrounding the use of social media by citizens during Hurricane Irma in Cuba. *Proceedings of the 15th International Conference on Information Systems for Crisis Response and Management*.
- Batard, R., Rizza, C., Montarnal, A., Benaben, F., & Prieur, C. (2019). Taxonomy of post-impact volunteerism types to improve citizen integration into crisis response. *Proceedings of the 16th International Conference on Information Systems for Crisis Response And Management*, 1114-1125.
- Bertoni, E., Fontana, M., Gabrielli, L., Signorelli, S., & Vespe, M. (Éds.). (2023). *Handbook of Computational Social Science for Policy*. Springer International Publishing. <https://doi.org/10.1007/978-3-031-16624-2>
- Bubendorff, S., & Rizza, C. (2020). The Wikipedia Contribution to Social Resilience During Terrorist Attacks. In A. Hughes, F. McNeill, & C. Zobel (Éds.), *ISCRAM 2020 Conference Proceedings – 17th International Conference on Information Systems for Crisis Response and Management* (p. 790-801). Virginia Tech. http://idl.iscram.org/files/sandrinebubendorff/2020/2271_SandrineBubendorff+CarolineRizza2020.pdf
- Bubendorff, S., & Rizza, C. (2021). Produire collectivement du sens en temps de crise : L'utilisation de Wikipédia lors de la pandémie de COVID-19. *Communiquer. Revue de communication sociale et publique*, 32, 32. <https://doi.org/10.4000/communiquer.8333>
- Bubendorff, S., & Rizza, C. (2022a). La communication de crise à l'heure des media sociaux : Quelle place pour le citoyen ? In C. Rizza & Sandrine Bubendorff, *Gérer les crises avec les media sociaux : Une approche pluridisciplinaire et professionnelle* (p. 77-88).
- Bubendorff, S., & Rizza, C. (2022b). Media sociaux et circulation de l'information : Enseignements des attentats du Bataclan et de la crise de Covid-19. In C. Rizza & S. Bubendorff, *Gérer les crises avec les media sociaux : Une approche pluridisciplinaire et professionnelle* (p. 25-38). Les Presses des Mines.
- Bubendorff, S., Rizza, C., & Prieur, C. (2019). Réseaux sociaux numériques et spatio-temporalité de l'information en gestion de crise (Working Paper No 19-SES-01; I3 Working Paper). Institut Interdisciplinaire de l'Innovation. <https://hal.telecom-paristech.fr/hal-02175338>

Camozzi, M.-L., Thubert, N., Coche, J., Bubendorff, S., Batard, R., Montarnal, A., & Rizza, C. (2020). Les media sociaux lors de la crise sanitaire de Covid-19 : Circulation de l'information et initiatives citoyennes (Working Paper No 20-SES-01). Institut Interdisciplinaire de l'Innovation. <https://i3.cnrs.fr/workingpaper/les-media-sociaux-lors-de-la-crise-sanitaire-de-covid-19/>

Castagnino, F. (2022). Les media sociaux dans un SDIS : entre épreuve de crédibilité et ressource professionnelle. In C. Rizza & S. Bubendorff, *Gérer les crises avec les media sociaux ? Une approche pluridisciplinaire et professionnelle* (Les Presses des Mines, p. 117-130).

Coche, J., Montarnal, A., Benaben, F., & Tapia, A. (2022). Automatisation du traitement des media sociaux : Opportunités et obstacles identifiés (Par C. Rizza & S. Bubendorff; p. 39-52).

Coche, J., Montarnal, A., Tapia, A., & Benaben, F. (2019). Actionable Collaborative Common Operational Picture in Crisis Situation : A Comprehensive Architecture Powered with Social Media Data. In L. M. Camarinha-Matos, H. Afsarmanesh, & D. Antonelli (Éds.), *Collaborative Networks and Digital Transformation* (p. 151-162). Springer International Publishing. https://doi.org/10.1007/978-3-030-28464-0_14

Courant, F., Biscay, J.-F., Boutillet, D., Rizza, C., Vinet, F., Weiss, K., Simoné, M., & Dehays, J. (2021). Mission sur la transparence, l'information et la participation de tous à la gestion des risques majeurs, technologiques ou naturels (No 013606-01; p. 68). Ministère de la Transition Ecologique. <https://www.ecologie.gouv.fr/sites/default/files/RAPPORT%20FINAL%20CULTURE%20DU%20RISQUE%20JUN%202021-1.pdf>

Denef, S., Bayerl, P. S., & Kaptein, N. A. (2013). Social media and the police : Tweeting practices of british police forces during the August 2011 riots. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 3471–3480. <https://doi.org/10.1145/2470654.2466477>

Dufty, N. (2012). Using social media to build community disaster resilience. *The Australian Journal of Emergency Management* (peer reviewed), 27(1). https://works.bepress.com/neil_dufty/8/

Eismann, K., Posegga, O., & Fishbach, K. (2016). Collective Behaviour, social media, and disasters : A systematic literature review. *Twenty-Fourth European Conference on Information Systems (ECIS)*.

Grant, T. J., Geugies, F. L. E., & Jongejan, P. A. (2013). Social Media in Command & Control : A proof-of principle experiment. *Proceedings of the 10th International ISCRAM Conference*, 52-61.

Hiltz, S. R., Kushma, J. Ann., & Plotnick, L. (2014). Use of Social Media by US Public Sector Emergency Managers : Barriers and Wish Lists. *Proceedings of 11th International Conference on Information Systems for Crisis Response and Management*, 600-609.

Hiltz, S. R., van de Walle, B., & Murray, T. (2011). The Domain of Emergency Management Information. In *Information System for Emergency Management* (p. 3-20). M.E. Sharpe.

Hughes, A., & Palen, L. (2012). The Evolving Role of the Public Information Officer : An Examination of Social Media in Emergency Management. *Journal of Homeland Security and Emergency Management*.

Hughes, A., & Palen, L. (2014). Social media in emergency management : Academic perspective. In J. E. Trainor & T. Subbio (Éds.), *Critical issues in disaster science and management : A dialogue between scientists and emergency managers* (University of Delaware).

Kaplan, A., & Haenlein, M. (2010). Users of the world, unite ! The challenges and opportunities of Social Media. *Business Horizons*, 59-68.

Kaufhol, M.-A., Rupp, N., Reuter, C., & Habdank, M. (2019). Mitigating information overload in social media during conflicts and crises : Design and evaluation of a cross-platform alerting system. *Behaviour and Information Technology*, 319-342.

Kavanaugh, A. L., Fox, E. A., Sheetz, S., & Yang, S. (2011, juin). Social media use by government : From the routine to the critical. *Proceedings of the 12th Annual Conference on Digital Government Research*.

Lagadec, P. (1984, août). Le risque technologique majeur et les situations de crises. *Annales des Mines*, 41-52.

Ludwig, T., Reuter, C., & Pipek, V. (2015). Social Haystack : Dynamic Quality Assessment of Citizen-Generated Content during Emergencies. *ACM Transactions on Computer-Human Interaction*.

Luna, S., & Pennock, M. J. (2018). Social media applications and Emergency management : A literature review and research agenda. *International Journal of Disaster Risk Reduction*, 565-577.

Moore, K., Tapia, A., & Griffin, C. (2013). Research in progress : Understanding how emergency managers evaluate crowdsourced data : A trust game-based approach. *Proceedings of the 10th International ISCRAM Conference*, 272-277.

Palen, L., Anderson, J., Bica, M., Castillo, C., Crowley, J., Díaz Pérez, P., Finn, M., Grace, R., Hughes, A., Imran, M., Kogan, M., LaLone, N., Mitra, P., Norris, W., Pine, K., Purohit, H., Reuter, C., Rizza, C., St Denis, L., ... Wilson, T. (2020). "Crisis Informatics : Human-Centered Research on Tech & Crises". <https://tinyurl.com/crisisinformatics>

Palen, L., Anderson, K. M., Mark, G., Martin, J., Sicker, D., Palmer, M., & Grunwald, D. (2010). A Vision for Technology-Mediated Support for Public Participation & Assistance in Mass Emergencies & Disasters. *Proceedings of ACM-BCS Visions of Computer Science*.

Palen, L., & Vieweg, S. (2008). The emergence of on line widescale interaction in unexpected events : Assistance, alliance. *Proceedings of CSCW 2008*.

Palen, L., Vieweg, S., Liu, S. B., & Hughes, A. (2009). Crisis in a Networked World : Features of Computer-Mediated Communication in the April 16, 2007, Virginia Tech Event. *Social Science Computer Review*, 467-480.

Reuter, C., Heger, O., & Pipek, V. (2013, mai). Combining Real and Virtual Volunteers through Social Media. *Proceedings of the 10 th International ISCRAM Conference*.

Reuter, C., & Kaufhol, M.-A. (2018). Fifteen Years of Social Media in Emergencies : A Retrospective Review and Future Directions for Crisis Informatics. *Journal of Contingencies and Crisis Management*, 41-57.

Reuter, C., Kaufhol, M.-A., Spahr, F., Spielhofer, T., & Hahne, A. S. (2020). Emergency service staff and social media – A comparative empirical study of the attitude by emergency services staff in Europe in 2014 and 2017. *International Journal of Disaster Risk Reduction*.

Reuter, C., Ludwig, T., Friberg, T., Moi, M., Akerkar, R., Pratzler-Wanczura, S., Gizikis, A., & O'Brien, T. (2014). Usage Patterns of Social Media in Emergencies—Emergency Management in Social Media Generation (FP 7 for Research and Technological Development D-3).

Reuter, C., Marx, A., & Pipek, V. (2011, mai). Social software as an infrastructure for crisis Management – a case study about current practice and potential usage. *Proceedings of the 8th International ISCRAM Conference*.

Rizza, C. (à paraître). Piloter l'innovation NexSIS 18-112 (Fonds d'Investissement en Etudes Stratégiques et Prospectives). Institut des Hautes Etudes du Ministère de l'Intérieur.

Rizza, C. (2020, juillet 20). Gestion de crise : Mieux intégrer la réponse des citoyens. *The Conversation*. <http://theconversation.com/gestion-de-crise-mieux-integrer-la-reponse-des-citoyens-141741>

Rizza, C. (2022a). La réorganisation d'un SDIS face à la première vague de COVID-19. In *Innovater en temps de crise: Réactions et adaptations face à la crise Covid-19*. <https://hal.archives-ouvertes.fr/hal-03713618>

Rizza, C. (2022b). Co-construire les media sociaux comme objet d'étude et outil de gestion de crise. In C. Rizza & S. Bubendorff, *Gérer les crises avec les media sociaux : Une approche pluridisciplinaire et professionnelle* (Les Presses des Mines, p. 13-22).

Rizza, C., & Bubendorff, S. (2022). Gérer les crises avec les media sociaux ? Une approche pluridisciplinaire et professionnelle (Presses des Mines). <https://www.pressesdesmines.com/produit/gerer-les-crises-avec-les-media-sociaux/>

Rizza, C., & Guimarães Pereira, Â. (2014). Building a resilient community through social network : Ethical considerations about the 2011 Genoa floods. *Proceedings of the 11th International Conference on Information Systems for Crisis Response and Management*, 294-298.

San, Y., Clarence, S., Iii, W., Thorkildsen, Z., Giovachino, M., & Director, M. (2013). *Social Media in the Emergency Management Field 2012 Survey Results*.

SAPEA. (2022). *Strategic crisis management in the European Union : Improving EU crisis prevention, preparedness, response and resilience (Evidence Review Report No 10; p. 282)*. Science Advice for Policy by European Academics.

St Denis, L., Palen, L., & Anderson, K. M. (2014). Mastering social media : An analysis of Jefferson County's communications during the 2013 Colorado floods. *Proceedings – 11th International Conference on Information Systems for Crisis Response and Management*.

Stallings, R. A., & Quarantelli, E. L. (1985). Emergent Citizen Groups and Emergency Management. *Public Administration Review*, 93-100.

Tapia, A., Moore, K., & Johnson, N. (2013). Beyond the Trustworthy Tweet : A Deeper Understanding of Microblogged Data Use by Disaster Response and Humanitarian Relief Organizations. *Proceedings of the 10 th International ISCRAM Conference*, 770-779.

Vieweg, S., Hughes, A. L., Starbird, K., & Palen, L. (2010). Microblogging during two natural hazards events : What twitter may contribute to situational awareness. *Proceedings of the SIGCHI conference on human factors in computing systems*, 1079–1088.

Wendling, C., Radish, J., & Jacobzone, S. (2013). *The Use of Social Media in Risk and Crisis Communication (Working Paper No 24; OECD Working Papers on Public Governance)*. OECD Publishing. <https://doi.org/10.1787/5k3v01fskp9s-en>

Zettl, V., Ludwig, T., Kotthaus, C., & Skudelny, S. (2017). Embedding Unaffiliated Volunteers in Crisis Management Systems : Deploying and Supporting the Concept of Intermediary Organizations. *Proceedings of the 14th ISCRAM Conference*, 421-431.