

RESEARCH REPORT

Leveraging Social Media and Crowdsourcing in Disaster Risk Management Processes in Europe

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LINKS

Strengthening links between technologies and society
for European disaster resilience



About the project

LINKS “Strengthening links between technologies and society for European disaster resilience” is a comprehensive study on disaster governance in Europe. In recent years, social media and crowdsourcing (SMCS) have been integrated into crisis management for improved information gathering and collaboration across European communities. The effectiveness of SMCS on European disaster resilience, however, remains unclear, due to the use of SMCS in disasters in different ways and under diverse conditions. In this context, the overall objective of LINKS is to strengthen links between technologies and society for improved European disaster resilience, by producing sustainable advanced learning on the use of SMCS in disasters. This is done across three complementary knowledge domains:

- Disaster Risk Perception and Vulnerability
- Disaster Management Processes
- Disaster Community Technologies

The project will develop a framework through an iterative process and bring together 15 partners and two associated partners across Europe (Belgium, Denmark, Germany, Italy, Luxembourg, the Netherlands) and beyond (Bosnia & Herzegovina, Japan) to understand, measure and govern SMCS for disasters. The LINKS Framework consolidates knowledge and experiences on the uses of SMCS into useful products for relevant stakeholders. It will be developed and evaluated through five practitioner-driven European cases representing different disaster scenarios (earthquakes, flooding, industrial hazards, terrorism, drought), cutting across disaster management phases and diverse socioeconomic and cultural settings in four countries (Denmark, Germany, Italy, the Netherlands). Furthermore, LINKS sets out to create the LINKS Community, which brings together a wide variety of stakeholders, including first-responders, public authorities, civil society organisations, business communities, citizens, and researchers across Europe, dedicated to improving European disaster resilience through the use of SMCS.



This project has received funding from the European Union’s Horizon 2020 Research and Innovation Programme under the Grant Agreement No. 883490



Document Information

Grant Agreement No. 883490
Project Starting Date 1 June 2020 (42 months)

KEYWORDS

social media, crowdsourcing, disaster risk management, resilience, organisational learning, technology governance, participation, EU

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SUGGESTED CITATION

Nielsen, A.B., Raju, E., Landwehr, D.R., Nicolai, J.E., Patil, T. & Andersen, N.B. (2023). Leveraging Social Media and Crowdsourcing in Disaster Risk Management Processes in Europe. LINKS: Strengthening links between technologies and society for European disaster resilience, funded by the European Union’s Horizon 2020 Research and Innovation Programme (No. 883490).

Foreword

The number of disasters has nearly doubled over the last 20 years for many reasons, including runaway climate change. At the same time, factors such as the deterioration of ecosystems, rapid urbanization, and growing poverty and inequality, are lowering the capacity of human systems to withstand hazards that are occurring more frequently and with greater intensity. These trends combined make it crucial that we prioritize investment in adaptive capacity, foresight and resilience building through an all-of-society approach. This includes making the best use of all means of communication to reach at-risk people and reach all those who are affected.

To that end, social media has grown to become an indispensable part of many people's lives, and increasingly, a primary source of information dissemination and consumption. How this capability can be leveraged to enhance disaster resilience is an important question.

This is especially relevant in the context of the ongoing Early Warnings for All initiative, which was launched in 2022 by the UN Secretary-General and aims to create universal early warning coverage by the year 2027. Currently, just over half of countries have operational early-warning systems in place and even fewer have legislation in place to connect these systems to preparedness and response plans.

That is why I welcome the publication of this report and thank the research team behind the LINKS project for producing it. This is a timely report that points towards innovative ideas to put people at the heart of resilience building. Its findings and recommendations can help organizations reflect on how they use social media and crowdsourcing in disasters and empower people to be active in reducing their risk. It is only when we put people at the heart of disaster risk reduction efforts that we can build resilience for all.

Mami Mizutori

Special Representative of the UN Secretary-General for Disaster Risk Reduction
Head of the United Nations Office for Disaster Risk Reduction

Executive Summary

In a changing technological landscape to address disasters, and with increasing diversity of stakeholders in disaster risk management, we need to develop new pathways of using social media and crowdsourcing more effectively. Going forward, there is a need to deepen our understanding on the role of social media and crowdsourcing in disasters in various socio-political contexts and the intra-organisational dynamics. Further, there is a need to focus on more people-centred social media and crowdsourcing research; and a strong need to fill the gaps on ethics, privacy and normative issues; and efforts must focus on all aspects of disaster risk management.

The following questions are addressed in the report:

- How are European disaster management organisations applying social media and crowdsourcing in disaster management processes?
- What are the limits and potentials of this application associated with institutional resilience?
- application of social media and crowdsourcing in disaster management processes be further strengthened?

The report is based on findings from four different European countries: Denmark, Germany, Italy and the Netherlands. The empirical research has centred around five hazard-specific cases: Flooding (Copenhagen region, Denmark); Earthquake (Province of Terni, Italy), Terrorism and Drought (Germany) and industrial hazards (South Limburg, The Netherlands).

The findings highlight a widespread use of social media and crowdsourcing in European or-

ganisations. However, with a far greater focus on social media than on crowdsourcing activities (see also: Fonio et al., 2022; Lüke et al., 2022; Lüke & Habig, 2023) and predominantly in preparedness and response. Furthermore, many of these activities are one-directional (e.g. organisations communicating to citizens) and often informal and ad-hoc based. The main limits for further institutionalising social media and crowdsourcing in disaster management processes are identified as being:

- The lack of backup and acknowledgement from decision-makers on the strategic level to prioritise social media and crowdsourcing in the organisation. This challenge is often emphasised by missing substantial plans, procedures, and guidelines for social media use.
- Operational tasks and communication tasks are often regarded as differentiated and separated tasks within the organisation;
- The implementation of new methods, tools and technologies is considered "risk-taking" in some organisations where existing structures and 'ways of doing' become barriers to the use of social media and crowdsourcing;
- Resource scarcity in organisations is a central barrier to building the required capacities to work inclusively with social media and crowdsourcing in disasters;
- In many organisations working with disasters, citizens are treated as a homogeneous group with identical needs, equal access to disaster management processes, communication channels, platforms and media outlets and similar perceptions of risks.

We thus suggest a turn towards placing people and power at the heart of questions of social media and crowdsourcing technologies. Instead of 'just' placing social media and crowdsourcing in the centre of our attention, we should focus on the power shifts that these technologies produce, the contexts in which they are supposed to be applied, as well as on the social and cultural condition that coproduce the outcomes of social media and crowdsourcing in disaster risk management processes. Understanding resilience as the capacity to respond to absorb disasters as well as the capacity to formulate alternative pathways moving forward, the varying capacities to reduce and deal with risk are conditioned by decisions taken across all aspects of disaster risk management. As such, we need to turn our attention to long-term recovery and prevention of disaster risk creation to get the full picture.

We present three main recommendations to address the challenges highlighted:

Recommendation I:

Increase formalisation of social media and crowdsourcing in the organisation.

Recommendation II:

Allocate resources to social media and crowdsourcing activities.

Recommendation III:

Diversify and target communication.

To support organisations in strengthening the application of social media and crowdsourcing in disaster risk management processes, the LINKS project has developed a range of resources integrated into an online platform, the LINKS Community Center¹. In this report, we highlight three of these resources:

→ **The Social Media and Crowdsourcing Guidelines Library** provides a comprehensive overview of and navigation system to relevant guidelines, standard operating procedures and legal frameworks for applying social media and crowdsourcing in disasters;

→ **The Including Citizens Handbook** presents a set of learning modules for organisations wanting to consider citizens in their disaster management processes. This includes questions related to unaffiliated volunteers, targeted communication and awareness, accessibility and mobilisation of citizens;

→ **The Resilience Wheel** serves as a practical tool through which organisations can discuss and assess current and future uses of social media and crowdsourcing within their organisation and across organisations.

It is important to note that multiple partners have contributed to the creation of the presented results throughout the project. This report contributes to enhancing the understanding of how social media and crowdsourcing are applied in European disaster risk management processes. Furthermore, it identifies the limits, potentials, and areas for improvement in the utilisation of these tools and technologies in disaster risk management. The dissemination of these findings aims to support organisations working in disaster risk management at both national and international levels.

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List of Acronyms

DRR	Disaster Risk Reduction
EU	European Union
GDPR	General data Protection Regulation
ICT	Information and Communication Technologies
NGO	Non-Governmental Organisation
SFDRR	Sendai Framework for disaster risk reduction
SMCS	Social Media and Crowdsourcing
SOP	Standard Operation Procedure

Definition of Key Terms

Social Media	<p>A group of Internet-based applications that build on the ideological and technological foundations of the Web 2.0 and that allow the creation and exchange of user-generated content (UGC) Forms of media that allow people to communicate and share information using the internet or mobile phones.</p> <p>Web 2.0 is the Internet we are familiar with today in which people are not just consumers of information but producers of knowledge through social networking sites and services like Facebook, Twitter and Instagram.</p>
Crowd Sourcing	<p>Describes a distributed problem-solving model where the task of solving a challenge or developing an idea gets “outsourced” to a crowd. It implies tapping into “the wisdom of the crowd”.</p> <p>In the context of LINKS, crowdsourcing involves using ICTs (Information and Communication Technologies). For example: crowdsource mapping in crisis zones. Digital volunteers/communities offer free services by mapping critical information related to disaster-affected zones.</p>
Disaster Governance	<p>Disaster governance refers to the way in which multiple actors across levels and sectors (public authorities, civil servants, citizens, media, private sector, and civil society actors) coordinate and collaborate in order to manage disaster risks.</p>
Disaster Resilience	<p>The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure.</p>
Institution	<p>Institutions are social structures that are composed of regulative, normative and cultural-cognitive elements that provide stability and meaning to social life. Institutions provide the ‘rules of the game’ and define the available ways to operate by discouraging, constraining or encouraging given behavioural patterns.</p>
Sustainable Advanced Learning	<p>A maintainable and evolving collection of knowledge and best practices produced for and by relevant stakeholders. Sustainable advanced learning entails a cognitive dimension (the capability to gain in-depth knowledge of crises and crisis response) and a social dimension (the ability to implement the knowledge into new practices).</p>

Definitions are retrieved from the LINKS Glossary: <https://links-project.eu/glossary/>

1

Introduction

How can social media and crowdsourcing help with building disaster resilience?

Every disaster highlights the numerous actors ranging from public to private and non-governmental organisations involved. Given Europe's diversity in terms of geography, political and legal landscapes, this is also reflected in how different countries and organisations respond to disasters and deal with risk differently. As across the globe, Europe is not immune to changing nature of disasters occurring from changing climate and other natural hazards, technical hazards, and security risks. The COVID-19 pandemic highlighted yet again the need to consider intersectional and transboundary aspects of disaster risks and how many disasters can occur at the same time. Further, the example of the onset of an early heatwave in Spain currently in 2023, clearly highlights the need for adapting preparedness, response and recovery strategies. In this context, there has been an increasing focus and push in using new technologies of different kinds in disaster situations. While the use of technology is increasing, there is a very limited nuanced discussion on how this relates to the people affected by disasters and how this impacts and relates to various governance processes.

The Sendai Framework for Disaster Risk Reduction (SFDRR) clearly emphasises the need for not only understanding disaster risk but also communicating and acting on disaster risk reduction (DRR). While the Sendai was written in 2015, it mentions social media only twice. However, the significance and role of social media and crowdsourcing, i.e. technologies that leverage web 2.0 platforms and crowd-based problem-solving approaches respectively, have been shown during many disasters in the past decade. The European Forum for Disaster Risk Reduction mentions the need for "inclusive and collaborative systems for governance and decision-making" (UNDRR, 2021). However, the majority of the focus of social media, crowdsourcing and other technologies has primarily focused on disaster response and less on governance itself. We highlight the need for a paradigm shift in this regard if social media and crowdsourcing platforms and technologies must play a role in building disaster resilience.

Social media and crowdsourcing can play a vital role in building disaster resilience. By leveraging these tools, government officials, NGOs and private sector actors can communicate more effectively with citizens, and disseminate information about potential disaster risks and how to deal with these risks. Social media and crowdsourcing can also facilitate community engagement and participation, enabling citizens to play an active role in building resilience in their communities. Crowdsourcing can be used to collect data from citizens about surroundings, location and extent of damage or potential damage that can be caused by disasters. This information can then be used to develop a more effective disaster response and inform future preparedness and risk reduction strategies.

1.1 The Role of Social Media and Crowdsourcing in Disasters

The proliferation of social media and crowdsourcing in disaster risk management has significantly changed since the first technologies and platforms were used in the early 2000s (Reuter & Kaufhold, 2018).

The potential of SMCS

The potential of SMCS for disaster governance became evident during the world response to the 2010 Haiti earthquake. The Ushahidi Haiti Project was initiated by a group of volunteers with the aim of quickly producing a crisis map assisting boots on the ground in response and early recovery (Morrow et al., 2011; Poljansek et al., 2017).

The Haiti earthquake represents a turning point for the application of crowdsourcing and crisis mapping in disaster management processes.

However, in Europe, agencies and organisations working with disaster risk management have just recently started to integrate these technologies and platforms into strategies, operational practices and routines. Our first literature review conducted in 2020 yielded a majority of studies, highlighting the need for further first-hand data collection. The search showed that there are few multi-site, comparative case studies compared to a high rate of single case studies and experimental studies. It also revealed a significant bias towards North American and South-east Asian contexts, and associated types of hazards and social media and crowdsourcing platforms (Nielsen & Raju, 2020; Nielsen et al., 2021). Most studies focused on preparedness and response activities, ignoring recovery and prevention efforts, and favoured technical and implementation issues over questions of power dynamics, sociocultural conditions and contextual sensitivities.

Since our first review on SMCS in disasters in 2020, the COVID-19 pandemic has created much interest in the role of social media and crowdsourcing in disasters. The COVID-19 pandemic was a slow-onset disaster, as it lasted three consecutive years and unfolded into multiple variants, mutations and waves of outbreaks. This allowed researchers to examine and compare social media and crowdsourcing use in disaster risk management at different points in

the COVID-19 timeline (Rullo & Nunziata, 2021), i.e.: prevention and mitigation of future outbreaks, which contrasted with the overwhelming focus on response identified in earlier literature. Nevertheless, social media and crowdsourcing continue to be largely used by governments as a live information channel, rather than a preventative tool (Zamarreño-Aramendia et al., 2020) and a resource for inclusive disaster risk reduction.

The COVID-19 pandemic also created a surge of intention towards particular geographical settings. China and Italy are dominant contexts to study social media and crowdsourcing in the more recent literature, which can largely be explained by their unique experience as the first epicentres of the COVID-19 pandemic. An important part of the research has focused on COVID-19-related fake news and misinformation; as a novel virus generating high levels of uncertainty and a pressing need for information, and sparking a surge in digital false information across the globe (Zarocostas, 2020). The ethical aspects of governments' attempts at reducing the spread of fake news by regulating social media and crowdsourcing were studied in various contexts; including Indonesia where the government implemented strict internet shut-downs (Rahman & Tang 2022), China (Ruan et al., 2020; Chang et al., 2022) and other EU and international settings (Vese, 2022). This reflects a change in the trend in many of the studies published in the past three years towards critical questions of power structures, accessibility, accountability, inequality and government misuse of social media and crowdsourcing.

In this report, we highlight that despite the increasing spread of social media and crowdsourcing in disaster risk management in Europe, these technologies and platforms continue to challenge most organisations working with disaster risk management. Finding effective solutions for disaster risk is becoming increasingly difficult given the constantly changing technological landscape and global risk uncertainties.

This situation demands that diverse organisations not only respond and coordinate their actions but also collaborate and involve citizens in decision-making processes.

Overall, we identify a need for broader recognition and engagement with social media and crowdsourcing before, during and after a disaster. Many organisations are hesitant to engage with both potentials and challenges related to the use of these technologies and platforms although they are important channels for information dissemination and mobilisation among citizens. Moreover, organisations working with disasters need to acknowledge citizens as resources in disaster risk management. Social media and crowdsourcing have the potential to support such inclusive processes, which allow for targeted dissemination of information, participatory approaches and access to large amounts of valuable data.

1.2 Scope of the Report

In 2020, we set out with an ambition to understand what role social media and crowdsourcing play in disaster risk management, including charting new pathways for efficient use in disasters. The report addresses three main research questions:

- How are European disaster management organisations applying social media and crowdsourcing in disaster management processes?
- What are the limits and potentials of this application associated with institutional resilience?
- Following the first two questions, how can the application of social media and crowdsourcing in disaster management processes be further strengthened?

The report provides organisations working with disasters, a state of the art and novel pathways to use social media and crowdsourcing in their work. In the context of the increased use and application of social media and crowdsourcing

technologies and platforms, we critically explore and examine the current ways in which processes, tools, mechanisms and practices can strengthen resilience by relying on social media and crowdsourcing.

The first part of the report considers the drivers of resilience in the context of social media and crowdsourcing: collaboration within and across organisations, citizen inclusion and digital literacy. The approach provides a holistic view of the conditions needed for strengthening disaster resilience. For all three drivers, we identify the most important capacities that organisations should build to enhance their ability to manage disaster risk through social media and crowdsourcing. Local conditions vary greatly across different organisations and geographies – experience, legal frameworks, risk landscapes and finances to name a few. Accordingly, understanding the drivers and capacities in context is paramount for assessing the local value of the capacities.

The second part, the findings chapter, presents an overview of our existing knowledge of how social media and crowdsourcing are applied in disasters. It considers the challenges we have identified in existing research on the topic as well across five hazard-based case studies (Denmark - Floodings, Germany – Droughts & Terrorism, Italy - Earthquakes and The Netherlands – Industrial Hazards) conducted in Europe. We use the three drivers for disaster resilience to discuss experiences, practices and barriers to integrating social media and crowdsourcing in disaster management processes.

The third part addresses the challenges identified in the findings of the report and considers how social media and crowdsourcing can be further strengthened in disaster risk management processes. These may support different organisations in finding a pathway for applying social media and crowdsourcing to enhance disaster risk management processes across the three drivers.



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1.3 How Did We Make This Report?

This section provides a brief overview of the research and co-creation process over three years. The report is an output of a large Horizon2020 project, LINKS- “Strengthening links between technologies and society for European disaster resilience” granted by the European Union. The results presented in this report are the outcome of three years of in-depth research into the use of social media and crowdsourcing in disaster management processes.

Data was collected and analysed through an iterative and organic process involving researchers and disaster professionals in four different European countries: Denmark, Germany, Italy and the Netherlands. The empirical research has centred around five hazard-specific cases: Flooding (Copenhagen region, Denmark); Earthquake (Province of Terni, Italy), Terrorism and Drought (Germany) and industrial hazards (South Limburg, The Netherlands) (see Clark et al., 2022).

The results presented in this report have been a process of organic development as presented in Figure 1. A series of deliberations, debates, discussions, workshops, and data collection in many forms has led to this output with immense learnings, insights, identification of gaps and potential pathways for greater use of social media and crowdsourcing for disaster resilience.

The case assessments consisted a set different research activities described below and presented in Figure 2.

Learning from scientific literature, reports and guidelines: Knowing that social media and crowdsourcing have been used since early 2000 in disaster risk management, we conducted a comprehensive literature review. This comprised all the research, guidelines and reports we could find on the experience of using social media and crowdsourcing in disasters as well as on resilience-building in the context of technological developments (Nielsen & Raju, 2020). This led to the first conceptual understanding of what drives resilience in the context of applying social media and crowdsourcing as well as a thorough understanding of the gaps and needs for further research. In 2023, we updated the academic literature review following the years of the COVID-19 Pandemic, which altered the understanding and application of social media and crowdsourcing in disasters.

For both rounds of reviews of the academic literature, we used a number of databases to search for academic papers: Scopus, Web of Science, and REX. These databases were specifically selected for their relevance to the research field under study and comprehensive collection of journals. Sources covered in this literature review include exclusively academic articles, written in English and published between 2010 and 2022. More than 250 academic papers were included in the final list of literature.

Based on our first literature review, we drafted a set of research questions allowing us to explore and examine current uses of social media and crowdsourcing in the five cases. Details on the different cases can be seen in Clark et al. (2022). Overall, the study is based on 54 interviews and 219 responses across the case countries and 284 across Europe conducted between November 2021 and March 2022. The survey is not representative but provides insight into how vari-

Figure 1: Process overview



ous organisations make use of social media and crowdsourcing in disasters.

Moreover, each case team contributed to exploring local particularities and aspects of social media and crowdsourcing use to ensure we captured the dynamism of the field. This local assessment took shape as additional interviews, focus groups and surveys (see Nielsen et al., 2021; Lüke et al., 2022, for more details on this process).

In a second round of case assessments, the objective was to explore findings from the first case assessment in more depth and to test the

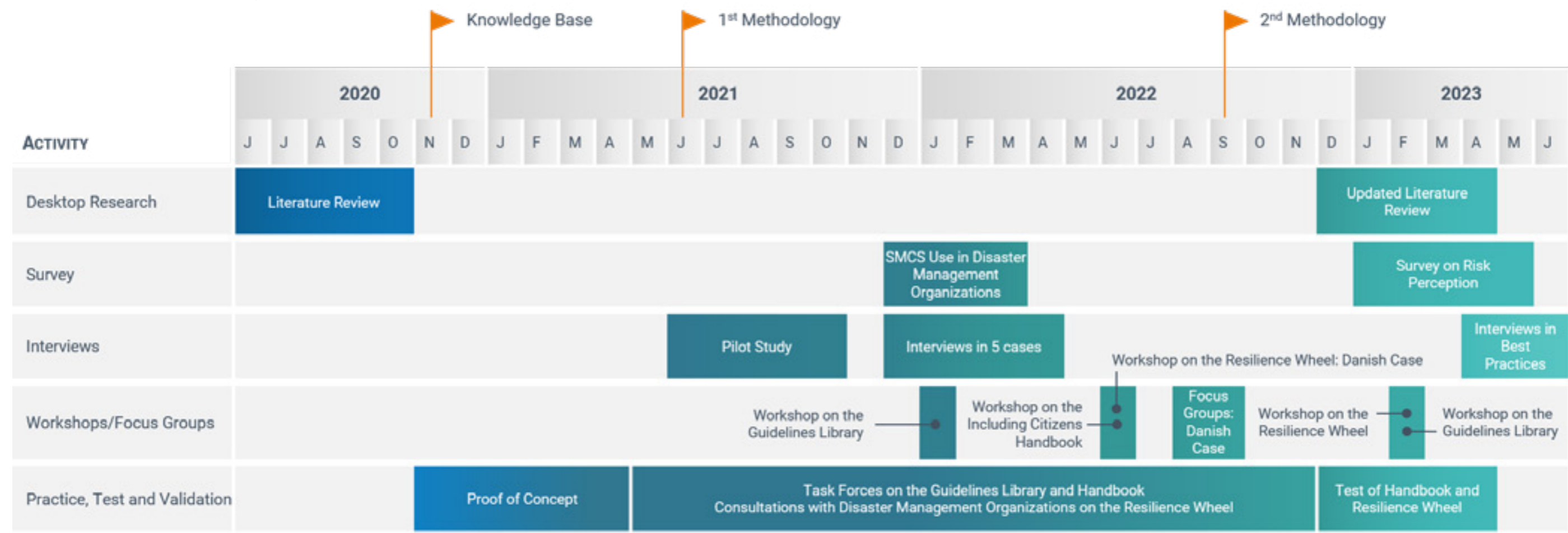
resources that we have included in this report (see Clark et al., 2022). This included a long range of activities – from classical research methods such as surveys and interviews to more practitioner-based co-creation approaches to testing and evaluation within organisations. Several workshops were held to support the translation of the results into the resources we present in this report. More details on these tools are included under the description of the resources in Section 5.

Co-creating with organisations working with disaster risk management: Insights from the partners working professionally with disaster

risk have been instrumental in guiding and testing the research and innovation throughout the project. These processes have taken shape as working groups or “task forces”, testing within organisations as well as workshops addressing proof of concept, creating prototypes and discussions of more developed outputs. The task-forces on the Social Media and Crowdsourcing Library and the Including Citizen Handbook, the LINKS project Community Workshops and the LINKS Advisory Committee meetings have been of paramount importance to these co-creation processes. External partners to the consortium, such as local government and NGOs, were consulted in the co-creation process.

The results presented in this report in the next sections are the outcome of these vast processes of data collection and co-creation. The different approaches served to understand the challenges of using social media and crowdsourcing in disasters from different viewpoints, and together they help us paint the picture. An overview of the main activities can be found in Figure 2.

Figure 2: Research activities



Source: Authors

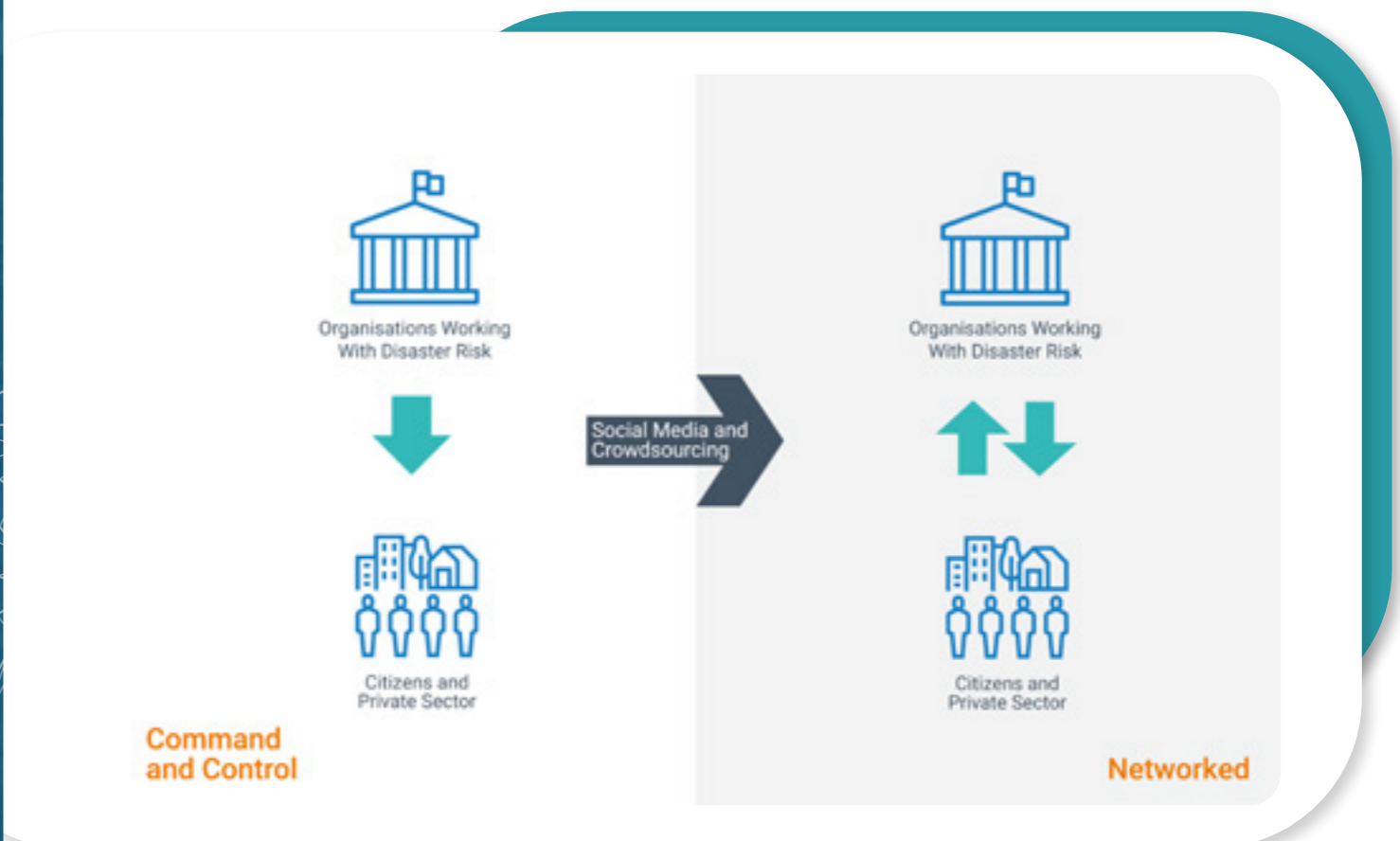
2 Conceptual Framework

How to build resilient disaster risk management processes in organisations using social media and crowdsourcing

Managing disasters is a complex task requiring the right knowledge, resources and experience. Social media and crowdsourcing may enable and alter disaster resilience if applied with sensitivity to the organisation's structures and procedures as well as the context in which efforts are targeted. To understand how the use of social media and crowdsourcing may strengthen disaster resilience, we first need to understand what creates resilient disaster risk management processes.

In a nutshell, social media and crowdsourcing hold the potential of transforming communication and collaboration between organisations working with disasters and citizens thereby fostering more participative and inclusive processes and enhancing disaster resilience. Resilience in this context refers to the ability to recover from disturbances and adapt to changing conditions. Social media and crowdsourcing influence interaction flows between organisations and citizens in two ways, through a shifting and a bridging mechanism.

Figure 3: Social media and crowdsourcing support a shifting mechanism



Source: : Adapted from Nielsen and Raju (2020). The arrow pointing from organisations to citizens and private sector actors reflects the move of “power to the people” in disaster management enabled by social media and crowdsourcing.

Social Media and Crowdsourcing Support a Shift of Information Flows between Organisations and Citizens

Social media and crowdsourcing change how citizens and other civil society actors get information and organise various disaster-related activities (Albris, 2018a, 2018b; Palen & Hughes, 2018). Social media and crowdsourcing change communication flow as they allow for new ways of disseminating and sharing information (Boin & Lodge, 2016; Bunker et al., 2013; Crowe, 2011; Reuter et al., 2011) as well as new ways for people to seek out information, communicate and engage in collaborative activities (Crowe, 2011; Dethridge & Quinn, 2016).

This citizen empowerment challenges the traditional top-down, command and control approach and promotes a more horizontal, collaborative approach to disaster risk management (Haworth et al., 2018). This shifting mechanism is shown in Figure 3.

Social Media and Crowdsourcing May Serve as a Bridge between Disaster Management Organisations and Citizens

Voluntarism and self-organisation play a crucial role in disaster risk management. However, the coexistence of official processes and independent efforts may lead to coordination issues and liabilities. Social media and crowdsourcing have the potential to bridge these processes that exist and unfold independently by creating a medium where actions of people, communities and groups that take responsibility and the formal disaster risk management processes can be coordinated. Figure 4 illustrates this mechanism of “bridging the actors” who partake in disaster risk management processes through social media and crowdsourcing technologies and platforms.

Figure 4: Social media and crowdsourcing as a bridging mechanism



Source: Adapted from Nielsen and Raju (2020)

The Resilience Wheel: Linking Organisational Processes with Citizens and Technologies for Greater Disaster Resilience

What does an organisation need to do to harvest the potential of both shifting and bridging mechanism? We conceptualise resilience through three drivers reflected in the Resilience Wheel. The Resilience Wheel is conceptualised as an approach that allows us to better understand what needs to be taken into account when using social media and crowdsourcing in disaster risk management processes. It provides a pathway to simplify the complexity of including citizens in disaster risk management through technology into a set and subset of factors through which the link between management processes, civil society and technology can be understood.

The Wheel consists of two layers: a set of drivers that reflect the most important focal points to alter resilience building through social media and crowdsourcing. Connected to each driver is a set of sub-themes that describe the needed capacities for building disaster resilience through social media and crowdsourcing in an organisation.

The drivers are:

Cooperation within and across organisations refers to the formal and informal procedures that are put in place in and across organisations to prevent, prepare for, respond to and recover from a disaster. The quality of these processes relates to internal and external collaboration procedures, the consistency of communication across organisations, the strategic integration of social media and crowdsourcing in official procedures, how organisations learn from experiences and whether information exchange takes place across departments and organisations.



Digital literacy refers to the skills and procedures an organisation implement to make use of social media and crowdsourcing. It comprises everything from technical competencies that one needs to collect and analyse crowdsourced data to legal competencies related to data protection and ethics. Moreover, this driver encompasses the ability to contextualise technology within the organisation. Different models of governance contribute to different uses of social media and crowdsourcing in disaster risk management. Understanding the political and institutional context when using social media and crowdsourcing is of paramount importance.

The inclusion of citizens refers to processes and practices put in place to facilitate collaboration with citizens through social media and crowdsourcing. This encompasses the ability to target information to diverse citizen groups, an active two-way engagement with citizens, a structure that allows everybody to participate despite different accessibility issues and processes that allows information to be trusted on both ends.

Different models of governance contribute to different uses of social media and crowdsourcing in disaster risk management. It must be noted that disaster risk governance happens in visible, invisible, formal and informal ways (Hilhorst et al., 2020). Therefore, we need a deeper understanding of the local, political, organisational and cultural contexts that organisations operate in to promote successful use and implementation of social media and crowdsourcing in disaster management processes.

We use the Resilience Wheel across the five European cases to gain a deeper understanding of how social media and crowdsourcing are currently used and how this can improve in disas-

ters (see Nielsen et al., 2021 for methodology). Moving from concept to practice, the Resilience Wheel has also been developed into a practical tool for organisations. This is presented in section 5.

In the next section, we create an overview of our findings on disaster risk management processes and the role of social media and crowdsourcing. It provides the bases for discussing why social media and crowdsourcing are included or not in disaster risk management processes, their limitations and the contextualized interactions between technology and political developments where technical choices for disaster resilience are made.

Figure 5: The Resilience Wheel



Source: Authors (Nielsen & Raju, 2020; Nielsen et al, 2021)
Based on The Rockefeller Foundation and Arup (2014)

How was the Resilience Wheel Developed?

Theory:

The Wheel is based on a systematic review of all existing research linking social media and crowdsourcing with disaster risk management (Nielsen & Raju 2020).

Empirics:

The Wheel was co-designed with a wide range of disaster management organisations across Europe. Drivers and characteristics were based on and further informed through qualitative expert interviews across various hazard scenarios, organisation types and socio-political contexts (Nielsen et al., 2021; Lüke et al., 2022).

Practice & Impact:

The City Resilience Framework developed by the Rockefeller Foundation and Arup for the 100 Resilient Cities Network influences the Wheel. Yet, developed, tested and translated to fit the specific aim of linking technology and management processes aiming at increasing disaster resilience (The Rockefeller Foundation & Arup, 2014).



3 Findings

Key challenges in implementing social media and crowdsourcing in disaster risk management

In this section, we bring together all the findings from our desk studies, interviews, and surveys across the five cases in the project, using the three drivers of the Resilience Wheel.

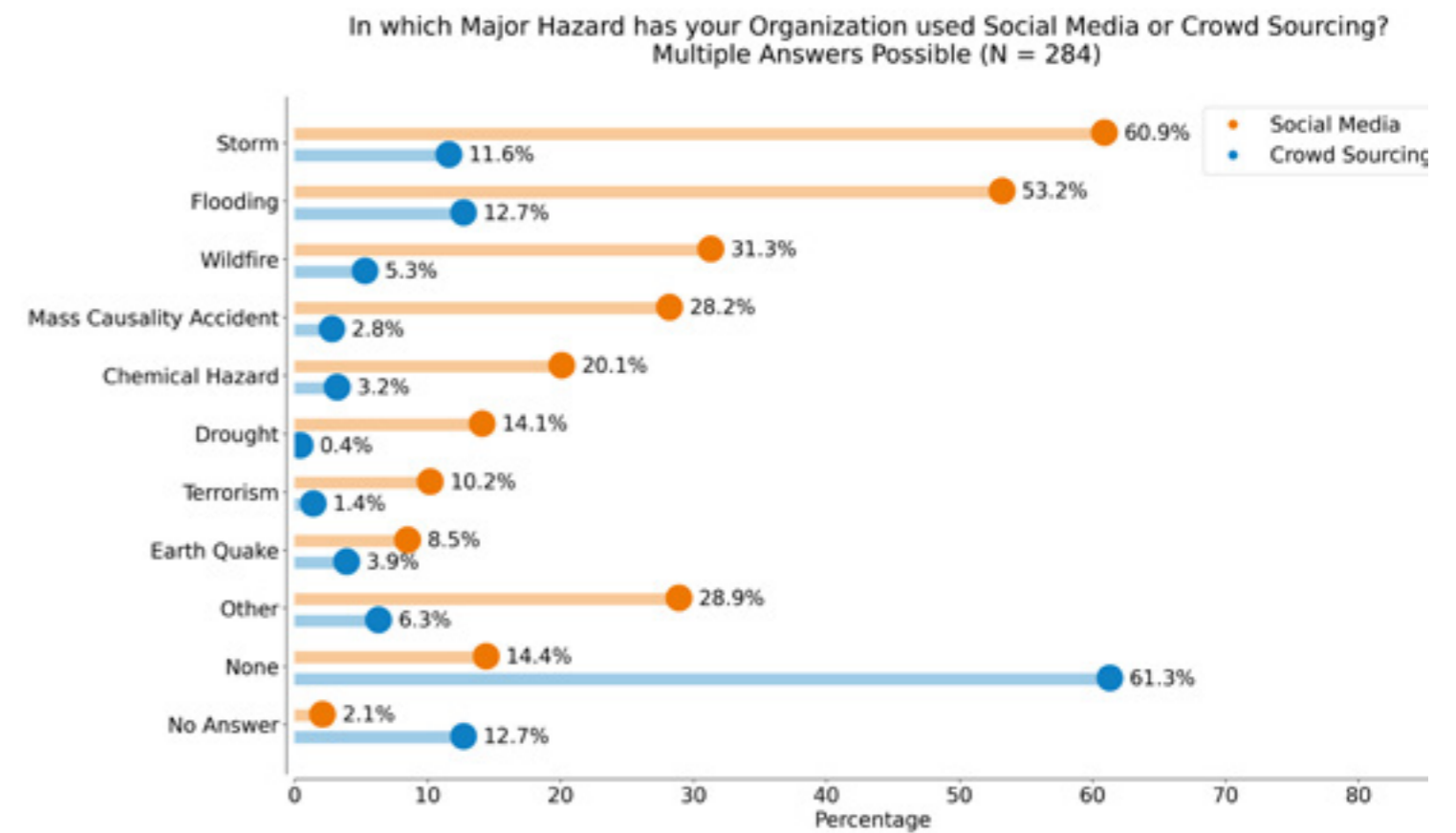
benefits of using social media and crowdsourcing in disasters are vast, our research shows that organisations are often reluctant to explore their full potential (see also Harrison & Johnson, 2019).

3.1 Cooperation within and across Organisations

Central to our understanding of the role of social media and crowdsourcing in disasters is the formal use of these tools in organisations tasked with reducing disaster risk. While the reported

Our cross-national European survey shows that many organisations working with disasters, in general, apply social media to reach citizens across various types of hazards. Crowdsourcing is on the contrary a less applied tool while some participants did provide some examples of crowdsourcing activities.

Figure 6: Social media and crowdsourcing use in European disaster management organisations



Source: LINKS online survey (see D6.4).

Our survey respondents assess crowdsourcing as a potentially relevant tool for disaster risk management, but its practical application is not widely adopted.

There seem to be several barriers to a comprehensive use of social media and not least crowdsourcing. First, while there are differences between organisations, representatives from different organisations express that they **lack backup and acknowledgement from decision-makers on the strategic level to prioritize social media and crowdsourcing use.**

Second, organisations need to navigate large amounts of complexity when preparing for, responding to and recovering from a disaster. This requires very tight collaboration and coordination of operations in disaster response, both within their organisation and in relation to other organisations. It appears that the emergency **operations and communication tasks are regarded as separate activities without full integration.** Respondents also refer to the need to follow tight procedures (SOPs) and guidelines during operations (especially law enforcement agencies), and that these tasks tend to require all available resources in the organisation in a crisis:

“Interviewer: If we then move on to the response phase, is it so different around how one looks at the importance of having procedures?”

Respondent: This is our contingency plan, that is, they are very clearly defined what triggers and what to do, who should be informed and what should be communicated, etc. So, there is a clear plan for all types of supply and all types of incidents, big and small” (Government agency, Denmark)

Being credible in their communication is also a big concern for many organisations. To deal with this, employing a “one-voice” policy is a prominent approach, leaving less room for inclusive communication strategies.

Third, disasters are characterised by a lack of a common situational picture and uncertainty. Organisations have a strong awareness that the information and messages they convey are correct through any medium. They are very concerned if they are spreading wrong or even false information to large groups of citizens threatened by a hazard, as it can potentially harm people and that weakens the credibility of the organisation, which potentially can damage its reputation in the long run. In disasters, much of the coordination efforts are devoted to the tasks of validating information, internally and between organisations to avoid the dissemination of incorrect updates (Cheong & Babcock, 2021). They express a strong and dominant need to focus on running a smooth operation with minor flaws, and **the implementation of new methods, tools and technologies is considered risk-taking by some.** Integration and inclusion of information from outside is a potential additional threat in an already threatening situation:

“In relation to the small gain it has, we do not use it in alert situations, our resources are to be focused and used in places where it is useful. We have a LinkedIn profile too, but again a bit the same, we use it when the situation is under control afterwards” (Government agency, Denmark)

Fourth, **few are guided by substantial plans, procedures, and guidelines for social media use,** compared to the number of plans for running emergency operations. The use of social media and crowdsourcing is to a large degree an ad-hoc activity.

It is important to note, that the description above is characterised by references to the use of social media and crowdsourcing in preparedness and response. There is however a need for a distinctive focus on the use in recovery and disaster risk reduction. The lack of focus and resources devoted to these processes is striking.

Finally, **learning and evaluation** from experiences with the use of social media and crowdsourcing is not a theme that organisations are very

explicit about. Evaluation processes are important for learning from previous practices and should thus be integral to all disaster risk management processes.

Several of our respondents state that evaluations are carried out following big disasters and less often following disasters with lesser impact. Organisational learning that pushes organisations towards higher integration of social media and crowdsourcing seems to be complicated for several reasons. Examples include staff turnover, young staff members being more

eager to apply new technologies where decision makers are more conservative and reluctant, and there are constant and rapid changes in the social media and crowdsourcing technological landscape. This leads to situations where the definition of formal procedures, evaluations, and training on procedures for social media use, and social media crowdsourcing, are supplemented with ad hoc activities taking place among different stakeholders at local levels. Such knowledge does not always transfer across different organisations.

Evaluation processes

The guideline developed by the EmerGent project (Gizikis et al., 2017), point to both quantitative and qualitative for evaluating the data gained through social media.

Quantitative assessments can be done with several analytical tools to understand metrics and indicators (e.g. fans, visits, likes or posts on Facebook). For Twitter, information such as followers, tweets, retweets and the change of followers before and after the event may provide interesting information for disaster management processes. Which channels performed better, and which platforms reached most people? Qualitative measures may be used to understand the performance more in-depth. What is the feedback received by users?

This guideline can be found in the [Social Media and Crowdsourcing Guidelines Library](#)



3.2 Digital Literacy

For implementing social media and crowdsourcing within an organisation, digital literacy, defined by capacities related to contextual, legal and technical skills, is a necessary pre-requisite.

Resource scarcity and prioritisation of social media and crowdsourcing are central barriers to capacity development for processing information in a timely manner during response and allocating the appropriately trained staff to different tasks (Knox, 2023; Behl et al., 2022).

Many organisations, large and small, lack the (trained) personnel in legal and technical skills to implement social media and crowdsourcing in their organisation. Missing expertise on regulatory frameworks such as the General Data Protection Regulations (GDPR) is restraining organisations. Instead of increasing awareness towards data protection regulations, the GDPR functions as an entry barrier to applying social media and crowdsourcing.

“We have considered using Facebook at some point, [...] but we have simply not had the resources for it [...]. There is everything we need to be aware of such as GDPR, cookies and all sorts of rules about how we should handle those things, so we have not actually done that. In the perfect world, if we had unimaginable resources, then it would be perfect to be on Facebook [...]. But we weigh Twitter far higher because it helps us spread the message.” (Government agency, Denmark)

Furthermore, the **hesitancy of few organisations to apply social media and crowdsourcing** can be tied to the general lack of technical skills in tailoring technologies to their needs. Especially during disaster response which is about reacting in a timely

and strictly coordinated manner (through contingency plans etc.), monitoring noisy and unstructured data from social media and other sources seems to be contradictory for many organisations, which have little experience and expertise in collecting, validating and analysing large amounts of data.

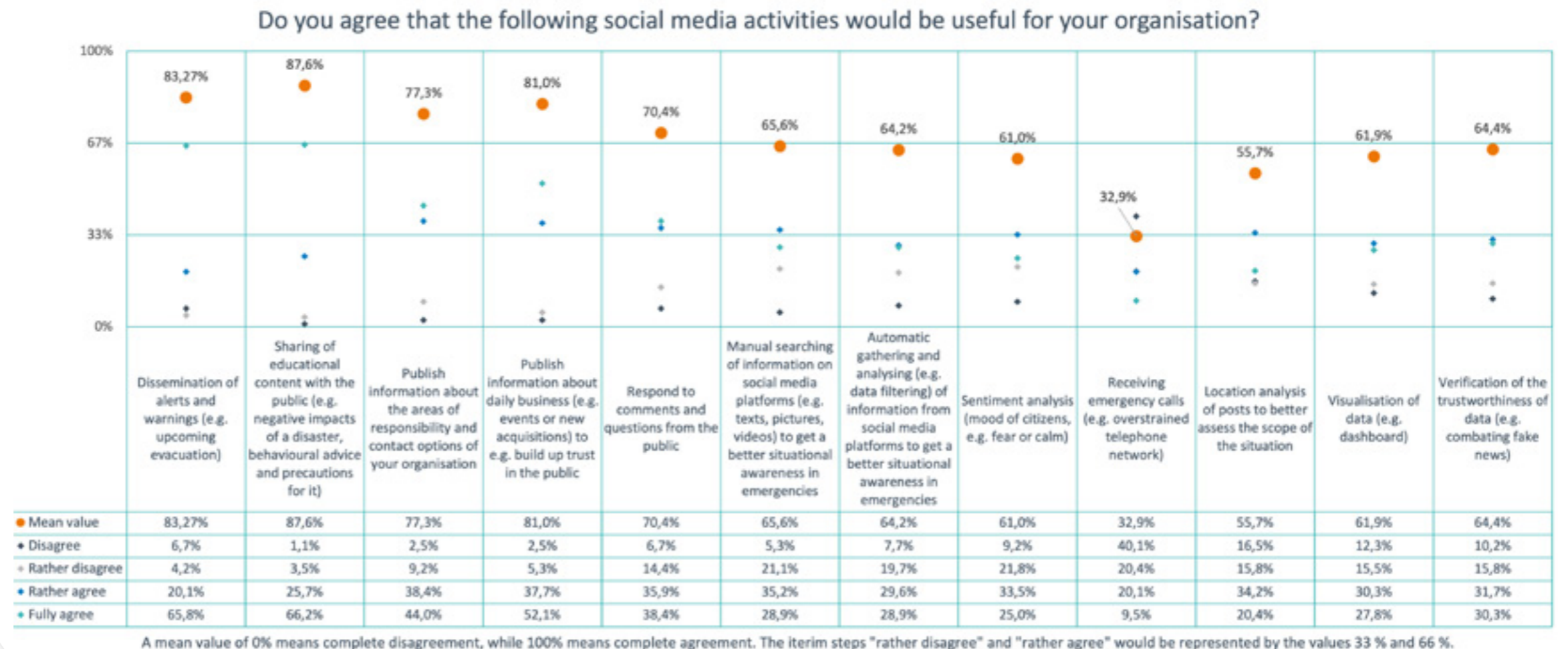
Finally, the value of social media and crowdsourcing are perceived and used in accordance with existing skillsets, know-how and practices. Figure 7 below shows this trend and points to how disaster management organisations in Europe value these technologies and platforms when they support existing command-and-control processes associated with top-down communication.

Social media and crowdsourcing may help organisations monitor and gather information in the context of assessing the impacts of the disaster, providing assistance and coordinating action with civil society and citizens. They boost efficiency in various disaster management processes when they create an opportunity for collecting information and footage of the immediate impacts of the disaster (Chan, 2012; Kirac et al., 2015). Social media and crowdsourcing enable collaborative processes by providing comprehensive data for authorities and digital volunteers to analyse and plot. Humanitarian actors and European po-

lice forces have used social media and crowdsourcing for many years to facilitate efficient responses, including in the context of terror attacks.

Nevertheless, many organisations lack knowledge about crowdsourcing and are hesitant to engage with it. This knowledge gap then leads to a critique of crowdsourcing in general due to its missing credibility, technical requirements or legal concerns. What is missing is a more nuanced discussion that highlights the potential of crowdsourcing – also in smaller organisations with fewer available resources.

Figure 7: Usefulness of social media and crowdsourcing for organisations working with disaster risk management



3.3 Citizen Inclusion

Citizen inclusion is a central aspect of disaster risk management in the context of social media and crowdsourcing as these technologies and platforms have the potential to alter the relationship between different organisations working with disasters and citizens (Froio et al., 2023). Inclusive processes require action from both working with disasters. On the one hand, citizens need to be proactive and aware of disaster risks. On the other hand, organisations need to realise that citizens can contribute with their resources and that their vulnerabilities, risks and needs are not homogeneous (Ferguson et al., 2018). It is very well known that disasters cause disproportionate impacts and this is linked to people's vulnerabilities. Organisations are hesitant to make processes more engaging when existing processes get the job done. Organisational structures and processes are 'sticky' and the potential and benefits of new processes do not always seem appealing. This argument is particularly evident in the context of crowdsourcing and more active engagement with citizens through social media platforms:

"As an organisation, we first look from another point: is there a need to use and implement something like [crowdsourcing images]? Certainly, you would need someone to deal with the topic first [...] So, if I share videos and photos on which people are recognizable, [...] with regard to police portals, for example, where you can upload it. [...] So, if there are victims on it, that's just not possible for us. This is like when the gazers stand by in a traffic accident and document and spread it [...] This is actually a difficult topic, what should then be seen on it or who has access to these portals" (NGO,

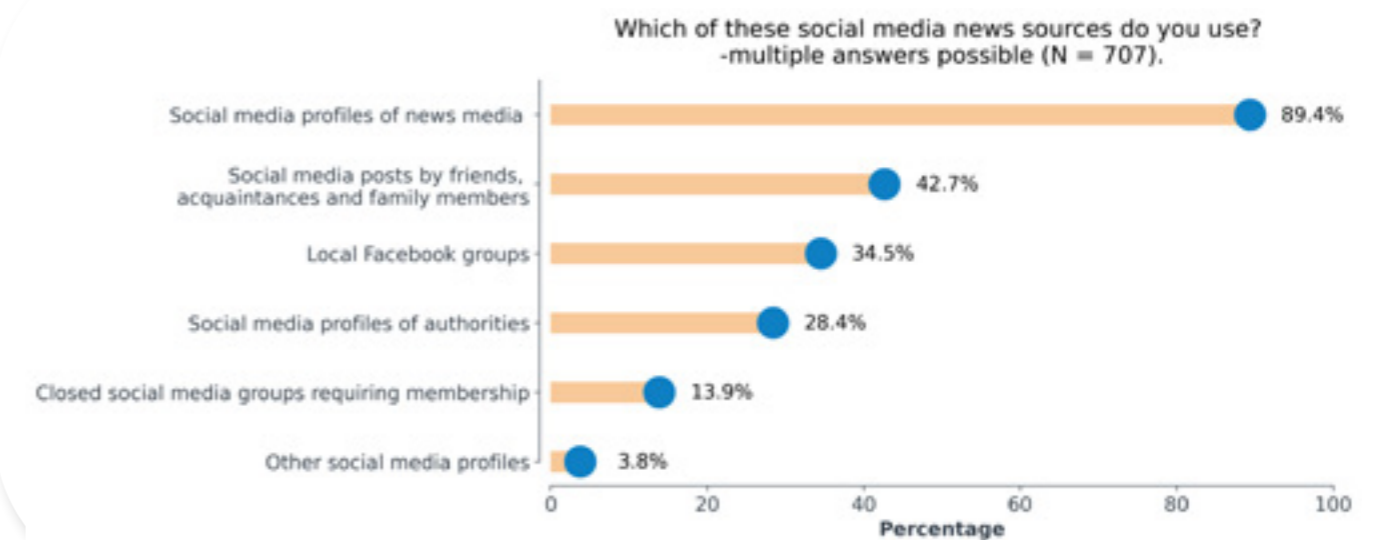
Germany)

Active engagement with citizens through a two-way communication process requires organisations to rethink their long-standing, and what is often perceived as successful, procedures for disaster risk management (Raisio et al., 2019). Moreover, command-and-control processes tend to apply a "one size fits all approach" when communicating risks to citizens, and rely on social media as a traditional tool for top-down communication. This problematic mode of communication is seen as efficient as it enables authorities to directly reach out to a large audience in a time- and resource-saving way:

"I am a firm believer that you just have to get to the 80 per cent first [...] we've become very good at not implementing 80 per cent of the solution because those other 20 per cent are running around complaining that they weren't really helped." (Industry, Netherlands)

There is a problem that **citizens are treated as a homogeneous group with identical needs, equal access to disaster risk management processes, communication channels, platforms and media outlets and similar perceptions of risks**. Citizens are diverse and need targeted communication through the right channels. A survey conducted in a municipality in Denmark shows how citizens use a wide range of communication channels and have different preferences towards social media platforms.

Figure 8: Information sources of citizens on social media



Source: Risk Perception Survey conducted in Frederiksberg, Denmark.

Citizens tend to consume information from different platforms. In addition, citizens sometimes view official sources as slow, old-fashioned and outdated (Liu et al., 2016) leading them to make sense of disasters through both official and unofficial sources (Albris, 2018). This emphasises the importance that organisations must have a nuanced understanding of citizens and the need to meet the citizens on the platforms they use.

News media tend to provide extensive and fast coverage of disastrous incidents and potential impending threats (Pantti et al., 2012; Ghersetti et al., 2023) and will thereby have a substantial influence on risk awareness and sense-making of the situation among citizens. Close cooperation with news media outlets is valuable and a sound supplement to disaster management organisations' dissemination of information on their own platforms (websites, text messages, social media profiles) (Widyastuti, 2021).

Given that not all people follow social media and that those who do have diverse platform preferences (Newman et al., 2022), it is crucial

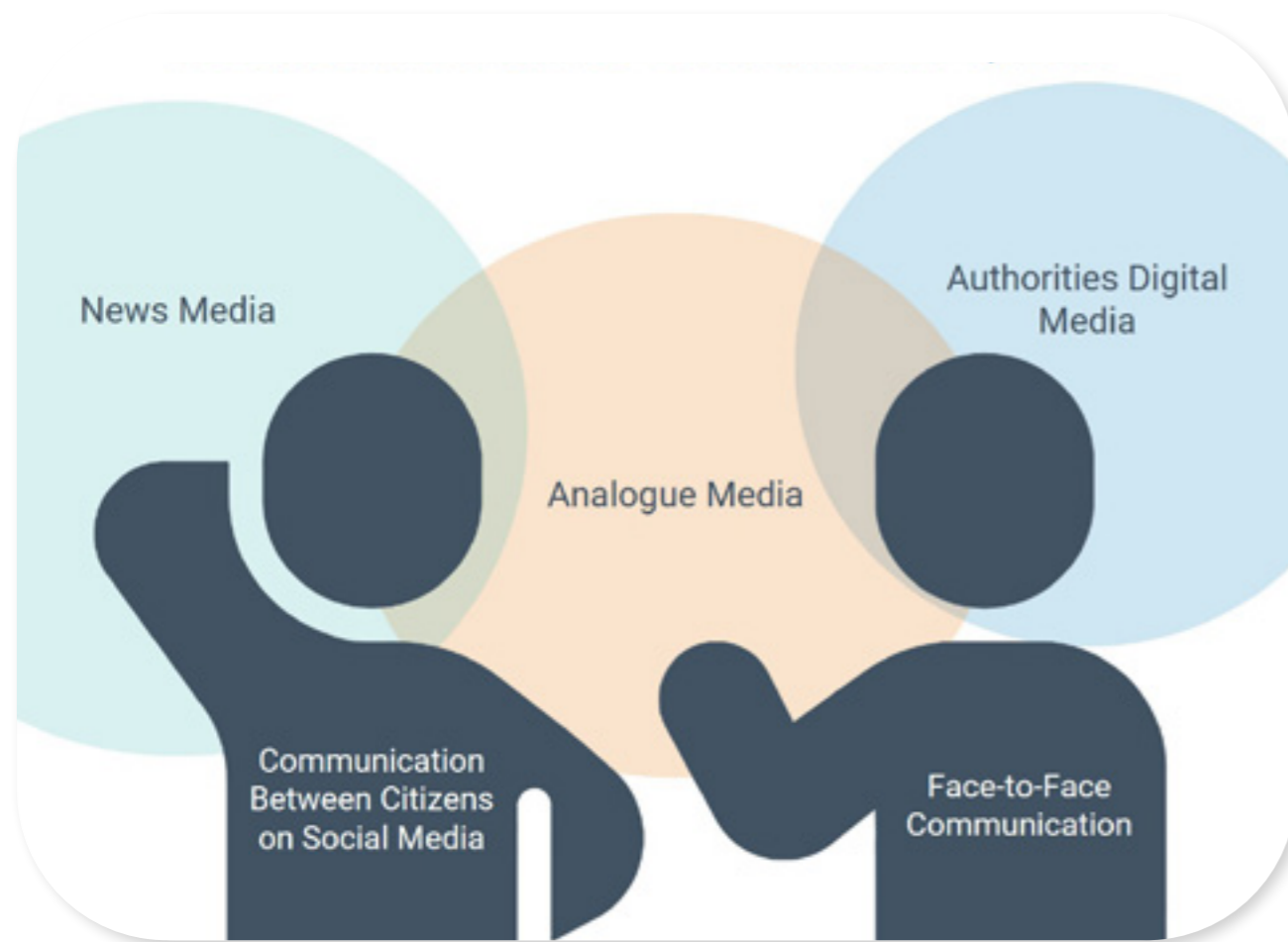
to involve news media in the dissemination of messages, to obtain an even higher reach. However, organisations always have to take into consideration that despite their use of several media, platforms and channels, most citizens engage in often comprehensive sense-making processes, negotiation and interpretation, when they receive messages regarding disasters. The focus group discussions conducted in the Danish case show that these processes are often paramount to make sense of the information received, but this information processing is in most cases hidden from the authorities. People either talk to neighbours, acquaintances they meet on the street, call each other on the telephone or communicate on social media, either with people they know well or in larger units, groups, and networks. It is not least in this process where the original information is adapted and put into context contains valuable insights for different organisations. People help each other, have an eye for the need of others, and these insights are of high value to organisations. In crises, authorities provide information on their own websites, through apps, and text messages and on their social media platforms,

The survey (N = 1,015) was conducted by an external public opinion company as a representative survey of citizens living in Frederiksberg, Denmark. Frederiksberg is a densely populated municipality with ca. 104,000 inhabitants within Copenhagen, consisting mainly of 3-5 story residential houses and little industry. Due to its old drainage system and high population density Frederiksberg is exposed to flood risks following cloud bursts. Participants were surveyed on their flood risk perception such as their information sources and self-efficacy in relation to flood risks.

and in some cases, the authorities produce non-mediated and analogue information material (like posters, stickers, letters etc). In addition, news media cover severe incidents intensively and through all these outlets, citizens are informed of the situation. The citizens do however communicate with each other, in their local communities (digital or physical), in their network, including social media, in order to make sense of the situation and get a more thorough understanding of the situation. It is in relation to each other that they interpret and process the information provided by the senders (authorities and news media) (See Figure 9).

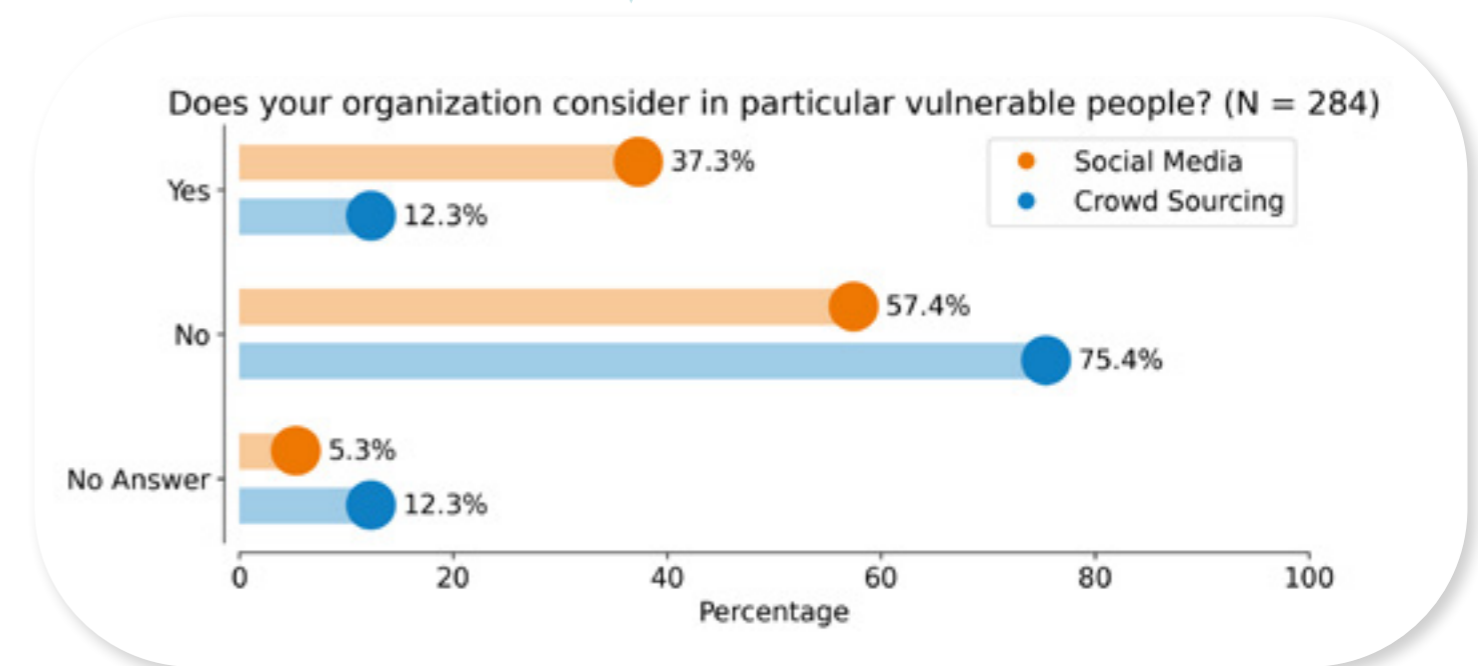
In some cases such as power failures or cyber-attacks, and for targeting specific groups of citizens, digital communication is not an option. In the Danish case, some elderly residents express that they prefer that information is conveyed through other means than digital media. In Canada 11 out of 14 organisations think the lack of trustworthy information accessed through social media is a concern (Harrison & Johnson, 2019). A similar concern is present in our empirical research of the five cases across Europe. There are indeed challenges with social media and crowdsourcing with regard to verification and constant 'fact checks' (Harrison & Johnson, 2019).

Figure 9: Mediation and Channels Communication Spheres



Source: Authors

Figure 10: Consideration of Vulnerable People



Source: LINKS online survey (see Clark et al., 2022).

Diversity factors, for example, gender, age, ethnicity, and economic status, to name a few, and their influence on risk and vulnerability need to be considered when analysing the effect of social media and crowdsourcing on disaster risk management processes (Carley et al., 2016; Gill & Bunker, 2012; Harrison & Johnson, 2019). As different groups of people need different kinds of information and may have different approaches to understanding risk and disaster information, one must pay attention to the different styles of disaster risk communication (Poljansek et al., 2017). Figure 10 shows that many organisations do not consider vulnerable groups when they work with social media and crowdsourcing.

Our results show a lack of including and engaging citizens, making processes more inclusive and tailoring them to specific target groups. This important driver of resilience is at least to some extent overshadowed by the organisations' concern about credibility. With the different tools developed throughout the LINKS project, we aim to encounter these shortcomings to increase societal resilience

through better citizen inclusion in disaster management processes.

We must not ignore that disasters are socio-political processes and disaster risk is a social construction (Raju et al., 2022). In this context, it is very relevant to be concerned about how social media and crowdsourcing may negatively influence the risk landscape (Bonati, 2020; Pazzi et al., 2021; Lüke et al., 2022). The digital divide must be taken seriously as this is not only about access to digital platforms but also about ICT (information and communication technology) (il)literacy. This may be potentially worse in rural settings with elderly populations (Bonati, 2020; Harrison & Johnson, 2019). This leaves us with a fundamental question of how should this be governed.

In section 5 we present different tools and their respective pathways for a better use of social media and crowdsourcing in disaster risk management process. These pathways provide a basis for discussion of potential untapped opportunities in the past to address the challenges highlighted.

4

Pathways to European disaster resilience in the context of social media and crowdsourcing

All organisations must consider their own context when applying social media and crowdsourcing in their disaster risk management processes. The Resilience Wheel as presented in Section 2, served as basis to explore what role social media and crowdsourcing plays in disaster risk management. In this section, we present a set of broad recommendations to address the challenges in using social media and crowdsourcing in disasters. While local contexts are central, the recommendations and practical tools suggested here can be applied broadly.

Recommendation I: Increase formalisation of social media and crowdsourcing in the organisation

Governmental actors are increasingly using social media and crowdsourcing platforms to manage disasters. However, our research shows that social media and crowdsourcing are often used in an ad-hoc, unilateral manner, with limited knowledge of their potentials and challenges associated with their implementation. Raising awareness on the need to develop capacity in organisations' use of social media and crowdsourcing is coupled with the call for greater integration of social media and crowdsourcing in disaster risk management plans (Busà et al., 2015).

A strategic and pre-designed approach to including social media and crowdsourcing in various organisational processes is key to harvest their value in disasters. This could include setting official objectives for using social media and crowdsourcing, target audiences, implementation strategies and evaluation procedures.

Recommendation II. Allocate resources to social media and crowdsourcing activities

Integrating social media and crowdsourcing into organisational processes can encounter barriers in training, liability and financial resources (see also Habig et al., 2021). A key solution is to allocate resources to increase technical and legal capacities without necessarily heavy budgets. Options include allocating time for training, boosting volunteerism units, or pooling teams. Especially for smaller operational level organisations, redistributing capacities is essential.

Recommendation III. Diversify and target communication

Disasters have disproportionate impacts. Organisations tend to miss the necessary procedures to target specific societal groups strategically. Very often citizen's capacities are ignored and under-utilised. Ignoring diversity and vulnerability could potentially exacerbate people's vulnerabilities during different disasters causing more harm. Therefore, we suggest that targeted communication is an effective way of reaching the most vulnerable groups to a specific hazard. To reach and include the largest number of citizens it is thus important for disaster management organisations to diversify their communication strategies.

5

Supporting the implementation of social media and crowdsourcing in an organisation

In the final part of this report, we present a set of concrete resources freely available through the LINKS Community Centre- developed as part of the LINKS project. Here we consolidate resources developed during the project and revolves around engaging with citizens and improving communication.

The resources support organisations in achieving the recommendations we suggest and provide a good starting point for those who want to embark on applying social media and crowdsourcing for more efficient and inclusive disaster risk management processes.

In the following sections, we present the three main resources developed to address the challenges highlighted above: The Including Citizens Handbook; The Guidelines Library; and the Resilience Wheel (moving from concept to practice).

5.1 The Including Citizens Handbook

Learning how to reach and include citizens through Social Media and Crowdsourcing in Disaster

Considering the multidimensional aspects of including citizens in disaster risk management processes, we identified that organisations need holistic approaches to redesign their internal processes on how to target and diversify communication and better allocate resources. To provide such a solution that can trigger and guide organisational change towards citizen inclusion, we developed the *Including Citizens Handbook* in close collaboration between researchers and professionals from the field of disaster risk management. Intertwining both professional and research-driven activities results in a product where the implemented scientific innovations are validated by professional perspectives, ensuring the relevance of the *Including Citizens Handbook* for disaster management organisations. Starting from the question “How can disaster risk management

Figure 11: Profile of the Including Citizens Handbook

Profile

Target group: Organisations working with disaster risk management.

Developers: University of Florence, University College Copenhagen, University of Copenhagen, Save the Children Italy, Safety Region South Limburg.

Functions

Learning tool: Including citizens into disaster management procedures in a holistic way requires rethinking established procedures. The Including Citizens Handbook helps to achieve this by providing practice examples from the field and tangible action steps organization can follow to achieve this goal.

Online Module: Co-developed with organisations working with disaster risk, the handbook content is available in an interactive online module that practitioners can use as training material.

Value

Organisations working with disasters can use the handbook both to train employees regarding the inclusion of citizens, and use it as a starting point to trigger processes of organisational change.

Link to the Handbook:

[Click here](#)



Figure 12: Preview of the Including Citizens Handbook

Including Citizens Handbook: Preview

Onboard (Unaffiliated) Volunteers:

Changes in the volunteering market result in a growing number of spontaneous and unaffiliated volunteers. Working with them is fundamentally different from working with volunteers that have been with an organization for years. In this module you can learn about possibilities that social media and crowdsourcing offers to help your organization in onboarding unaffiliated volunteers.

Example:

The Ready2Help App developed by the Dutch Red Cross is one example how organisations used social media and crowdsourcing technologies to better incorporate unaffiliated volunteers.

In the handbook, we are providing in depth insights about this case, directly drawn from academic analysis and insights from the Red Cross working with the Ready2Help App.

organisations develop their practice for applying social media and crowdsourcing to include all citizens, including vulnerable groups, to secure resilience?" we developed four interactive online modules targeting European disaster management organisations. Each module corresponds to one section of the Handbook: Each of the four sections serves a different purpose tied to the overall theme of including citizens.

Figure 13: Sections of the Including Citizens Handbook



For the *Mobilizing Volunteers* section of the handbook, we identified in our cases that volunteers can play a crucial role in increasing societal resilience. However, social media and crowdsourcing are also fundamentally transforming the volunteering sector, creating both challenges and opportunities for organisations to mobilise volunteers (McLennan et al., 2016; Reuter & Kaufhold, 2018).

On the one hand, individualisation in society as such leads to an increasing trend of short-term volunteer commitment that organisations must adapt to. On the other hand, social media provides opportunities for volunteers to contribute spontaneously and irrespective of time and place to collective disaster efforts. As an interview partner from an Italian NGO highlights, organisations must adapt to these trends:

“When you speak about volunteerism, [it] is something that people do in their free time. And available free time in our life has changed a lot. [...] and also the demand [of] very young volunteers to grow through a volunteering experience. But we should follow the flow [...]. Because participation is what people like to experience not to belong to an organization.” (NGO, Italy)

In the *Mobilising Volunteers* section of the Handbook, we developed training material for different organisations that aim at assisting volunteers to adapt to these trends. Specifically, this section focuses on how organisations can use digital technologies to mobilise and onboard volunteers, but also on how organisations can make use of digital volunteering efforts.

The *Increasing risk awareness* section of the handbook deals with the question of what organisations should take into consideration and pay attention to when they aim to increase the awareness of certain risks among citizens.

It suggests how organisations can plan and produce communication materials in formats, that are better suited to creating a change among citizens. The argument running through the section is that different target groups need differently suited messages applying different formats, and disseminating through different channels and in relevant networks and settings. Finally, the two sections dealing with *Making Information Accessible* and *Mobilizing Citizens* are developed in collaboration with The Univer-

sity of Florence, the Civil Protection of the Province of Terni (Bonati, 2020; Pazzi et al., 2021). The former section provides training material that is mainly concerned with the factor of diversity in the context of disasters. Here social media and crowdsourcing can provide useful advantages in reaching out to a diverse audience. Combined, these two sections aim to provide training material for practitioners that helps to make information accessible without leaving the most vulnerable social groups behind. When promoting the increasing usage of social media and crowdsourcing in disaster management organisations, accessibility and differences between citizens are important to consider, as existing inequalities can proliferate in the digital domain and have the potential to be exclusive towards societal groups (Madianou, 2015).

For all four sections, the training consists of several resources produced and collected throughout the LINKS project. First, each sub-module centres around short explainer videos that introduce each theme. Second, we provide different case scenarios collected from organisations that have worked with including citizens in disaster management processes. These aim to display how other organisations from the field have implemented programs aiming at citizen inclusion.

Third, we derived specific action steps from the cases and the scientific literature. These provide applicable guidance for different organisations that want to increase citizen inclusion within their organisational work (see Froio et al., 2023, for a detailed description and example). Fourth, we provide a collection of additional materials such as guidelines, reports and case studies. These aim to serve as a starting point for practitioners to engage further with one of the topics addressed in the Including Citizens Handbook. While some of the guidelines and use cases are specially developed for the Including Citizens Handbook, we also present contextualised resources from the Guidelines and Use Case Libraries respectively.

Figure 14: Profile of the Guidelines Library

Profile

Target group: Organisations working with disaster risk management.

Developers: Federation of European Fire Officers (FEU), University of Copenhagen and Safety Innovation Center.

Functions

Support tool: It is a complex task to navigate the landscape of guidelines, standard operational procedures and legal frameworks on the use of social media and crowdsourcing in disaster risk management. The Social Media and Crowdsourcing Guidelines Library supports this navigation by providing a comprehensive overview of existing guidelines and regulatory frameworks.

Filter system: Starting from the content of the guidelines, appropriate filters were developed to describe, compare and classify the guidelines.

Value

Organisations are able to quickly search existing knowledge and guidelines on the specific issue at hand. One example could be how to establish an efficient social media strategy or improve the current strategy.

Link to the Guidelines Library:

[Click here](#)



5.2 The Social Media and Crowdsourcing Guidelines Library

Getting an Overview of Social Media and Crowdsourcing in Disasters

Raising awareness of the need to build capacity in national governments' use of social media and crowdsourcing in disaster management processes is coupled with the call for greater integration of social media and crowdsourcing in disaster risk management plans (Busà et al., 2015). If social media and crowdsourcing play a key role in disasters their aim and function ought to be reflected in relevant legal frameworks, policies and guidelines for disaster risk management (Gill & Bunker, 2012; Gizikis et al., 2017).

As both social media and crowdsourcing and their integration in disaster risk management is recent, the landscape of regulatory frameworks, policies and guidelines is relatively limited. The Guidelines Library provides an overview of the very fragmented landscape of guidelines guiding social media and crowdsourcing.

Our mapping of current guidelines includes global, European and national levels. It contains guidelines in various European languages as well as a small synopsis of each of the guidelines that allow users to quickly get an overview of the content.

The guidelines cover a range of topics that address the challenges that we have highlighted in this report related to formalising social media and crowdsourcing in an organisation, how to maximise resources and build a team, issues of verifications and how to consider vulnerable groups. The Social Media and Crowdsourcing Guidelines Library helps organisations:

- Build a communication strategy for social media and consideration of the main elements (e.g. needed roles for the team);
- Set up and evaluate social media activities;
- Recommended actions on social media before, during and after a crisis;
- Tips and behavioural advice for citizens on social media in crises;
- Consideration of legal requirements; when using social media;

- Verification of information from social media;
- Use of technologies to support work with social media;
- Support people with specific needs.

The Guidelines Library contains several filters that support the navigation of the documents included in the library. The filters allow users to narrow down their search results and find the relevant information on:

- Language;
- Disaster risk management activities;
- Specific theme (e.g. social media strategy, verification);
- Experience with using social media and crowdsourcing;
- And see if platforms and technologies are mentioned in the document:
- Platforms (e.g. Facebook, telegram)
- Technologies (e.g. ArcGis, Branchwatch)

5.3 The Resilience Wheel: Concept to Practice

Setting Disaster-Resilient Pathways

The Resilience Wheel as a practical tool supports organisations working with disasters in mapping their current activities and future needs using social media and crowdsourcing in disasters. It provides a tool for dedicated sets of workshops designed to map out and assess resilience-building practices in the context of social media and crowdsourcing.

The Resilience Wheel is developed to spark conversations within and across organisations working together and to facilitate collaborative identification and prioritisation of strategic projects strengthening the use of social media and crowdsourcing in disaster risk management efforts.

The format is flexible as it allows organisations to customise an approach that suits local needs while serving as a starting point for having such

dialogue. Each organisation will have to set their course of action in terms of how to apply social media and crowdsourcing in disasters. That said, our research shows that the three drivers for resilience may apply more broadly.

Figure 15: Profile of the Resilience Wheel

Profile

Target group: Organisations working with disaster risk management.

Developers: University of Copenhagen and University College Copenhagen.

Functions

Strategic tool: The resilience wheel serves as the basis for a strategic conversation and assessment on the use of social media and crowdsourcing in an organisation. It does so by providing a set of steps that may support organisations in strategically strengthening the use of social media and crowdsourcing in disasters.

Value

The workshops can be used to map out current practices and future needs of using social media and crowdsourcing in relation to the three main drivers: digital literacy, inclusion of citizens and cooperation within and between organisations. It supports organisations in getting an overview, finding the gaps and prioritizing actions for strategic implementation.

Link to the workshop tool to map potentials of SMCS usage within an organization:

[Click here](#)



6

Conclusion and Ways Forward

- There is an immediate need to shift focus on understanding and placing emphasis on citizen vulnerability and diversity for social media and crowdsourcing to be effective agents for disaster resilience. This report presents novel approaches rooted in co-created and tested processes to navigate complexity in using social media and crowdsourcing in disasters primarily for organisations.
- With the increasing use of social media and crowdsourcing in disasters, it is crucial to always remember that addressing issues of vulnerability, inclusion and diversity must be central to disaster risk management.
- Overall, the findings from our studies highlight that we need a drastic shift from solely technology-focused approaches to more inclusive decision-making processes and disaster risk governance more broadly for social media and crowdsourcing to support resilience building in European disaster management.
- The report suggests new ways to examine and reflect on the increasing use of technologies with caution. Social media and crowdsourcing use in disasters will only increase and how can this be channelled to ensure a safer society without leaving anyone behind? This entails including citizens as active participants in disaster risk management processes without absolving the different organisations of their responsibility to reduce disaster risk and impacts.

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LINKS

Strengthening links between technologies and society for European disaster resilience

LINKS 'Strengthening links between technologies and society for European disaster resilience' is a project funded by the European Commission under the Horizon 2020 Research and Innovation Programme. The aim of LINKS is to consolidate knowledge on how Social Media and Crowdsourcing can be used to strengthen disaster resilience. The results of the project feed into a strategic LINKS Framework with useful resources for creating more disaster resilient communities, and to help stakeholders working in disaster risk management to focus on what's important when considering the application of Social Media and Crowdsourcing in disasters. The LINKS Framework is presented in the LINKS Community Center (LCC), the online platform providing a user-friendly access to the LINKS results and a means to exchange knowledge and experiences. You can access the LCC and join our LINKS Community at: <https://links.communitycenter.eu/>



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under the Grant Agreement No. 883490