



LINKS

Strengthening links between technologies and society
for European disaster resilience

D3.4 CASE ASSESSMENT REGARDING DISASTER MANAGEMENT PROCESSES

LEVERAGING SOCIAL MEDIA AND CROWDSOURCING IN DISASTER MANAGEMENT PROCESSES IN EUROPE

Research Report

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EXECUTIVE SUMMARY

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, and 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 (DRPV)
- Disaster Management Processes (DMP)
- Disaster Community Technologies (DCT)

Bringing together 15 partners and 2 associated partners across Europe (Belgium, Denmark, Germany, Italy, Luxembourg, the Netherlands) and beyond (Bosnia & Herzegovina, Japan), the project will develop a framework to understand, measure and govern SMCS for disasters. The LINKS Framework consists of learning materials, such as scientific methods, practical tools, and guidelines, addressing different groups of stakeholders (e.g. researchers, practitioners, and policy makers). 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, and 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 social media and crowdsourcing.

About this deliverable

This report provides an overview of the final results of the case assessments conducted as part of the LINKS project on social media and crowdsourcing use in **disaster management processes** (WP3). The report serves as the conclusive version of the knowledge base on disaster management processes developed throughout the project (see also D3.1 Nielsen & Raju, 2020; D3.2 Nielsen et al., 2021 and D2.7 Lüke et al., 2022).

The report addresses three main research questions formulated early in the project (see D3.2):

1. How are European disaster management organisations applying social media and crowdsourcing in disaster management processes (RQ1)?
2. What are the limits and potentials of this application associated with institutional resilience (RQ2)?
3. Following the first two questions, how can the application of social media and crowdsourcing in disaster management processes be further strengthened (RQ3)?

The assessment identifies a widespread use of social media and crowdsourcing in European organisations. However, with a far greater focus on social media than on crowdsourcing activities (see also D5.3 Fonio et al., 2022; D2.7 Lüke et al., 2022; and D4.4 Lüke & Habig, 2023) and predominantly in the preparedness and response phases. 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.

To support organisations in strengthening the application of social media and crowdsourcing in disaster management processes, the LINKS project has developed a range of resources integrated into an online platform, the LINKS Community Center. In this deliverable, 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.

This report is published in two versions, each targeting a different audience. The first version, presented in this deliverable, emphasises internal LINKS processes and their linkages with other work packages. This version is targeted the LINKS Consortium, the European Commission and readers with a thorough understanding of the LINKS project, its workflow and its deliverables. The second version (forthcoming) is aimed at a broader audience. This high-level version highlights the main results of WP3 and disseminates the output of the work package to national and international organisations involved in disaster risk management.

It is important to note that multiple partners have contributed to the creation of the presented results throughout the project. Moreover, this deliverable should be considered in conjunction with D.2.5 Froio et al. (2023), who focus on the assessment of vulnerability and disaster risk perceptions and D4.4, which provides the case assessment on Disaster Community Technologies (DCT) and lays the foundation for further exploration of tools and technologies for disaster risk management.

By addressing the research questions and presenting the final version of the knowledge base, this report contributes to enhancing the understanding of how social media and crowdsourcing are applied in European disaster 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

Acronym / Abbreviation	Description
CMINE	Crisis Management Innovation Network Europe
DCT	Disaster Communication Technologies (LINKS Work Package 4)
DHpol	Deutsche Hochschule der Polizei (Engl. German Police University)
DMP	Disaster Management Processes (LINKS Work Package 3)
DRMKC	Disaster Risk Management Knowledge Centre
DRPV	Disaster Risk Perception and Vulnerability (LINKS Work Package 4)
DRR	Disaster Risk Reduction
EU	European Union
GDPR	General data Protection Regulation
ICT	Information and Communication Technologies
LCC	Links Community Center
NGO	Non-Governmental Organisation
RQ	Research Question
SMCS	Social Media and Crowdsourcing
SOP	Standard Operation Procedure
UNDRR	United Nations Office for Disaster Risk Reduction
WP	Work Package

DEFINITION OF KEY TERMS¹

Term	Definition
Disaster Management Processes (DMP)	A collective term encompassing a systematic series of actions or steps taken to reduce and manage disaster risk. Disaster management processes are often associated directly with the phases of the Disaster Management Cycle.

¹ Definitions are retrieved from the LINKS Glossary.

	<p>In the context of LINKS, we specifically refer to DMP as the policy frameworks, tools and guidelines developed to govern disasters across all phases of the Disaster Management Cycle.</p>
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>
LINKS Framework	<p>A set of best-practices consisting of methods, tools and guidelines for enhancing the governance of diversity among the understandings and applications of SMCS in disasters for relevant stakeholders.</p> <p>Methods in LINKS refer to approaches that will enable researchers and practitioners to assess the effects of SMCS for disaster resilience under diverse conditions. Tools are practical instruments supporting first-responders, public authorities and citizens with the implementation of SMCS in disaster and security contexts. Guidelines are recommendations for improving national and regional governance strategies on SMCS as well as introductions and explanations of how to apply the methods and tools under diverse conditions.</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’</p>

	and define the available ways to operate by discouraging, constraining or encouraging given behavioural patterns.
Sustainable Advanced Learning	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).

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, and political and legal landscapes, this diversity 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 management processes.

The Sendai Framework for Disaster Risk Reduction 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 (see LINKS glossary), have been shown during many disasters in the past decade. The recently held European Forum for DRR 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.

Figure 1: 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.

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 and Kaufhold, 2018). However, in Europe, agencies and organisations working with disaster risk management have just recently started to integrate these technologies and platforms into strategies and 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 Southeast Asian contexts, and associated types of hazards and social media and crowdsourcing platforms (D3.1 Nielsen and Raju 2020; D3.2 Nielsen and Raju 2021). Most studies focused on preparedness and response activities, at the expense of recovery and prevention efforts, and favoured technical and implementation issues over questions of power dynamics, sociocultural conditions and contextual sensitivities. The departure point for the research found in this report was that a more holistic approach to the usage of social media and crowdsourcing was needed.

Since the first review was done back 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 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 (Zamarreno 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, COVID-19 sparked 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 shutdowns (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 (see Section 4.2 on digital literacy). 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

As part of the LINKS project, 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 formulated early in the project (see D3.2):

- How are European disaster management organisations applying social media and crowdsourcing in disaster management processes (RQ1)?
- What are the limits and potentials of this application associated with institutional resilience (RQ2)?

- Following the first two questions, how can the application of social media and crowdsourcing in disaster management processes be further strengthened (RQ3)?

In this report, we aim to consolidate the work that has been conducted over the last three years by answering these questions.

The report provides organisations working with disasters, a state of the art and novel pathways to use social media and crowdsourcing in their work. This report aims to provide a knowledge base that gives an overview of the use of current social media and crowdsourcing in disaster management processes. Disaster management processes encompass the steps taken to reduce or manage disaster risk in an organisation. 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 report has three main parts: “Conceptual framework: How to use build resilient disaster management processes in your organisation using social media and crowdsourcing”; “Findings: Key challenges of implementing social media and crowdsourcing in disasters” and “Pathways to European disaster resilience”.

The first part 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 as in five hazard-based case studies (Denmark - Floodings, Germany – Droughts & Terrorism, Italy - Earthquakes and The Netherlands – Industrial Hazards) conducted in Europe in the LINKS project. 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 management processes. We introduce a set of resources which can be used as tools integrated into *the LINKS Framework* through the LINKS Community Center (see D7.4 Kiehl et al., 2022; D5.3 Fonio et al., 2022; D.5.4 Fonio & Tzavella, 2022). These may support disaster management organisations in finding a pathway for applying social media and crowdsourcing to enhance disaster management processes across the three

drivers. We highlight several tools in the toolbox particularly relevant for addressing the challenges highlighted in this report (see also D5.3):

- **The Social Media and Crowdsourcing Guidelines Library** provides an overview of 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 tool through which organisations can discuss and assess current and future uses of social media and crowdsourcing within their organisation.

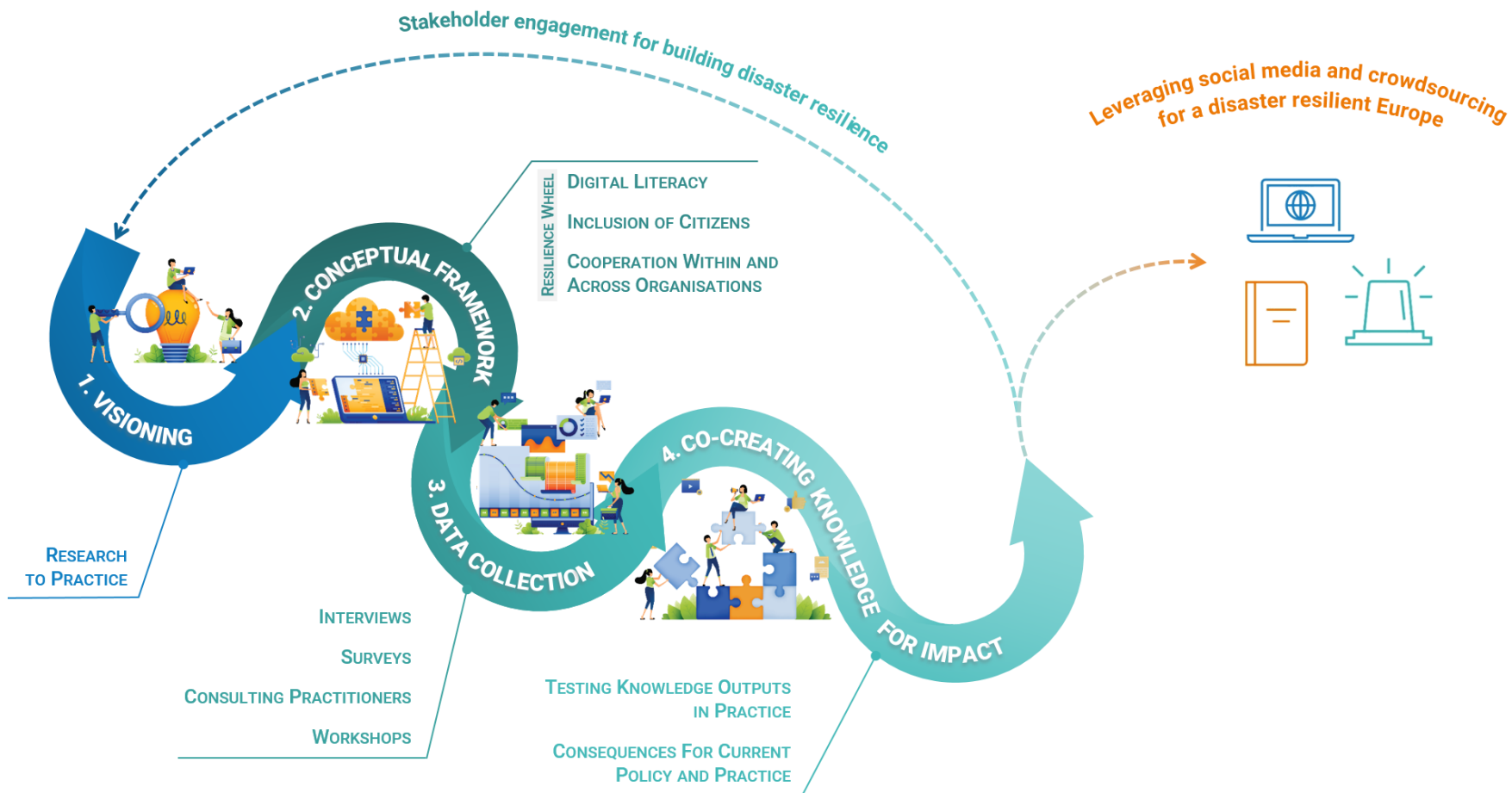
It must be highlighted that continuous engagement, discussions, debates and reflections with the different case assessment teams, and different stakeholders have resulted in shaping our overall novel comprehensive understandings and the individual resources (such as the Resilience Wheel, the Guidelines Library etc). The results presented in this deliverable are thus the joint outputs of these activities and are not specifically linked to any single activities (e.g. one interview or a specific meeting).

Moreover, this document does not contain detailed descriptions of the methodology or the case-related activities. These are found in D.3.2, D2.7, D6.4 and D6.5.

1.3 How Did We Make This Report?

This section provides a brief overview of the research and co-creation process over three years. Being an output of a large Horizon2020 project, LINKS 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.

Figure 2: WP3 project process overview.



Source: Authors

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 D6.4).

The results presented in this report have been a process of organic development as presented in Figure 2. 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 (see D2.5 and D4.4. for the case assessments concerning Disaster Risk Perception and Vulnerability, and Disaster Community Technologies).

The case assessment consisted of a set of different research activities described below and presented in Figure 4.

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 (D 3.1,). 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. Snowball sampling was also used as a method to gather sources. The key terms below were used systematically across databases to search for relevant sources:

Figure 3: Literature Search Query.

TITLE-ABS-KEY (governance OR government) AND TITLE-ABS-KEY (disaster* OR hazard OR hazards OR emergency OR emergencies) AND TITLE-ABS-KEY ("social media" OR crowdsourc*) AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) JR LIMIT-TO (SRCTYPE , "r") AND (LIMIT-TO (LANGUAGE , "English"))

Source: Authors

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.

Exploring through the LINKS project case assessments: 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. The first case assessments were carried out by the LINKS Case Assessment Teams and consisted of a large comparable interview study and an online survey (see D.6.4).

The first round of assessment took place between November 2021 and March 2022 across all five cases. In total, the case teams conducted 54 interviews. The survey received 219 responses across the case countries and 284 across Europe. The survey is not representative but provides insight into how various organisations make use of social media and crowdsourcing in disasters (see D6.4 for more details on the first case assessment).

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 D3.2 and D2.7 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 D6.4). 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 4.

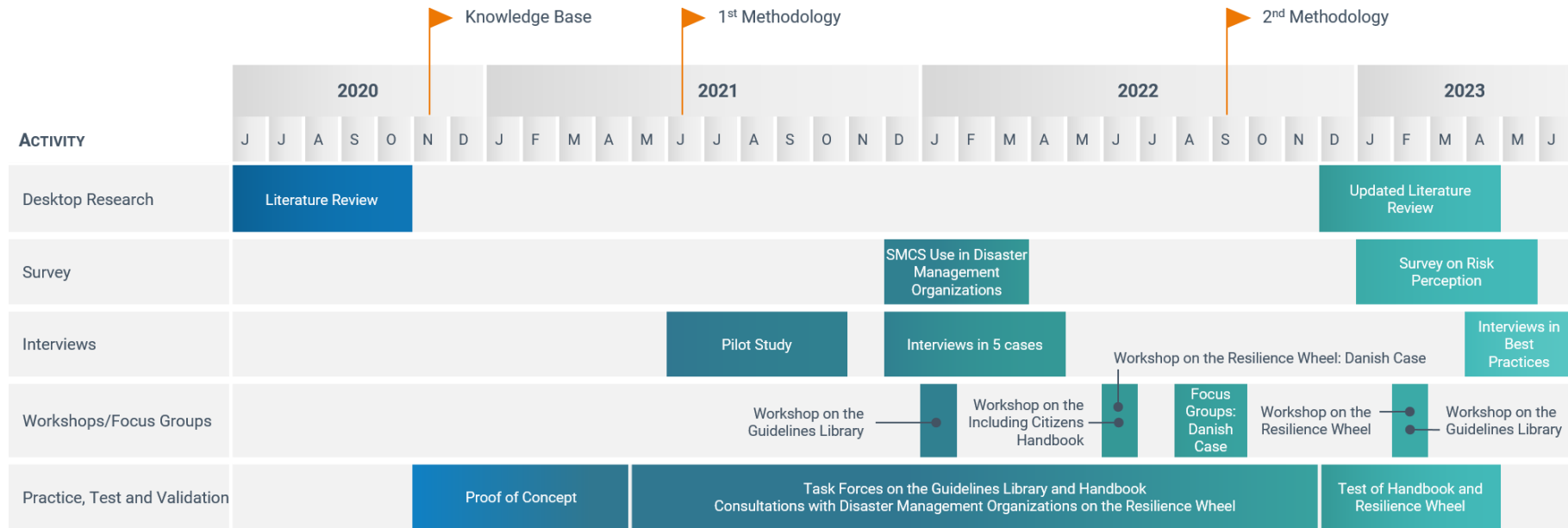
For the traditional research methods we, in particular, include results from the Danish sub-study in Section 3. This consists of six focus groups with citizens living in the Municipality of Frederiksberg as well as a survey conducted on flood risk perceptions among citizens living at Frederiksberg. The survey includes 1000 people and is representative of the population living in the municipality.

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 (see D5.5 (forthcoming) and D6.5 (forthcoming)). Details on how these processes were carried out can be found in the textboxes addressing each of the LINKS resources presented in Section 4 as well as in D2.7. The taskforces on the Social Media and Crowdsourcing Library and the Including Citizen Handbook, the LINKS Community Workshops and the LAC meetings have

been of paramount importance to these co-creation processes. External partners to the consortium, such as local government and NGOs, have been consulted to adapt and verify the value of the results.

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. Consequently, the case assessment activities were used to constant develop and triangulate our results. An overview of the main activities can be found in Figure 4.

Figure 4: Research Activities.



Source: Authors

2. CONCEPTUAL FRAMEWORK: HOW TO BUILD RESILIENT DISASTER MANAGEMENT PROCESSES IN YOUR ORGANISATION 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 management processes.

We define resilience as the ability of individuals, institutions and systems to recover from disturbance and to develop and adopt alternative strategies in response to changing conditions (LINKS Glossary). Resilience is a normative positive quality of a system, institution, or individual that increases the capacity to manage disaster risk (Adger, 2000). In this report, we are interested in understanding how social media and crowdsourcing interact with the management of risk reduction for greater disaster resilience.

In a nutshell, social media and crowdsourcing hold the potential of changing the relationship between disaster management organisations and citizens. Of the particularities of a governance system, participative and inclusive disaster management processes condition better disaster risk management (Vollmer et al., 2018) and social media and crowdsourcing platforms and technologies support such decentral, inclusive and participatory forms of disaster governance. Social media and crowdsourcing change disaster management processes because they alter the information and collaboration flow between organisations and citizens. Two types of changing interaction flows can be identified in the existing research (D3.1): a shifting and a bridging mechanism.

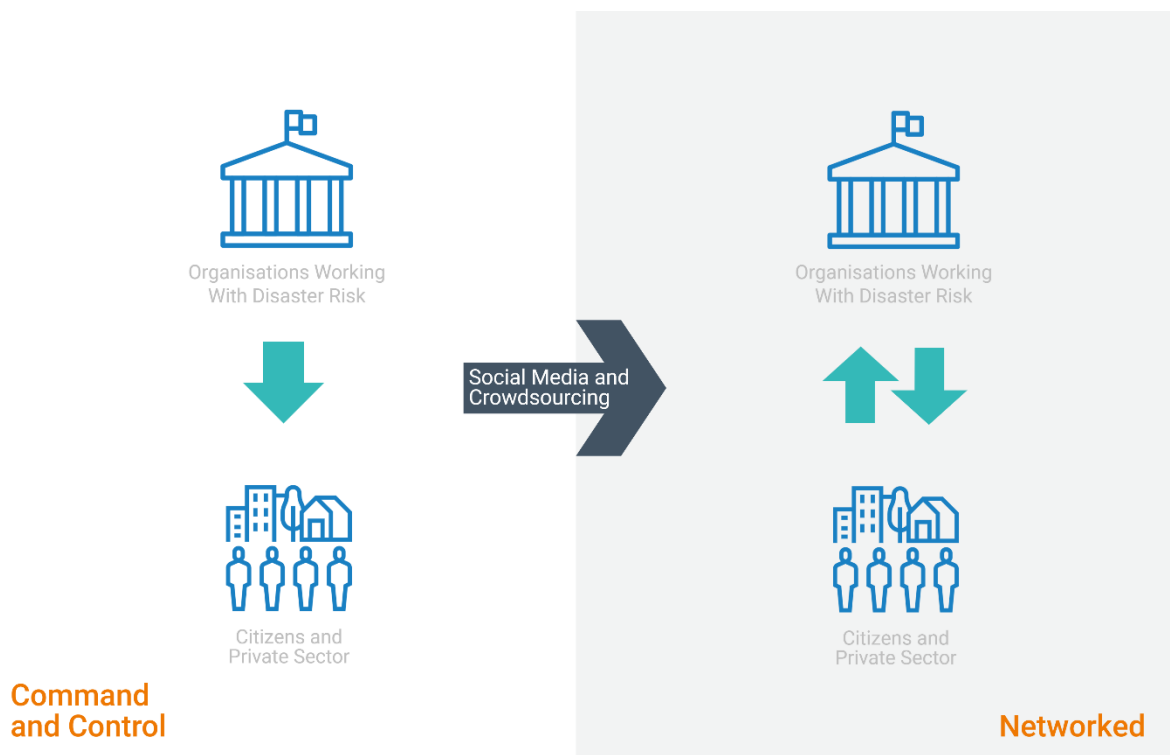
2.1 Social Media and Crowdsourcing Support a Shift of Information Flows Between Organisations and Citizens

Social media and crowdsourcing change how citizens and other civil society actors get information and organise various disaster-related activities such as preparedness and response 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 disaster management logic of 'command and control' and promotes a more collaborative approach to disaster risk management

(Haworth et al., 2018). Social media and crowdsourcing provide a channel through which information can shift direction: from a centralised, top-down and command-and-control approach where information flows from disaster management organisations towards people to a bottom-up and horizontal approach where information flows from citizens to disaster management organisations (Douvinet et al., 2017; Poljansek et al., 2017). This shifting mechanism is shown in Figure 5.

Figure 5: Social media and crowdsourcing support a shifting mechanism.



Source: Adapted from D3.1. 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.

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

Voluntarism and self-organisation have always existed in places with disaster risk and disaster management organisations have always relied on voluntarism and self-organisation among people in affected communities, particularly during response. Nevertheless, self-organisation and unaffiliated voluntarism are often considered an issue due to convergence and coordination issues (Jin et al., 2014). Convergence occurs when official command-and-control processes exist alongside local groups and volunteers organising response activities on their own. If too many volunteers self-organise, participate and engage in disaster preparedness

and response they may create liability and coordination issues for civil protection, emergency agencies and first responders (Jin et al., 2014; Boin and Byander 2015).

Social media and crowdsourcing have the potential to bridge these processes that exist and unfold independently by creating a medium where such actions can be coordinated. Social media and crowdsourcing serve as a bridge between the actions of people, communities and groups that take responsibility and the formal disaster management processes. Figure 6 illustrates this mechanism of “bridging the actors” who partake in disaster management processes through social media and crowdsourcing technologies and platforms.

Figure 6: Social Media and Crowdsourcing as a Bridging Mechanism



Source: Adapted from D3.1

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

What do an organisation then need to do to harvest the potential of both shifting and bridging mechanism? We start with the concept of resilience to promote a holistic perspective of socio-ecological-technical dimensions and an approach to disaster risk management that allows us to look beyond a particular disaster or hazard. Resilience focuses on enhancing the capacities of systems, institutions, and communities without relating it to a specific event. 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. The Resilience Wheel provides an approach to harvest the benefits,

ie. make use of citizens (shift) and create a better interaction (bridge). 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 three drivers together alter disaster management processes in an organisation by changing the relationship between formal management processes and citizens. 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

Figure 7: Development of Resilience Wheel

How was the Resilience Wheel Developed?

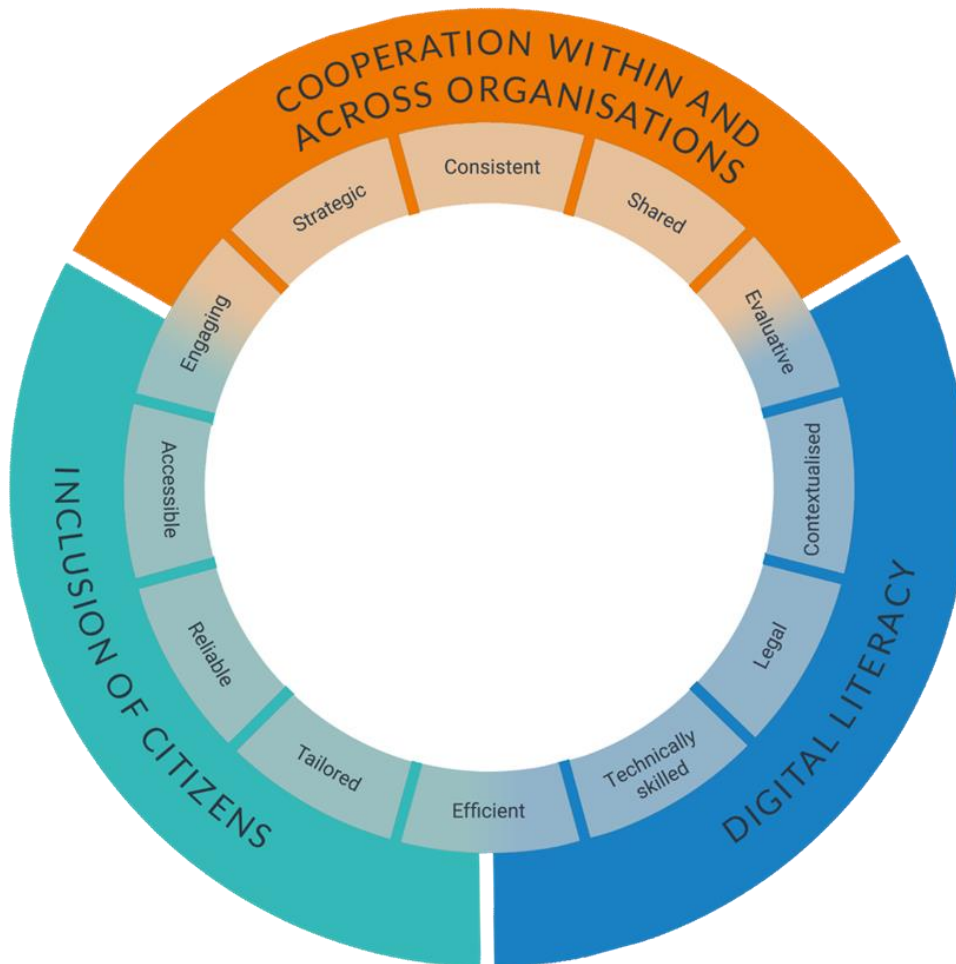
Theory: The Wheel is based on a systematic review of all existing research linking social media and crowdsourcing with disaster risk management (D3.1).

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 (D3.2 and D2.7).

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 and Arup, 2014).

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.

Figure 8: The Resilience Wheel



Source: Authors (D3.1; D3.2 and D2.7)

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, Boersma and Raju, 2020). Therefore, we need a deeper understanding of the contexts that disaster management organisations operate in when using social media and crowdsourcing in disasters. Local, political, organisational, and cultural conditions explain differences in the use of social media and crowdsourcing and the study thus points to the importance of understanding socio-political factors for the successful use and implementation of social media and crowdsourcing in disaster management processes.

We use the Resilience Wheel across the five European cases as the basis to explore different questions across the three drivers and different themes to gain a deeper understanding of

how social media and crowdsourcing are currently used and how this can improve in disasters (see D3.2 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 4.

In the next section, we create an overview of our findings on disaster 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 management processes, their limitations and the contextualized interactions between technology and political developments where technical choices for disaster resilience are made.

3. FINDINGS: KEY CHALLENGES IN IMPLEMENTING SOCIAL MEDIA AND CROWDSOURCING IN DISASTERS

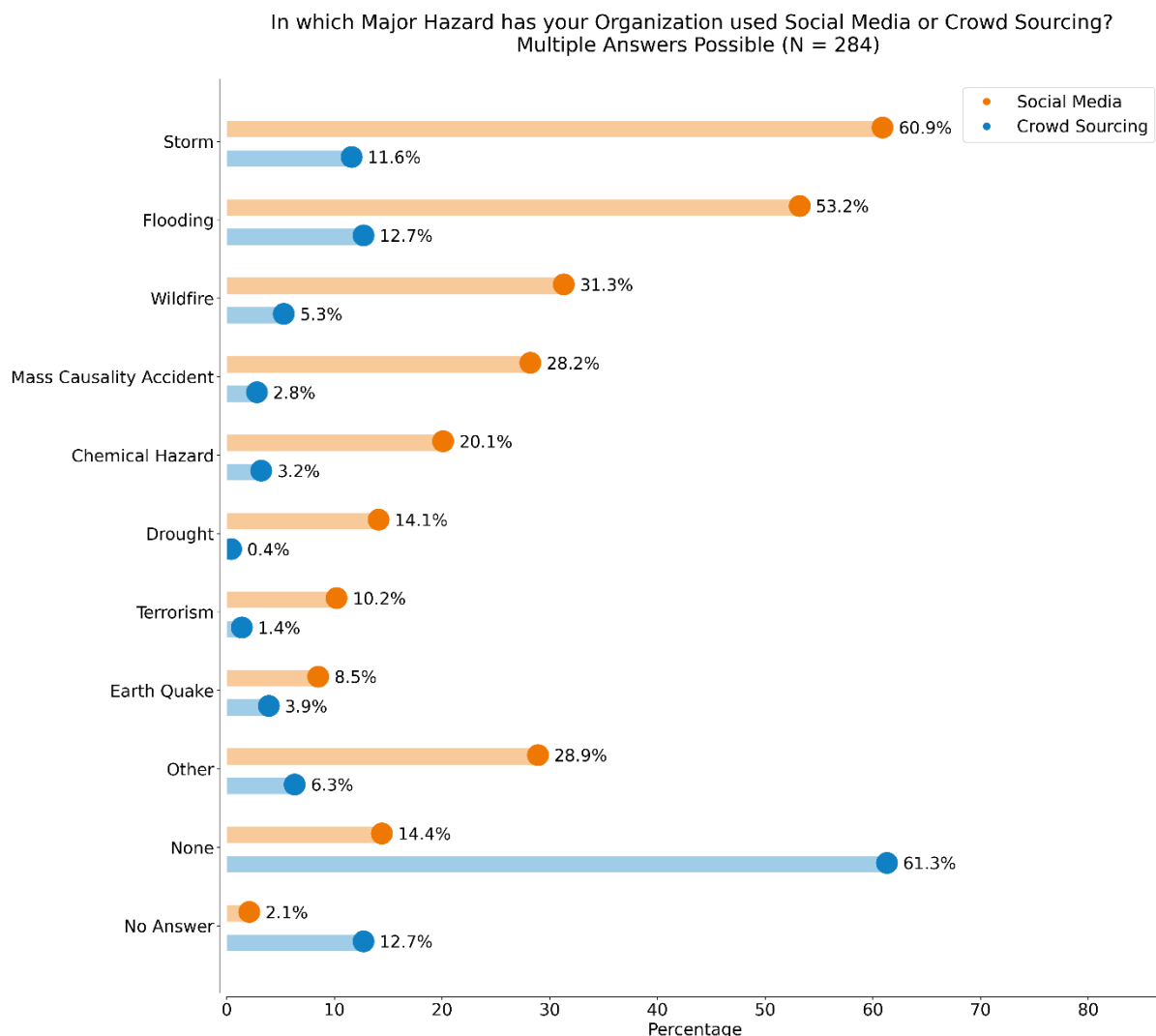
In this section, we bring together all the findings from our desk studies, interviews, and surveys across the five cases in the project. The results are presented using the three drivers of the Resilience Wheel. Here we highlight the state of the art from our desk studies and present the challenges and gaps in disaster-related practices identified during the empirical work.

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 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, 2017; Roche et al., 2013).

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

Figure 9: 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 management, but the practice for applying the methods and technologies is still not in place.

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 do however express that they **lack backup and acknowledgement from decision-makers on the strategic level to prioritize social media and crowdsourcing use** further than the case is today.

Second, disaster management organisations need to navigate large amounts of complexity when preparing for, responding to and recovering from a disaster. This requires very tight coordination of operations in disaster response. Operations involve coordination both within their organisation and in relation to other organisations. It appears that the **operational tasks and communication tasks are regarded as differentiated and separated as different tasks**

by some. Several 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?”

Interviewee: 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 disaster management organisations. To deal with this employing a “one-voice” policy is a prominent approach. This, however, is often interpreted as “top-down” communication procedures and may carve out more inclusive communication strategies both when it comes to in- and outward information flows.

Third, disasters are characterised by a lack of a common situational picture and uncertainty. Disaster management 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. This is for two reasons. First, it can potentially harm people if they are not correctly informed of how to handle a situation. Second, the dissemination of wrong information weakens the credibility of the organisation, which potentially can damage its reputation in the long run. In disasters, much coordination effort is devoted to the tasks of validating information, internally and between disaster management 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. Instead, our research shows the importance of professional experience, many years of training, sidekick training and tacit knowledge.

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 phases. There is however a need for a distinctive focus on the use in recovery and prevention. The lack of focus and resources devoted to these two phases is striking. This links to the classic silo-thinking in addressing disasters and a traditional notion of the response phase being the primary goal of disaster practice.

Finally, learning and evaluation from experiences with the use of social media and crowdsourcing is not a theme that disaster management organisations are very explicit about. Evaluation processes are important for learning in organisations: what worked, what did not work and how can the collaboration between authorities and citizens be improved in the next response situation? Learning from previous practices should thus be integral to disaster response and feed into recovery, prevention and preparedness measures. While much data is generated during disaster response, it ought to be analysed and translated into measures during recovery and prevention (Jamali et al., 2019).

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 are staff turnover, which prevents continuous development, young

Figure 10: Example EmerGent Guideline


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

[Click Here](#)



staff members being more eager to apply new technologies where decision makers are more conservative and reluctant to test new technologies, 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.

3.2 Digital Literacy

For implementing social media and crowdsourcing within an organisation, digital literacy is a necessary prerequisite. When disaster management organisations strive for resilience, they need more than hard technical skills to implement social media and crowdsourcing. Digital literacy is defined by capacities related to contextual, legal and technical skills.

Resource scarcity and prioritisation of social media and crowdsourcing are central barriers to building these capacities. Both when it comes to processing information in a timely manner during a response situation and when it comes to allocating the appropriately trained staff to different tasks, the available resources are often limited (Knox, 2023; Behl et al., 2022).

This is particularly the case for legal and technical skills. Many organisations lack the (trained) personnel to implement social media and crowdsourcing in their organisation. Missing expertise on regulatory frameworks such as the GDPR is restraining organisations from applying social media and crowdsourcing in general, as they are afraid to face legal consequences. Instead of increasing awareness towards data protection regulations, the GDPR functions as an entry barrier to applying social media and crowdsourcing. Especially smaller organisations face this barrier of allocating resources to technical and legal skills, however, also larger organisations with an active social media team have to restrain themselves from using multiple channels due to limited resources:

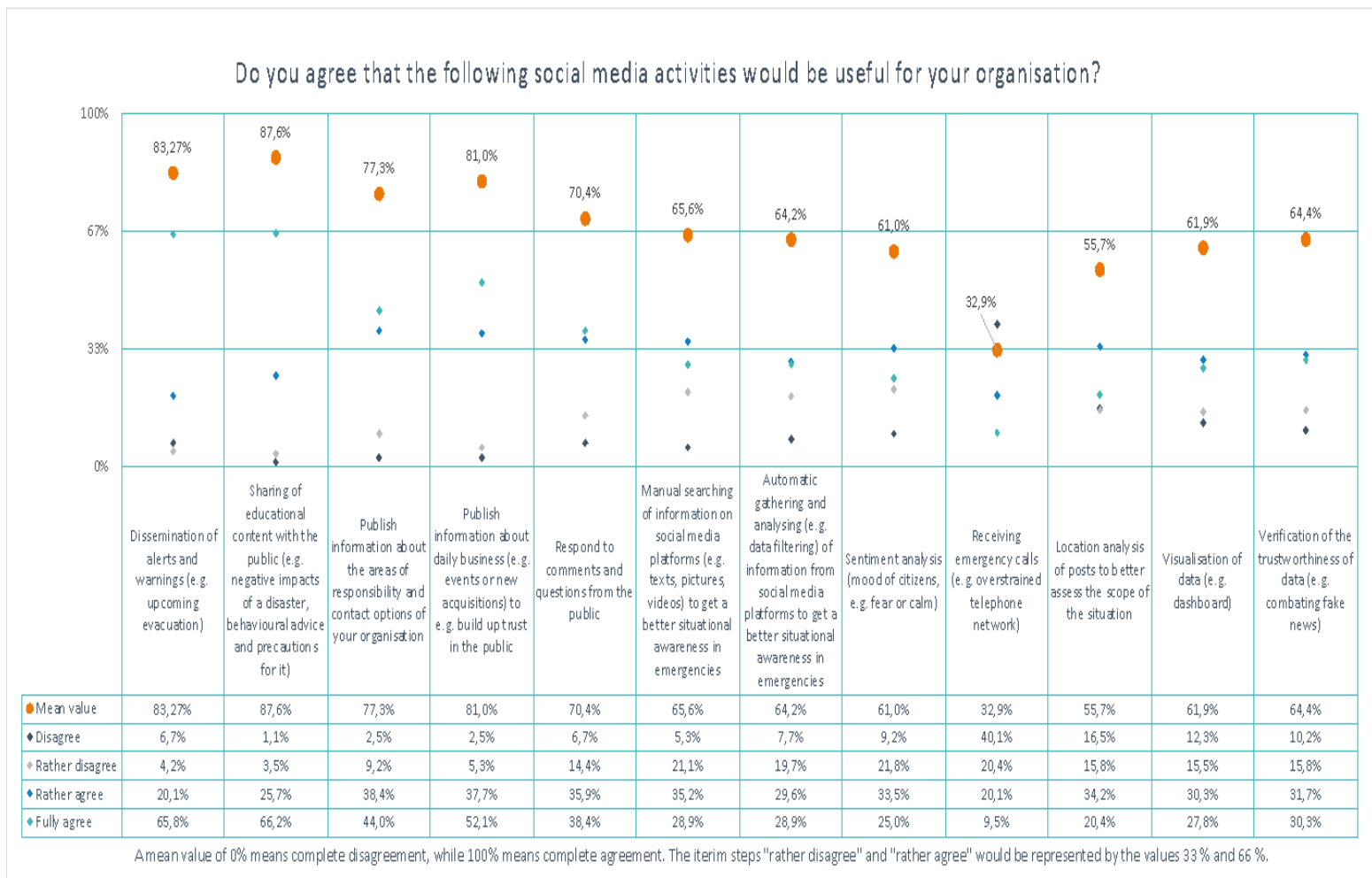
“We have considered using Facebook at some point, [...] but we have simply not had the resources for it [...]. There is everything we need to be aware of such as GDPR, cookies and all sorts of rules about how we should handle those things, so we have not actually done that. In the perfect world, if we 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 some organisations to apply social media and crowdsourcing** can be tied to the more general lack of technical skills in these organisations as well as the tailoring of the technologies to match the needs of the organisation. 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 11 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.

Figure 11: Usefulness of social media and crowdsourcing for organisations working with disaster risk management



Source: LINKS online survey. See D6.

Social media and crowdsourcing may help disaster management organisations monitor and gather information in the sense 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 open a window to the scene of the event and 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 disaster management processes by integrating a large amount of information from social media platforms providing comprehensive data for authorities and digital volunteers to analyse and plot. Humanitarian actors have proven this many times when using crowdsourced data to get a real-time overview of the crisis while unfolding (Morrow et al., 2011). Similarly, police forces across Europe have used social media and crowdsourcing for many years to facilitate efficient responses in the context of terror attacks.

"In the case of terror, [...] we know that something happened somewhere. [...] And then we start looking for what is where? [...] The Halle situation on the synagogue attack is a classic example of what terror is all about. [...] Something happens, and the term synagogue comes up, where actually the alarm bells should go off. And then there is first information in the social media. [...] we found this video that the bomber himself had recorded. It gave us a lot of information about the situation [...] where it became clear once again how important the social media were." (Government agency, Germany)

Nevertheless, many organisations have little or no existing knowledge about crowdsourcing and are hesitant to engage with the topic in the first place. 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 about the topic that highlights the potential of crowdsourcing – also in smaller organisations with fewer available resources.

3.3 Inclusion of Citizens

The inclusion of citizens is a central aspect of disaster management processes in the context of social media and crowdsourcing as these technologies and platforms have the potential to alter the relationship between disaster management organisations and citizens (see also Section 2 and D2.5).

Inclusive processes require action from both disaster management organisations and citizens. On the one hand, citizens need to be proactive and aware of disaster risks. On the other hand, **disaster management 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.

Disaster management 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 challenges the command-and-control mode of traditional disaster management processes. It requires organisations to rethink their long-standing, and what is often perceived as successful, procedures for disaster risk management (Raiso et al., 2019).

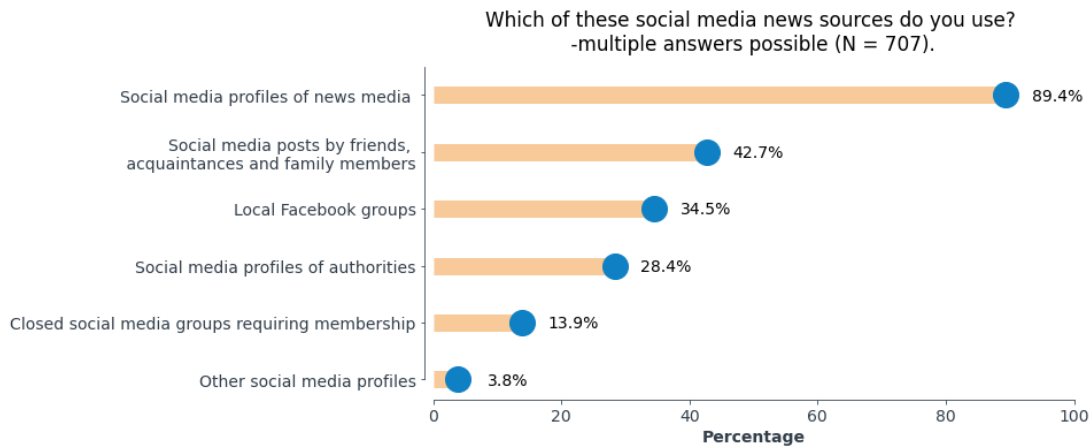
Moreover, command-and-control processes **tend to apply a “one size fits all approach”** when communicating risks to citizens. This is also the case in the context of social media where many organisations rely on social media as a traditional tool for top-down communication directed from disaster management organisations to citizens. This 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)

The problem is that **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.** Citizens are diverse. Uniform communication processes potentially miss informing people at risk because the message is not targeted to the group(s) at risk or communicated through the right channels. A survey conducted in a

municipality in Denmark² shows how citizens use a wide range of communication channels and have different preferences towards social media platforms.

Figure 12: Information sources of citizens on social media



Source: Risk Perception Survey, Wp3, conducted in Frederiksberg, Denmark.

Citizens tend to consume information from different platforms while none has universal coverage. 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 of disaster management organisations having 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 if spectacular (Pantti, Wahl-Jorgensen & Cottle 2012; Ghersetti, Ólafsson & Ólafsdóttir 2023). Despite the variation in the public's trust in legacy media (Newman et al. 2022), which varies across Europe, news media coverage will 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). The speed of the dissemination can be crucial and is provided by news media.

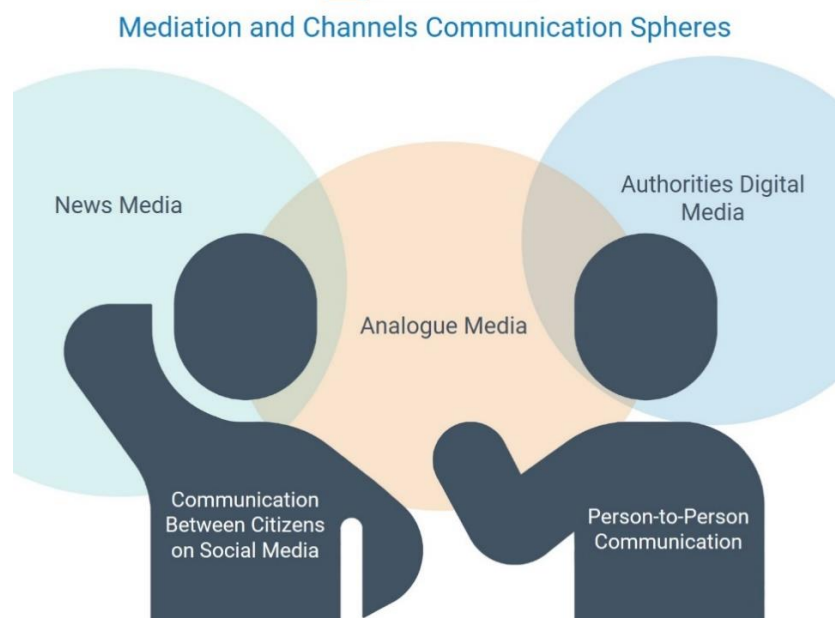
It follows from the fact that not all people follow social media and that those who follow social media have diverse platform preferences (Newman et al. 2022), that it is crucial to involve

² 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.

news media in the dissemination of messages, to obtain an even higher reach. However, disaster management organisations always have to take into consideration that despite their use of several media, platforms and channels to reach the public with information, 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 paramount to a majority of citizens to make sense of the information received, but this stage of information processing is in most cases hidden from the authorities. People either talk to their neighbours, with 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, that contains valuable insights also for disaster management organisations. The messages meet reality and the usefulness, the obstacles and the overseen potential get revealed. People help each other, have an eye for the need of others, and these insights are of high value to disaster management organisations. In crises, authorities can provide information on their own websites, through apps, and text messages and on their social media platforms, 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 13).

Figure 13: Mediation and Channels Communication Spheres



Source: Authors

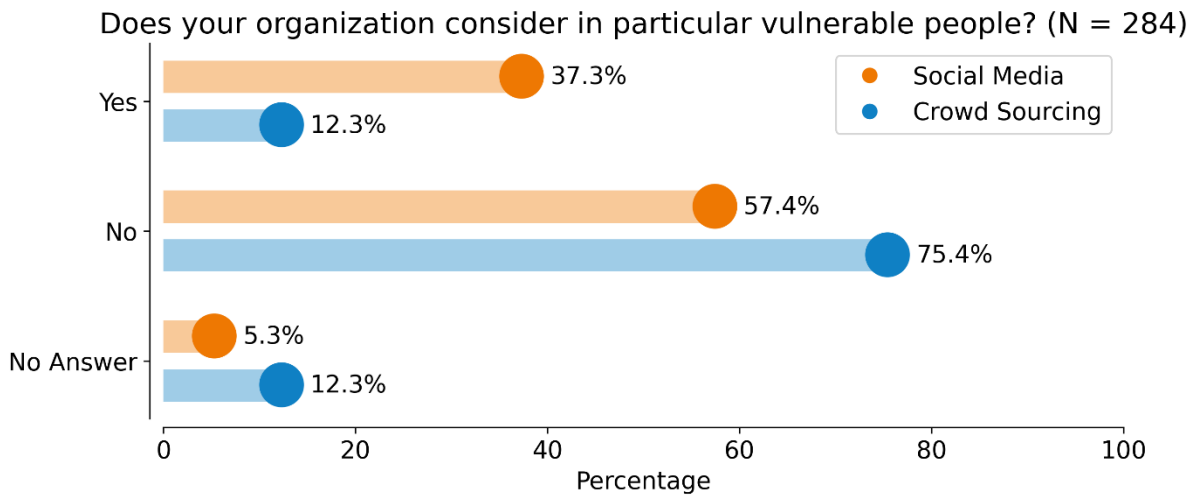
In some cases and targeting some groups of citizens, digital communication is not an option. Power failures complicate the use of digital media, cyber attacks or hybrid attacks might cause situations where platforms and websites can't be applied. In the Danish case, some elderly residents express that they do not use digital media, but prefer that information is conveyed through other means.

Finally, command-and-control procedures allow for control over the quality of information as communication is coordinated and verified before being disseminated to citizens. The information on social media raises concern among most organisations working with disasters. 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. As highlighted earlier, organisations' credibility is dependent on ensuring that quality information is provided (e.g. Jin et al., 2014; Kankanamge et al., 2020). However, there are challenges with social media and crowdsourcing with regard to verification and constant 'fact checks' (Harrison & Johnson, 2019).

We must not ignore that disasters are socio-political processes and disaster risk is a social construction (Raju, Boyd and Otto, 2022). In this context, it is very relevant to be concerned about how social media and crowdsourcing may negatively influence the risk landscape (See D2.1; D2.2 and D2.7). Moreover, already vulnerable populations for example those who are outside the digital world, will not gain from sound and correct information disseminated on social media. 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 (D2.1 and D2.2; Harrison & Johnson, 2019). This leaves us with a fundamental question of how should this be governed.

Diversity is central to disaster risk management. This can be in any form, for example, gender, age, ethnicity, and economic status, to name a few, are factors that need to be considered when analysing the effect of social media and crowdsourcing on disaster management processes (Carley et al., 2016; Gill & Bunker, 2012; Harrison & Johnson, 2019). Further, with this diversity, it is important to ensure that cultural sensitivity is applied to understand risk and vulnerability and to respond to disasters (Nielsen, Bonati & Andersen 2023). 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 14 below shows that many disaster management organisations do not consider vulnerable groups when they work with social media and crowdsourcing.

Figure 14: Consideration of Vulnerable People



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

Our results show that the inclusion of citizens is lacking in disaster management processes. This refers to a lack of 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 disaster management organisations' concern about credibility. With the different products developed throughout the LINKS project, we aim to encounter these shortcomings to increase societal resilience through better citizen inclusion in disaster management processes.

In section 4 we present the products 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

All organisations will have to 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 the foundational conceptual basis to explore what role social media and crowdsourcing plays in disaster risk management. The three drivers in the Resilience Wheel helped with the process of data collection, data analysis and to chart the recommendations in this section. In this section, we present a set of broad recommendations to address the challenges highlighted in Section 4. While local contexts are central, the recommendations suggested here can be applied broadly. As a result of the LINKS project, different sets of practical tools have been developed to address various social media and crowdsourcing challenges in disasters. For each of the recommendations suggested below,

we highlight which tools from the project can serve as a basis to approach the recommendation. In the second part of this section, we provide a brief overview of these different resources which are available through the LINKS Framework (see D5.5 (forthcoming)) at the LINKS Community Center.

This is not an exhaustive list that will overcome all challenges highlighted in Section 4, however, these recommendations support organisations in working actively with setting a pathway for European disaster resilience.

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

Governmental actors are increasingly using social media and crowdsourcing platforms in disasters. These platforms may provide a window of opportunity to manage disasters more efficiently and inclusively. Our research shows that social media and crowdsourcing are often used in an ad-hoc manner, as mono-directional communication and without utilising the management potential provided by these technologies. Limited knowledge of the potentials of social media and crowdsourcing as well as the challenges associated with their implementation refrain organisations from using these technologies and platforms in disaster risk management. Raising awareness of the need to build 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).

For organisations to harvest the value of social media and crowdsourcing in disasters, there appears to be a strong need for a strategic and pre-designed approach to including them in various organisational processes. This could include setting official objectives for using social media and crowdsourcing, considering who such processes are implemented for, how social media and crowdsourcing are best implemented and agreeing on procedures for evaluation. For this specific recommendation, the following tools could be of use to organisations wanting to start the formalisation process:

- **The Social Media and Crowdsourcing Guidelines Library** contains guidelines on how to increase the formalisation of social media and crowdsourcing in organisations. This includes guidance on how to create a social media and crowdsourcing strategy and what is needed in such a strategy;
- **The Resilience Wheel** provides an entry point to start discussions on how to set a strategic direction for using social media and crowdsourcing in disasters. It furthermore provides a tool to collectively assess current practices and use of social media and crowdsourcing in an organisation.

4.2 Recommendation II. Allocate resources to social media and crowdsourcing activities

Integrating social media and crowdsourcing into organisational processes can encounter several barriers in terms of training, liability and financial resources (see also Habig et al., 2020). A key solution to this is to allocate resources to activities that increase the capacities, both technical and legal, within an organisation. Resources do, however, not always have to be tied to an increased budget. One solution could be to allocate time for training or education within the organisation, to boost volunteerism units, or to pool teams together. Especially for organisations that act on the operational level and in smaller organisations, this would redistribute some of the capacities. Social media teams tend to work in shifts, they need to be of sufficient size which makes them inaccessible for small organisations.

For this specific recommendation, the following tools could be of use for organisations to consider:

- **The Including Citizens Handbook** provides training on how to use social media and crowdsourcing to include citizens in disaster risk reduction efforts. Moreover, it provides a section on how to coordinate and include volunteers to increase capacity during disaster response;
- **The Social Media and Crowdsourcing Guidelines Library** is a freely available resource that provides a large set of guiding materials on how to overcome some of the main barriers to using social media and crowdsourcing in disasters. This includes guidelines on how to set up social media teams.

4.3 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.

For this recommendation, the following resources may help different organisations working with disasters to achieve this goal:

- **The Including Citizens Handbook** overall provides training on how to better include citizens in disaster risk reduction efforts. Two sections are of particular relevance to this recommendation: the sections on raising risk awareness and the section on accessibility;
- **The Social Media and Crowdsourcing Guidelines Library** contains guidelines on how to target communication to citizens;

Additionally, a **Policy brief on targeted communication** (see Annex to this report) was developed specifically to support this recommendation.

4.4 The LINKS Framework and the LINKS Community Center: 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 that are freely available through the LINKS Framework. The Framework is designed in a way that helps with User Guidance (see D5.5 forthcoming) at the LINKS Community Center. The LINKS Framework brings together the different resources developed during the project. The Framework revolves around two main themes: engaging with citizens (collecting information, mobilising citizens, mobilising volunteers) and improving communication (targeting communication, ensuring credible information and making information accessible). The Framework guides relevant stakeholders using a set of questions to find the most appropriate “answers” through the different resources that can help them to address their social media and crowdsourcing challenges within the realm of the two themes. The main aim is to orient and guide users towards the different resources through a new, simplified User Guidance approach which – at the moment of writing (May 2023) – is being implemented both in the Framework and in the Links Community Center. It is worth noting that the Framework is the result of three years of work (see: D5.3, D5.4 and D5.5 (forthcoming)) that led to an integrated set of useful resources under the thematic areas mentioned above.

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 management processes. A detailed description of the process and The LINKS Framework is provided in the Last version of the LINKS Framework (see D5.5 (forthcoming) and D6.5 (forthcoming)).

In the following sections, we present the challenges highlighted above: The Including Citizens Handbook; The Guidelines Library; and the Resilience Wheel (moving from concept to practice). Further, we also present a draft of a policy brief being developed on targeted communication in disasters in the annex.

4.5 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 management processes, we identified that organisations need holistic approaches to redesign their internal processes on that matter. This speaks directly to recommendations II and III on how to target and diversify communication and how to 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

three main resources developed to address the

Figure 15: 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.

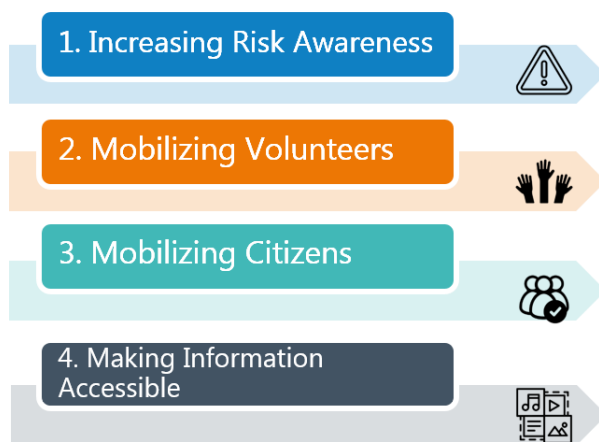
Link to the Handbook:

Click Here



management organisations develop their practice for applying social media and crowdsourcing to include all citizens, including vulnerable groups, to secure resilience?” we are developing four interactive online modules targeting European disaster management organisations. Each module corresponds to one section of the Handbook:

Figure 17: Sections of the Including Citizens Handbook



Each of the four sections serves a different purpose tied to the overall theme of including citizens.

For the *Mobilizing Volunteers* section of the handbook, we identified in the case assessments that volunteers can play a crucial role in increasing societal resilience. This is because they can bring extra resources and knowledge into disaster risk management processes. 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).

Figure 16: Development of the Including Citizens Handbook

Theory: The Handbook is based on the joint effort of the knowledge bases “Disaster Risk Perception and Vulnerability” and “Disaster Management Processes” (see D2.5) and directly supports the shifting and bridging mechanism described in Section 2

Empirics: The idea of the Handbook builds on the results of the first case assessment that showed how organisations rarely harvest the full potential of citizen engagement when using social media and crowdsourcing (See Section 3 or D2.7). Furthermore, we conducted additional expert interviews to develop the case examples.

Practice: The concrete themes and sub-themes were co-developed within the LINKS Consortium (e.g. LINKS Annual Meeting in 2022) and in an interdisciplinary working group of disaster management practitioners and researcher from across Europe. This working group was a weekly co-creation meeting where practice organisations brought their perspectives on the themes, sub-themes and structure of the handbook. The online format is an outcome of this. The training online modules were validated with additional practitioners outside the working group to ensure their practical relevance. This includes the Danish Red Cross in January and February and the representatives from European law enforcement agencies in June 2023 (LINKS Annual meeting)

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 disaster management organisations that aims at assisting them 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.

Figure 18: 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 a disaster management 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 from the Red Cross working with the Ready2Help App.

Lastly, the two sections deal with *Making Information Accessible* and *Mobilizing Citizens* are informed by the Disaster Risk perception and vulnerability knowledge base (WP2). Developed in correspondence with the Civil Protection of the Province of Terni, 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). How this can be counteracted is therefore the main goal of these two handbook sections.

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 disaster management organisations that want to increase citizen inclusion within their organisation (see D2.5 for a detailed description and example)

Fourth, we provide a collection of further materials such as guidelines, reports and case studies. These aim to serve as a starting point for practitioners to further engage with one of the topics addressed in the Including Citizens Handbook. While some of the guidelines and use cases are specially developed and collected for the including citizens handbook, we are also using the handbook to present contextualised resources from the Guidelines and Use Case Library collected in other parts of the project.

4.6 The Social Media and Crowdsourcing Guidelines Library

Getting an Overview of Social Media and Crowdsourcing in Disasters

Existing research shows that social media and crowdsourcing are often used in an ad-hoc manner, as mono-directional communication and without utilising the management potential provided by these technologies (Graham et al., 2015; Harrison & Johnson, 2019; Migliorini et al., 2019). 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 management are recent developments in disaster risk management, the landscape of regulatory frameworks, policies and guidelines and 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. It contains a total of 59 documents – still counting, which are described and categorised at the LINKS Community Center.

The guidelines cover a range of topics that guide organisations in addressing 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;

Figure 19: 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 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

Disaster Management 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



- Consideration of legal requirements; when using social media;
- Verification of information from social media;
- Use of technologies to support work with social media;
- Support of vulnerable 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. The filters allow you to search on:

- Language;
- Disaster management phase;
- 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)

Figure 20: Development of the Guidelines Library

How was the Guidelines Library developed?

Empirics: The guidelines in the guidelines library are based on a systematic review of all existing guidelines on social media and crowdsourcing (see Nielsen and Raju 2020). The review has continuously been updated between 2020 to 2023.

The Guidelines Library is one out of three libraries (see also D4.4). The three LINKS Libraries operate as a tightly integrated information model (see D2.7), which is made accessible through the same technical solution (LINKS Community Center).

Practice: The structure, filters and synopsis are informed by and tested through a survey, several workshops with representatives from European disaster management organisations as well as by field tests within DHpol and the European Federation for Fire Officers. The structure and the filter system is co-designed between FEU, University of Copenhagen, Safety Innovation Center and DHpol between 2021 and 2023.

One central output from the taskforce during the second case assessment is that the filter system changed from AND to OR following a set of workshops held in the LINKS consortium as part of the 2nd Case assessment. Likewise, the need for translations of the Guidelines Library was discussed and tested by organisations in the LINKS consortium, which made us settle on an automated approach through the browser of the user.

4.7 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. Using the tool in a workshop format can support organisations in strengthening and formalising social media and crowdsourcing use in their disaster risk management efforts.

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 in the sense that 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. Using the Resilience Wheel as the backdrop, we suggest a three-step process outlined

Figure 21: 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

Click Here



below that an organisation may take to assess the potential of using social media and crowdsourcing in disaster risk management.

Step I: Identify current practices of using social media and crowdsourcing in disaster risk management

Organisations working with disaster risk should begin by identifying their current uses of social media and crowdsourcing in disaster risk reduction and how these practices speak to organisational collaboration, citizen inclusion and technical skills.

This exercise can be done by bringing different departments together from the organisation or by bringing different organisations together, which work closely in disaster risk reduction efforts. The format may be a workshop or seminar where each of the resilience drivers is discussed in turn in relation to ongoing activities by workshop participants.

Step II: Identify the strategic potential in furthering the use of social media and crowdsourcing in disasters

In the second step, workshop participants should discuss the outcome of the initial mapping. Are some of the drivers and sub-themes more prioritised in current activities compared to others? Where do participants see the need for further formalisation of social media and crowdsourcing use and what activities are needed in the organisation? This discussion may take place as part of the initial workshop or as a separate workshop when the outcome from the first steps is analysed.

Figure 22: Development of the Resilience Wheel.

How was the Resilience Wheel concept for practice developed?

Theory: The Wheel is based on the conceptual approach presented in Section 2.

Empirics: The first cross-case assessments – both survey and interviews informed the re-working of the drivers and sub-themes. See the entire set of drivers and sub-themes in Annex II (see also D2.7).

Practice & Impact: The concept for practice was co-created with practitioner partners in the LINKS consortium. This co-creation process started in the Spring of 2022 where all practice partners were invited to a collective brainstorm on the functions of the Wheel in their organisations. This was carried out as bilateral meetings and as workshops throughout 2022.

After adjusting the wheel to a concept for practice, the Wheel was carefully translated and adopted to test in four of the LINKS consortium's organisations: The Greater Copenhagen Fire Department, The Safety Region of South Limburg; DHpol and Frederiksberg Municipality. The tests were – and continue to be – conducted through LCWs with different stakeholder constellations depending on the context.

Figure 23: Resilience workshop conducted at the Greater Copenhagen Fire Department in February 2023



Source: LCW report, Greater Copenhagen Fire department, feb. 2023.

Step III: Prioritise actions with the most potential for formalisation and implementation

Having local conditions in mind, organisations may develop a list of potential actions for strategic activities based on the mapping exercise carried out under step I and II. Organisations should conduct a feasibility analysis of the proposed actions to identify which is more suited for implementation in the concrete context. Here, it becomes paramount that organisations consider the specific circumstances – from financial resources to overlapping and conflicting interests within the organisation. Once a list of actions has been completed, the organisation may consider including these activities in formal planning and strategies.

In Annex II we present different considerations to be made by organisations working with disasters in using social media and crowdsourcing. These considerations, which can also be seen as prerequisites for organisations using social media and crowdsourcing are categorised into the three drivers of the Resilience Wheel.

5. CONCLUSION AND WAYS FORWARD

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.

This report is the result of an organic process of understanding the role of social media and crowdsourcing in disaster risk management processes in Europe since 2020. It not only consolidates the state of the art and findings from our data but also presents new pathways in addressing the challenges identified. It must be highlighted that continuous engagement, discussions, debates and reflections with the different case assessment teams, and different stakeholders have resulted in shaping our overall novel comprehensive understandings and the individual resources (such as the Resilience Wheel, the Guidelines Library etc).

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. Further, 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.

5.1 Next Steps

To leverage the findings and the different resources developed, we are communicating with different organisations working with disasters within the consortium and externally on the potential use of the products. Further, our work on The Resilience Wheel specifically has already been incorporated into teaching materials at the University of Copenhagen's disaster management education.

In the next 6 months, while we continue to develop these various pathways to help build disaster resilience, each of the resources will continuously be discussed and disseminated with relevant external stakeholders and their platforms such as PreventionWeb; The Red Cross Red Crescent Societies and UNDRR Europe. In the coming months running to December 2023, we have planned to develop videos to highlight key findings and pathways on disaster

risk management processes in the context of social media and crowdsourcing. These will be available as a companion to reading this report.

For the resources developed as part of this knowledge base, a set of activities are currently in the pipeline. First, to finalise the resources and solve some remaining issues related to their use in organisations across Europe. This includes:

- Create a strategy for how the Guidelines Library is updated with newly available resources beyond the end of the LINKS project;
- Create detailed instructions for how to facilitate a workshop using the Resilience Wheel as the guiding tool so all organisations will have the possibility to use the tool without input from the developers;
- Finalise all sub-themes in the Including Citizen Handbook as digital training modules.

Second to ensure further implementation of the products in organisations that are part of the LINKS project. This includes:

- Implementing the Guidelines Library, Resilience Wheel and the Including Citizens Handbook as teaching material at DHpol (Germany);
- Using the Resilience Wheel as a workshop tool to facilitate dialogue between Frederiksberg Municipality (Denmark) and a set of local stakeholders important for the municipality's disaster risk reduction effort (e.g. the local utility company);

Third, to introduce all the resources to a new set of European stakeholders and thus ensure that our resources are part of a broader landscape of knowledge resources within the European disaster risk reduction research community. As part of this effort, to assess the potential for integration of our products within European knowledge platforms (e.g. CMINE, Disaster Risk Management Knowledge Centre platform).

Fourth, to discuss the potential for integration within a global knowledge platform (e.g. preventionweb, UNDRR disaster scorecard) recognising that our products are parts of a global knowledge landscape within the disaster risk reduction research community.

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7. ANNEX I: DRAFT POLICY BRIEF



Targeting Communication in Disasters

Populations in disasters are often assumed to be homogenous. However, targeting communication for different groups of citizens based on their individual needs and capacities allow for efficient disaster risk management. Targeted communication is also important in the context of increased use of digital technologies such as social media and crowdsourcing to manage disasters. In order to be effective, communication should be inclusive and consider specifically vulnerable populations.

Context

The primary goal of communication with citizens before, during and after a disaster is to provide information and advice that potentially reduces disaster impacts and ensures citizen safety. This serves a dual purpose: first, it helps to prepare and protect citizens from harmful impacts of disasters and second, it facilitates efficient operations for the organisations working with disaster risk management by encouraging cooperation with their advice. It is crucial to acknowledge that citizens possess valuable skills, resources, and they are more likely to act on advice from the organisations working with disaster risk management when they are sufficiently targeted and informed. Communication is a two way street and citizens can play an active role in this process. However, citizen's skills are ignored and it is commonly assumed that large populations at risk of disasters have uniform information needs. This assumption fails to take into consideration the inherent diversity and vulnerability of large populations and in turn their differential needs, capacity, and resources. This exacerbates peoples' vulnerabilities during different disasters. Therefore, effective communication requires targeting different groups who are most susceptible to a specific hazard followed by targeted messaging that meets the varying needs of different groups.

Targeted communication meets the dual purpose of citizen's needs and the goals of organisations working with disaster risk management.

Why to target disaster communication?

Maintain Credibility

Citizen trust in different organisations working with disasters is vital for successful disaster risk management. Citizens expect that communication from these organisations meets their needs and addresses their concerns. Meeting these expectations increases citizen trust and gives credibility to information and advice provided by various organisations. Considering this, it is important to identify those needs and provide consistent and specific information to citizens. Further, in order for communication to be successful, various organisations working with disaster risk management must invest in information collaboration and coordination for volunteers before, during and after disasters.

Increase Citizen Engagement

Targeting different groups of people within a population makes crucial disaster information accessible to everyone. Access to information not only allows people to grasp the urgency of information provided but also encourages their participation. Citizen engagement and participation such as volunteerism with their valuable skills and capacities allows for gathering citizen insights and experiences which can be helpful in decision-making that are rooted in local realities and contexts. This can only be achieved when citizen's skills are recognised and utilized in disaster risk communication.

Efficient use of resources

It is of immense benefit to plan for targeted communication during preparedness activities due to availability of time and other resources to analyze the needs of different groups. This is often not possible when disasters occur as the focus is on urgency of decision making.

Targeting citizen's needs matters in disaster communication to not only establish trust between citizens and organisations working with disaster risk management organisations but also to improve citizen engagement during disasters.

Targeting communication in policy and practice: Ways Forward

Recognise diverse needs for information and media use

In addition to having differential information needs, it is also important to consider that people hold varying media preferences and therefore need to be reached through different channels and media outlets. Therefore, it is essential for organisations working with disasters to map out the media choices of their target audiences in the current diverse media landscape, including social media platforms and digital solutions, to effectively communicate important messages. However, it is equally important to recognize the limitations of digital media, as not all citizens approve of its use, and power failures or other technical issues may hinder communication. Therefore, backup channels of information dissemination and communication must be planned for in such situations.

Identify the diverse needs of different groups of citizens

Socio-demographic characteristics such as age, nationality, language, type of housing, characterization of household members, social networks, religion, ethnicity, economic resources, disabilities, and other vulnerabilities can often define, and influence individual needs for information. Further, hazard-specific

situational conditions are crucial in defining their needs as people can be directly or indirectly affected by disasters.

Targeted communication during disaster preparedness and response

Targeted communication during disaster preparedness allows for an iterative process with room for testing, feedback, change and follow-up activities. Building trust with citizens is a gradual process and various organizations working with disaster risk management can benefit from nuanced understandings of targeted communication in planning which also strengthens operations when disasters occur.

This can be achieved by implementing a targeted communication strategy into the organization's existing planning and training documents. Continuous monitoring, evaluation and follow-up during disaster response is crucial to address the concerns and needs of citizens at risk.

More recently, it has become apparent that digital technologies have become indispensable tools for communication in disaster risk management. However, it is important that we must focus on communication strategies that are efficient and inclusive. We propose targeted communication as an overarching strategy under given situations of vulnerabilities, high risks and uncertainties.

Action points

- ✓ Disaster management organisations can map out and identify different target groups, their information needs, actions to take, advice to provide, and preferred media using the parameters listed above. This must be done in a manner to suit the local context.
- ✓ It is also the responsibility of these organizations to determine which activities related to a certain disaster could be handled by each target group independently and when they may require support or assistance.

Key Takeaways

- ✓ Targeted communication is an effective strategy to meet diverse information needs for efficient and inclusive disaster risk management.
- ✓ Targeting communication helps in building citizen trust and encourages citizen engagement in disaster risk management.
- ✓ Use of digital media must be inclusive and ensure that the most vulnerable citizens have access and know how to use different forms of media.
- ✓ Understanding population diversity, vulnerability, the local context and incorporating this into existing disaster risk management actions is key.

<https://links-project.eu>

<https://links.communitycenter.eu/index.php/Welcome!>



Sources and further reading

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8. ANNEX II: CONSIDERATIONS FOR THE RESILIENCE WHEEL

COOPERATION WITHIN AND BETWEEN ORGANISATIONS

- Organisations should take on an *evaluative* approach to lessons learned within and across organisations;
- SMCS use should be *strategic* and integrated in communication plans and cooperation agreements. The purpose of using SMCS and its audience should be taken into consideration in the strategic planning;
- Information communicated through SMCS should be *consistent* across organisations to avoid confusion and mistrust in the information communicated from different organisations;
- Experiences and know-how of applying SMCS should be *shared* within and across disaster management organisations to allow for better integration and coordination.

DIGITAL LITERACY

- SMCS platforms and processes should be selected and *contextualised* to the needs and identity of the organization(s) using them;
- The use of information obtained through SMCS platforms should be grounded in *legal* principles and adhere to existing regulations concerning privacy and data protection;
- Organisations need the right *technical skills* and know-how to act digitally in disaster management processes;
- SMCS use should support a direct, fast and *efficient information* communication and allocation of resources in disaster risk management.

INCLUSION OF CITIZENS

- SMCS use has immense potential of informing and mobilising citizens if it is active and *engaging* allowing for citizens to contribute and partake in disaster management efforts;
- Information communicated through SMCS should be made *accessible* to all citizens across digital divides. This includes considerations about the extent to which information provided through SMCS also must be provided via other means for those outside the digital world;
- *Reliable* and trust-worthy communication between organisations and citizens allow for greater coordination and collaboration of action and limits false information;
- The use of SMCS should be carefully *tailored* to diverse perceptions of risk and be sensitive to a broad range of people with different cultural, social and economic backgrounds.