



LINKS

Strengthening links between technologies and society
for European disaster resilience

D2.6 REPORT ON THE MONITORING OF DRPV – RELATED BROADER CONTEXT APPLICATION

Research Report

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NOVEMBER 2023



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



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Deutsche
Hochschule der Polizei



DOCUMENT INFORMATION

Grant Agreement	No. 883490	Deliverable Due Date	30 November 2023
Project Starting Date	1 June 2020 (42 months)	Actual Submission	30 November 2023
Deliverable Number	D2.6 WP2	Leading Partner	UNIFI

KEYWORDS

Vulnerability, Risk perception, Research activities

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VERSION HISTORY

Release	Status	Date
0.1	Initial Draft	16 October 2023
0.2	Internal Review	06-13 November 2023
1.0	Final Version - Submitted to EC	30 November 2023

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CITATION

Suggest citation: Froio, C., Nardini, O., & Graziani, F. (2023). Report on the Monitoring DRPV – related Broader Context Application. Deliverable 2.6 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/>

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, due to the use of SMCS in disasters in different ways and under diverse conditions. In this context, the overall objective of LINKS is to strengthen links between technologies and society for improved European disaster resilience, by producing sustainable advanced learning on the use of SMCS in disasters. This is done across three complementary knowledge domains:

- Disaster Risk Perception and Vulnerability (DRPV)
- Disaster Management Processes (DMP)
- Disaster Community Technologies (DCT)

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

About this deliverable

The present deliverable is divided into two core sections. The first focuses on the latest stage of development of the Knowledge Base on Disaster Risk Perception and Vulnerability (KB DRPV), following the elaboration of the outcomes of the desk research conducted on the most recent literature on the subject. The second section presents the final version of two products directly related to the Knowledge Base, the Including Citizens Handbook and Feel Safe, and specifically describes how the two platforms can support practitioners working in disaster management in engaging with citizens (the Handbook) and with children (Feel Safe) by using digital tools. The document also presents the long-term vision on the usage of both products after the conclusion of

the LINKS project, as it outlines the further implementation of the online platforms and a dissemination strategy.

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LIST OF ACRONYMS

Acronym / Abbreviation	Description
DRM	Disaster Risk Management
DRPV	Disaster Risk Perception Vulnerability
DRP	Disaster Risk Perception
DRR	Disaster Risk Reduction
KB	Knowledge Base
LCC	LINKS Community Center
LCW	LINKS Community Workshop
NGO	Non-Governmental Organisation
SDG	Sustainable Development Goal
SMCS	Social Media Crowdsourcing
UN	United Nation
WP	Work Package

DEFINITION OF KEY TERMS¹

Term	Definition
Disaster	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.
Disaster Risk Management	Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.
Disaster Risk Reduction	Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.
LINKS Community Center	The LCC brings together different stakeholders (LINKS Community) in one user-friendly and flexible web-based platform and enables them to exchange knowledge and experiences and to access, discuss and assess learning materials on the usage of SMCS in disasters.
LINKS Framework	The LINKS Framework consolidates knowledge and experiences on the uses of social media and crowdsourcing in disasters, into products for relevant stakeholders. The Framework is accessible online through the LINKS Community Center, and can be used by stakeholders to openly explore knowledge, or as a strategic planning tool for guiding disaster management organisations in their planning for using social media and crowdsourcing in disasters.
LINKS Knowledge Base	The outputs and knowledge obtained from the assessments of the three knowledge domains. The knowledge is used to develop the LINKS Framework.
Risk Perception	Risk perception is the way individuals and groups appropriate, subjectivise and perceive risks that might or might not be calculated in an objective manner during risk assessments. The importance of studying risk perception more seriously is obvious: risk perception directly influences people's ability and level of preparedness. Risk perception covers what is also referred to as "risk awareness".

¹ Definitions are retrieved from the LINKS Glossary: <https://links-project.eu/glossary/>

<p>Vulnerability</p>	<p>The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.</p> <p>The LINKS project focuses on social vulnerability, which is interpreted as a function of exposure, susceptibility and resilience. It is a pre-existing and dynamic condition, result of processes built over time (e.g., social power relations at national and international levels) and all the environmental and social circumstances that allow or limit community's capacity to deal with risks.</p>
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1. INTRODUCTION

The present document represents a progression from the previous deliverable (D2.5: Froio et al., 2023), as it presents, on one hand, the monitoring of the **Knowledge Base (KB) on Disaster Risk Perception and Vulnerability (DRPV)**, on the other, the latest stage of development of two products, i.e. **the Including Citizens Handbook**² (specifically two out of four sections, i.e. *Making information accessible* and *Mobilizing citizens*, both developed by the University of Florence, UNIFI) and **Feel Safe**³ (Save the Children Italia, SCIT).

As for the KB on DRPV, the deliverable provides an overview of its evolution since the beginning of the project until the latest improvements, as shown in D2.5 (submitted in May 2023), highlighting the key findings about, on one side risk perception, on the other, vulnerability. The state of the art is based on the desk research carried out in the last months: as it will be explained, the new findings should be regarded more in terms of *consolidation* of previous conclusions and *further review* of data gathered from SMCS (Social Media and Crowdsourcing) during or after a hazard. In the context of the application of the KB within the LINKS partners and in the broader context, the deliverable provides an overview of how the KB has been applied through, on one hand, the implementation of the products (specifically the Handbook), on the other, a series of dissemination activities (conferences, workshops, policy briefs).

Regarding the products, as the document highlights, the Handbook, if compared to its version presented in D2.5, nowadays is:

- Completely digitalized and implemented with its core sections (i.e., *Making information accessible*, *Mobilizing citizens*, *Mobilizing volunteers*, *Communicating risk*), and their relative sub-sections;
- Enriched with new visuals, especially short videos already translated in the languages of the consortium (English, Italian, Dutch, German, and Danish), also available on LINKS official YouTube channel;
- Integrated in the LINKS Community Center (LCC) and fully accessible and linked to the user guidance in the LINKS Framework.

² https://links.communitycenter.eu/index.php/Including_Citizens_Handbook

³ https://links.communitycenter.eu/index.php/Feel_Safe

Figure 1: 'Accessibility' section graphical interface of the platform



The validation of the user experience of the two sections of the Handbook dealing with accessibility of information and mobilization of citizens, has been carried through a series of activities:

- An online survey that involved 12 participants (see Sec. 4);
- Three workshops (Osnabrück, Germany; Rome and then Terni, Italy, see Sec. 4);
- Five individual user story exercises with both LINKS partners and externals (see Sec. 5.2).

The online survey, launched in March 2023, was meant to gather feedback and inputs from practitioners, technicians, administration offices, and volunteers, mostly external to the LINKS project. The people involved were selected together with the Italian partner, Province of Terni (PDT) and the whole survey was translated in Italian so to include more users as possible.

As part of the validation process, the in-person workshops were key for the implementation of the product as well as for its dissemination. The first workshop (Osnabrück, Germany, July 2023) played a pivotal role in gathering insights from experts on how to build up the online platform and its articulation in core-sections and sub-sections. The following two workshops (Rome, October 2023, and then Terni, November 2023) aimed to show the whole product, how it was integrated into the LINKS Community Center, and the new videos. The workshop in Terni, in particular, provided the opportunity to launch the Italian version of the Handbook so to strengthen the link with the Italian context.

As for the five individual user story exercises, the detailed description of each exercise has a twofold aim. The first is to show in practice how the product is structured and articulated in macro-sections and sub-sections. In the context of the exercise, the users were asked to imagine the potential and real-life application of the Handbook, according to their experience and knowledge in the field of disaster and risk management. The second is to show in practice that the Handbook could be of relevance to different target groups. Hence, the exercise has been useful to understand the different ways the Handbook can support several audiences, including academics for research purposes.

Regarding Feel Safe, as previously highlighted in D2.5, the product has entered an advanced phase with its official public launch in October 2023, following months of testing and validation through workshops and activities with schools. The LINKS Final Event that took place in Rome at Save the Children Italy Offices (16-17 October) provided the opportunity to show Feel Safe to an international audience made up of experts in the field of disaster management, with a focus on children's risk awareness. The present document (Sec. 6) will also outline the additional activities being carried out for the month of November 2023, the final month of the project: in this context, the platform has been part of a project with a high number of children affected by the floods in Emilia Romagna region (Italy, May 2023).

The deliverable addresses different target audiences. Practitioners and stakeholders, including those within the LINKS Consortium, will be interested in the sections regarding the final stage of development of the Handbook and Feel Safe, particularly in their potential usage in different contexts and in a multi-hazard perspective (see Sec. 5 and 6). Additionally, researchers will find inputs for further research directions in the section on the state of the art of the KB on DRPV (see Sec. 2 and 3), which has been filtered and synthesized in a table (see Annex I), as well as in the LINKS Policy Outputs on how to ensure accessibility of information in disasters (see Annex II).

1.1 Reading guide

This deliverable is structured in the following sections:

- **Section 2** outlines the progression of the Knowledge Base on Disaster Risk Perception and Vulnerability (KB DRPV) starting from the first deliverables on the subject (D2.1: Bonati, 2021 on risk perception; D2.2: Pazzi et al., 2021, on vulnerability), until the latest submitted deliverable (D2.5). An introduction to the LINKS Policy Outputs on accessible information is included in this section (for the whole document, see Annex II), as part of the monitoring of the application of the KB in the broader context.
- **Section 3** provides an overview of the current state of the art on DRPV following the desk research and the elaboration of the relevant inputs coming from the most recent scientific literature on the subject. This section may be of relevance to researchers as it provides a review of relevant contributions on the topic.
- **Section 4** revolves around the methodology used to validate the Including Citizens Handbook (an online survey plus three workshops). The methodology here described is consistent with the preconditions of D2.7 (Lüke et al., 2022) and follows up the validation process as highlighted in D2.5.
- **Section 5 and Section 6** should be regarded as the core parts of the deliverable as each one describes the monitoring of the actual use of the products (i.e., the Including Citizens Handbook and Feel Safe) in a broader context application.
- **Section 7** concludes the report.

2. KNOWLEDGE BASE ON DISASTER RISK PERCEPTION AND VULNERABILITY: TRACKING ITS EVOLUTION FROM THE BEGINNING OF THE PROJECT

At the beginning of the LINKS project, one of the objectives of WP2 had been to identify the gaps in the scientific literature on Vulnerability, Risk Perception and their relation to social media and crowdsourcing (SMCS), as well as the eventual inconsistencies in the research methods used in this type of studies. What emerged from the in-depth review of the concept of vulnerability was one central gap that became the focus point of WP2's subsequent research: *Vulnerability has been generally regarded as a static and non-operational concept.*

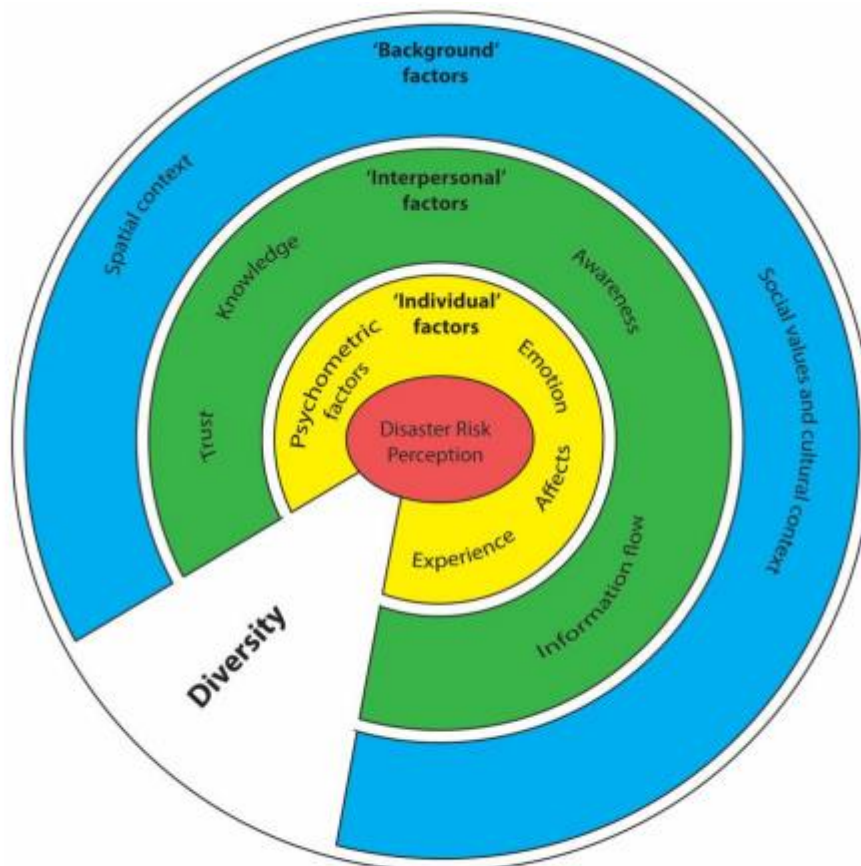
Henceforth, the first task of WP2 was to point out the importance of considering vulnerability and diversity as two closely entwined factors, and to integrate vulnerability in the larger social context through a holistic perspective. Following these considerations, the purpose of the D2.1 (Bonati 2020) was to establish the so-called Vulnerability-Paradigm that would help to identify different vulnerability profiles and to target the social groups who happen to be the most vulnerable to risks. The assessment of the DRPV then became a tool to understand how social media and crowdsourcing can:

- Shape vulnerability and have an impact on diversity (i.e., social and geographical disparities);
- Build resilience and social participation by creating connectivity.

The D2.2 (Pazzi et al. 2020) provided the second part of the Disaster Risk Perception and Vulnerability (DRPV) Knowledge Base (KB), focusing more on Disaster Risk Perception (DRP). The main assumption here was that the resilience of local communities can be enhanced once local risk perception is thoroughly understood. A three-level approach had been selected to evaluate DRP in relation to the use of social media and crowdsourcing (SMCS) and it considers several factors linked to the individual and to the environment.

- Background factors, i.e., geographical and socio-cultural contexts;
- Interpersonal factors, i.e., shared knowledge, awareness, information flow and level of trust;
- Individual factors, i.e., personal experience.

Figure 2. The main factors in Disaster Risk Perception (DRP) (from D2.2, p. 17)



Source: Authors' contribution based on Lai et al. (2018) and Renn & Rohrmann (2000), adapted to include the 'diversity' concept

Among the key takeaways from D2.2 was that social media could make a difference in the perception of risk in the sense that they can increase the level of knowledge and awareness but, on the other hand, could also be responsible for disinformation or misinformation.

The assessment of the knowledge base consequentially led to the development of the DRPV methodology, in order to support the LINKS Framework and the two case assessments of the five cases (see D6.4: Clark et al., 2022; D6.5: Larruina et al., 2023).

The aim of the D2.3 (Bonati et al. 2021) was to address the gaps identified in the first two deliverables and to regard them as possible outputs. The tasks of the DRPV methodology have been consequentially pointed out:

- To focus on the dynamics of marginalisation and social exclusion as part of a thorough understanding of the disaster management process in connection to the digital space;
- To provide a people-centred perspective.

Following up to D2.3, the second methodology was developed with the main purpose to support the further steps of the LINKS Framework and the second case assessments, based on the evaluation

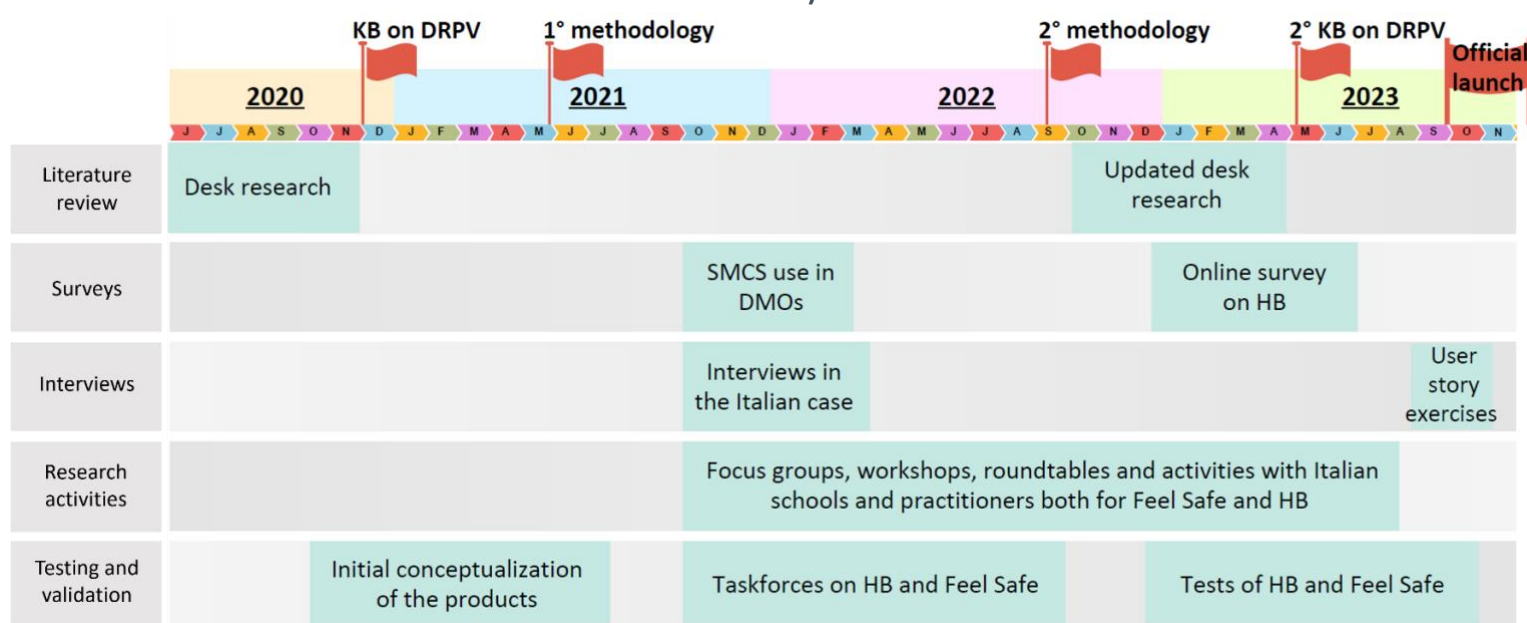
of the first case assessments. The key conclusion of the second methodology was *the importance of the progression from a research-driven approach towards a practitioner-driven one*: the practitioner played a pivotal role in the implementation of the results and in providing outputs that eventually fed into the development of the products (see D2.7, Lüke et al., 2022).

As for the recent advancement of development of the Knowledge Base on DRPV, the latest submitted deliverable (D2.5, Froio et al. 2023) dealt with the case assessment regarding the DRPV. The document had a twofold aim:

- To highlight how the Second Methodology for the DRPV has informed the work conducted on the Handbook, a product whose origins, as stated at the very beginning, should be traced back to the Knowledge Base on DRPV;
- To present the current status of advancement of the Knowledge Base itself through a selective overview of the most recent scientific literature (i.e., literature produced throughout the year 2023) on the topic under consideration.

What emerged from the D2.5 could be summarised as follows: *The progression from a theoretical approach to a practitioner-driven perspective*. This gradual shift went hand in hand with the latest stage of development of the Handbook, which required a regular interaction with the practitioners.

Figure 3: Activities conducted by WP2 throughout the duration of the LINKS project (2020-2023)



3. THE STATE OF THE ART ON DISASTER RISK PERCEPTION AND VULNERABILITY (DRPV) AND SOCIAL MEDIA AND CROWDSOURCING (SMCS): AN OVERVIEW (2023)

The issues presented in this section have been mostly addressed in D2.1 and D2.2, and further explored in D2.5 in relation to the development of the Handbook and Feel Safe, being two products associated with the Knowledge Base (KB). In the context of the present deliverable, as it will be highlighted below, the state of the art on Disaster Risk Perception and Vulnerability (DRPV) represents *a consolidation of existing knowledge and an overall update*.

The review of the recent literature concerning Disaster Risk Perception and Vulnerability (DRPV), and related topics indicates that in the past decade, the interest in developing more inclusive disaster risk management approaches, concerning both vulnerable groups and disadvantaged people, has gradually increased, mostly as a response to the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction (Alburo-Canete et al. 2023)⁴.

According to the study of recent directions and findings regarding DRPV and the use of digital technologies, it is possible to recognize four types of research⁵:

- **Cumulative research**, which summarises or synthesises existing research. See Acikara et al. (2023); Fauzi (2023); Phraknoi et al. (2023);
- **Collection and processing of data** retrieved from social media and crowdsourcing in the context of previous hazards. See Kirby et al. (2023); Ishtiaq (2023); Tounsi et al. (2023);
- **Evaluation of data and past experiences as basis for empirical solutions**. See Whytlaw & Hutton (2023); Yuliana (2023); Lam et al. (2023); Moghadas (2023); Yildirim (2023);
- **New definitions and further research directions**. Rivera & Knox (2023); Sumaylo (2023); Nielsen et al. (2023).

One of the challenges that occurs most frequently in recent studies concerns data collection policy and privacy in the context of data collected from social media during or in the subsequent phase of a disaster. Moghadas (2023), Lam et al. (2023), and Kirby et al. (2023), specifically address ethical as well as privacy considerations concerning the use of social media data in disaster management. The latter, following the results of a 2018 survey on the use of social media data by public and private

⁴ The Sustainable Development Goals (SDGs) are 17 goals that represent “a urgent call for action” for all countries, both developed and in developing status. The global partnership recognizes the need for strategies to reduce poverty, improve health and education (see <https://sdgs.un.org/goals#history>). The Sendai Framework deals with the adoption of strategies about disaster risk on three levels: exposure to hazards, vulnerability, and hazards’ characteristics (see <https://www.undrr.org/implementing-sendai-framework/what-sendai-framework#:~:text=The%20Sendai%20Framework%20focuses%20on,existing%20risk%20and%20increase%20resilience>).

⁵ For a further overview of the literature review on DRPV published in 2023, please refer to Annex I.

organisations in the context of Hurricanes Sandy and Isaac (2012), highlights the existence of confusion on how to gather and preserve data retrieved from social media platforms. The lack of a clear policy guidance in this regard is an issue to be addressed, as it could discourage the use of social media in disaster management operations in the whole disaster management cycle. As already stated, gathering information from all social groups, including the vulnerable and the disadvantaged, as well as disseminating good practices and knowledge, represents two equally significant steps in nowadays risk communication practices. Kirby et al. (2023) specifically addresses Facebook and Twitter, being 'more listenable channels': even though 'Twitter data is made available for purchase' and Facebook 'generally retains the data generated on their platform' (see pp. 139-140), confusion remains evident, especially when it comes to other online platforms.

The lack of clarity on data use policies in this context may be a significant impediment to future research on how to effectively include the public in general and the vulnerable groups in particular, throughout the disaster management process. Ensuring accessibility to information through social media and crowdsourcing is an important step towards inclusion, but one that can be hindered if there is a lack of clear, timely and shared policies on how to use data while protecting user privacy.

Based on the re-elaboration of information contained in the scientific literature examined here, four main challenges and gaps preventing the inclusion of *all groups* across the emergency management phase appear to be more often highlighted by the scientific community:

- The lack of a transparent policy guidance on how to gather/retain data retrieved from SMCS (see Kirby et al., 2023);
- Algorithm bias (see Lam et al., 2023) which could be also connected to the spreading of false information;
- Social disparities, which includes physical and sensorial vulnerabilities (see Ishtiaq, 2023; Sumaylo, 2023; Whytlaw & Hutton, 2023; Yildirim, 2023);
- Geographical disparities, especially in relation to small communities with lack of access to internet.

Consistent with the topic, Moghadas (2023) suggests a possible solution through a bottom-up approach based on the integration of passive crowdsourced data (i.e., Twitter) and online surveys (active crowdsourced data). Other participatory tools, such as workshops and meetings, even though online, are less-timely and sometimes too costly; in addition, they might potentially unable a wider participation of citizens as well as the inclusion of groups with different needs. As Rivera & Knox (2023) state, 'Public administrators must include *all groups* throughout each phase of emergency management to help ensure a 'whole community' approach'. As stressed in the latest published mid-term report for the implementation of the SENDAI Framework for Disaster Risk Reduction (years 2015-2030), "the community participation in a bottom-up co-creation process is essential" especially in the recovery planning, and the implementation of "inclusive disaster

response mechanisms” (Sendai Framework 2023: 11) has been acknowledged as key in the overall plan of enhancing community resilience to disasters.

Moreover, several studies have explored the topic of the equitable access to information and services in times of crisis (see Dhakal et al., 2021; First et al., 2021; Tate & Emerich, 2021, Saja et al., 2018).

More recently, Rivera (2023) regards the inclusion of vulnerable people within the context of emergency management in terms of **social equity**, to be interpreted in the sense of *equal access to the relief system, personnel, and not least, to information*. The term ‘social equity’ applied to disaster management does not represent a new concept as its occurrence in the scientific literature on this topic could be traced back to years 2009-2010 at least (see Gooden et al. 2009). With the overall improvement of the use of SMCS in everyday life and their integration in disaster management processes, the concept of ‘social equity’ has been updated, hence implemented and developed. As Rivera (2023) points out, equity of access to information could be guaranteed by emergency management organisations in several ways: for example, by providing information through a variety of media (not only visuals, such as computer and TV, but radio too), with language that could be understood by all segments of society (i.e. plain and straightforward language; subtitles and translation in different languages and so forth).

Narrowing down to the context of flood risk management, Babicky et al. 2021, (p. 3 in part.) highlights the following preconditions to the *equal access* to information and services, also with reference to vulnerable groups (see D2.1, in part. Sec. 4):

- **Distributional equity.** Equal distribution in fundings and resources for disaster management (see also Kim & Sutley, 2021), in particular for the recovery phase;
- **Recognitional equity.** Acknowledgment of individuals with specific needs;
- **Procedural equity.** Equal access to the relief system (see also Domingue & Emrich, 2019).

In conclusion, the desk research on the most scientific literature on DRPV has detected an overall improvement in the acknowledgement of the need for broader inclusion of all of society in the disaster management cycle. On the other hand, questions about how it could be done on the ground, remain open and require to be addressed by practitioners, communication strategists, and policy makers.

3.1 The application of the Knowledge Base on Disaster Risk Perception and Vulnerability within LINKS partners and in the broader context

In the latest stage of the LINKS project, the activities of the WP2 team were focused on the desk research on further findings about Disaster Risk Perception and Vulnerability (DRPV), and in the implementation as well as application of the Knowledge Base (KB), whose foundations can be found in D2.1; D2.2; D2.5. The activities carried out by WP2 in the last six months of the project, associated

not only to the products (i.e., the Handbook and Feel Safe) but also to the KB on DRPV, could be found in D6.6 (Larruina et al., 2023), and an overview of the dissemination activities carried so far in D9.6 (Sciarretta & Sposato, 2023).

In the present context, the aim is to highlight how the dissemination of the KB on DRPV has been articulated in the last six months on three levels:

Implementation of the Handbook through the production of informative videos.

Since the Including Citizens Handbook is a product rooted in the Knowledge Base (KB), hence its implementation strictly depended on the advancement of the KB starting with the beginning of the project until the latest phase. As anticipated in D2.5, the Handbook, which is today an online platform, has been integrated with new informative materials in the form of a series of short videos (2 minutes max) on the themes related to accessibility of information as well as inclusivity, and mobilization of citizens. Additional videos were produced for the other two sections of the Handbook, i.e., *Communicating Risk* and *Mobilizing Volunteers*. *The videos filter and disseminate practical knowledge which derives from the KB on Disaster Risk Perception and Vulnerability (DRPV) and are addressed to practitioners*. They have an appealing aesthetic and an accessible language: the videos are available with subtitles and in the five languages of the LINKS consortium (English, Dutch, Italian, German, and Danish). The videos can be viewed on LINKS official YouTube channel at the following links:

- English: <https://www.youtube.com/playlist?list=PLWSsJMg--6mdwh-3hbnMfXH5-HzZVF87S>
- Dutch: <https://www.youtube.com/playlist?list=PLWSsJMg--6md8FsSMNw1ttNAmkk4dx244>
- Italian: <https://www.youtube.com/playlist?list=PLWSsJMg--6metfbW1T60IKy3bsV3yi9IA>
- German: <https://www.youtube.com/playlist?list=PLWSsJMg-6mc91k8fleB9JbxPdM4WLhD1>
- Danish: <https://www.youtube.com/playlist?list=PLWSsJMg--6meTlxNC9L1IqZiYKZ2RKA8s>

Presentation of the key findings of the KB on DRPV through conferences, roundtables and workshops.

Round table with Italian practitioners (volunteers, administration offices, representatives from Civil Protection Offices based in the Umbria region, businesses, scholars).

The online round table (22 May, 2023) provided the opportunity not only to have a dialogue with practitioners involved in disaster management operations with different backgrounds and skills, but also to present the key findings of WP2 research and activities to an Italian audience. The key element was *inclusivity and accessibility of information*, in the sense of *strengthening forms of participations of people with vulnerable profiles in disaster management process*. Among the objectives of the round table was how to strategize the use of social media in risk communication and to guarantee inclusivity.

Participation in the international online workshop organized by project Pantheon (EU funding project) about community engagement in disaster risk management (28 June 2023).

WP2 provided insights in the conclusive debate on the challenges and the solution on how to better involve people with disabilities in the preparatory phase as well as in the aftermath of a disaster. The guidelines and practices provided in the Handbook (in part. in the section of the product about accessibility) were also part of the discussion on *how to overcome accessibility problems when it comes to social media, for a more efficient dissemination of good practices and information.*

LINKS events: Osnabrück, Germany (4-5 July 2023) and Rome, Italy (16-17 October 2023); LINKS Community Workshop (LCW): Province of Terni, Italy (28 November 2023).

In the three events, WP2 provided an overview of the development of the Knowledge Base (KB), highlighting the main gaps in the scientific literature about vulnerability and risk perception, and the most recent outcomes of the desk research and activities carried out to consolidate the KB. If the first two events saw the participation of an international audience inside and outside the LINKS consortium, the third one (LCW), being organized by the municipality of the Province of Terni, in the Umbria region, Italy, had a local dimension. The workshop was introduced with an overview of the contribution of Province of Terni (PDT), a partner of the LINKS project, to the activities carried out by WP2, followed by an overview of the key findings of the KB on Disaster Risk Perception and Vulnerability (DRPV) led in Italian. *In this context, a demonstration of the main features of the LINKS Community Center was carried in Italian, with the purpose of showing the new Italian interface of the website.* Additionally, a workshop on the two legs of the Handbook (i.e., *Making information accessible* and *Mobilizing citizens*) aimed to officially launch the product translated in Italian.

Policy brief on inclusivity of information in disasters.

Still in the context of the work on the Knowledge Base on Disaster Risk Perception and Vulnerability (KB DRPV), to disseminate the results of the research conducted by WP2, a policy brief on inclusivity of information and accessibility in disasters was released (*Accessibility for all: fostering inclusive uses of social media in disaster communication*, see Annex II). The purpose of the document is to actively implement organisations' inclusive use of SMCS (social media and crowdsourcing) in their practices, and to provide knowledge on how digital tools could be used in disaster management. The policy briefs are available on the LINKS Guidelines Library, along with the policy brief designed by WP3 about targeted communication⁶.

The policy brief provides distilled information and definitions coming from D2.1 and D2.2, while the recommendations and the key actions reflect a more practitioner-driven approach. Accessibility has been regarded here according to four definitions: *material accessibility; physical and sensory*

⁶ At the following link:

[https://links.communitycenter.eu/index.php/Accessibility for all: fostering inclusive use of social media in disaster risk management](https://links.communitycenter.eu/index.php/Accessibility_for_all:_fostering_inclusive_use_of_social_media_in_disaster_risk_management)

accessibility; cultural accessibility; relief accessibility. The recommended actions encompass three levels for each type of accessibility issue: operational, strategic, policy. *Providing a number of practical recommendations on three levels was key to create a document that could impact disaster management in a cohesive way.*

The next step in this direction will be the translation of the document in Italian and its dissemination through the collaboration with the Italian partner, the Civil Protection Office of the Province of Terni (PDT).

4. METHODOLOGY AND APPROACH: SURVEY AND WORKSHOPS

As anticipated and described in the previous deliverables, D2.7 (Lüke et al. 2022) and D2.5 (Froio et al. 2023), the Including Citizens Handbook represents a tool developed considering the knowledge and the concepts learned and obtained thanks to the in-depth analysis of the Knowledge Base (KB) made during the different phases of the project. In particular, the Handbook concerns topics related to Disaster Risk Perception and Vulnerability (DRPV). As already explained, the product is divided in four core sections: *Making information accessible*, *Mobilizing citizens*, *Mobilizing volunteers*, and *Communicating Risk*. They deal with different levels of vulnerability and delve into several aspects of risk perception.

The first validation and assessment of the initial versions of the Handbook was carried out in the case assessments in the early phase of the project, starting from June 2022 (see D6.4: Clark et al., 2022; D6.5: Larruina et al., 2023, D2.5). Originally, the Handbook was planned to be a PDF document, with the idea to provide practitioners and experts with a practical tool to be used and shared throughout the emergency cycle. Then, the second version of the Handbook, still in collaboration with the University College Copenhagen (UCC) and the University of Copenhagen (UCPH), has been translated into a digital format in the form of an online platform, more interactive and appealing than a fixed document. The content of two sections, *Making information accessible* and *Mobilizing volunteers* (both developed by the University of Florence, UNIFI) are still available in both formats, i.e. digital and as downloadable PDFs. For this reason, a new validation process has been carried out in the last phase of the project related to the new digital version of the Handbook. The validation process entailed an online survey and three workshops.

The online survey (March – October 2023)

An online Google form survey has been provided to experts, civil protection technicians and volunteers, as well as academics and researchers. The selected participants work within the field of disaster management on different levels, and have thoroughly studied topics such as vulnerability, risk perception in relation to the use of social media in emergency contexts with a local or international perspective.

The survey, available both in English and Italian, is composed of ten questions and aims to evaluate two out of four sections of the Handbook, i.e., *Making information accessible* and *Mobilizing citizens*. The questions are specifically related to the sub-sections of the product that contain practical recommendations and suggestions, instead of the more theoretical or informative sub-sections. Henceforth, the participants were asked to rate the guidelines and actions and to evaluate their feasibility in hazardous situations. The grades of the answers are between 0 and 10, where 0 represents the uselessness of the action and 10 its high usefulness.

12 answers in total have been obtained from experts, fire chiefs, paramedics, civil protection employee and technicians, researchers, as well as social scientist from different European countries.

The results have been included in the Annex III. The survey provided valuable information and feedback, especially in the 'comments' sections: *most of the participants appreciated the actions that have been developed as they found them practical and quite clear*, even though more examples would be appreciated.

Moreover, some additional comments have been added to the answers, providing further suggestions and recommendations on how to improve the Handbook. The comments have been followed to update the tool as well as to integrate as much information as possible: the aim has been to create a product that could be efficient and beneficial to the potential user, as well as easy to navigate. The main suggestions are related to the necessity to add information about the emotions of vulnerable people, to understand how they feel and how to help them; to potentially include a specific section related to homeless people; to focus more on the challenges of people who are not fully familiar with the local language. Overall, the participants strongly recommended to translate the Handbook in the five languages of the project, to guarantee its use and efficacy on a local level.

LINKS workshops (July 2023 and October 2023)

The Handbook has been tested also with two in-person workshops that have been done with experts, civil protection technicians, firefighters, police representatives, members of both Italian and international NGOs, and people from the scientific community.

The first workshop took place in Osnabrück (Germany) during the LINKS Annual Meeting in July 2023, and the second one at the LINKS Final Event in Rome (Italy) in October 2023. The workshops shared the same structure: partners and participants, after a short introduction on how to access the Handbook through the LINKS Community Center (LCC), as well as an overview of the product, had the possibility to surf and navigate through the platform autonomously. The exercise aimed to understand how stakeholders and practitioners would approach the platform according to their own personal experiences in the disaster management field; which sections and sub-sections would effectively come in handy, and which one would need to be reviewed. More general questions (did the participants find the platform easy to use, intuitive, well organized and so forth?) were part of the dialogue with the practitioners involved in the workshops.

The two workshops have seen the participation of both LINKS partners, especially practitioners, and external people.

- As for the first workshop in Osnabrück, the participants were mostly LINKS practitioners, whilst four people were external. During the workshop, UNIFI tested the section *Making information accessible*. Partners and practitioners provided valuable suggestions about the structure of the platform and recommendations on how to make the navigation experience smoother and more intuitive. Following up the comments from the participants, *some sections have been implemented, for example by including information on linguistic*

minorities or updating the checklists; more symbols and graphics have been added, so to help the navigation and to better guide the reader.

- Regarding the second one, that took place in Rome (Italy), an amount of 27 people took part in the workshop (15 externals, 12 LINKS partners). In this context two out of four sections of the Handbook, i.e., *Making information accessible* and *Mobilizing citizens*, were presented and tested. The feedback obtained from the workshops have been used to implement the platform and to integrate a few missing information and guidelines according to the recommendations of the participants. Both partners and external experts suggested to translate the platform in different languages so to facilitate its wider dissemination. *In this second workshop, the videos, as part of a new feature of the product, have been shown for the first time to an audience: the videos embedded in the platform have been enthusiastically received by the participants as they found them informative and visually pleasing.* A few more recommendations have been collected: to include an introduction with high-level instructions on how to use the platform; to add a link to the LINKS Guidelines Libraries, as they provide further knowledge and insights on the topic the Handbook deals with. Moreover, specifically about some recommended actions developed for the *Mobilizing Citizens* section, a few practitioners suggested to enrich the content by aligning it to the Civil Protection standard procedures.

The LINKS Community Workshop in Terni (Italy, November 2023)

Moreover, the Handbook had been validated at the last LINKS Community Workshop (LCW) organized by the Civil Protection Office of the Province of Terni (PDT) in Terni in November 2023. In this context, the Italian translation of the aforementioned sections, i.e., *Making information accessible* and *Mobilizing citizens*, had been presented to an Italian speaking audience and tested. The workshop saw the participation of 10 experts external to the LINKS project: authorities at local level such as mayors, civil protection technicians and operators, as well as members of local NGOs. The introductory presentation focused on the core elements and key findings of the Knowledge Base on Disaster Risk Perception and Vulnerability (KB DRPV) developed by WP2 throughout three years and a half of LINKS project. In this occasion, the Italian version of the two sections of the Handbook had been tested, and *it was the first time that the product was shown in a different language than English.* As in the previous workshops, the participants were given the opportunity to surf and navigate the online platform autonomously: in addition, PDT provided them with the printed PDF version of *Making information accessible* and *Mobilizing citizens*, that could be shared with colleagues and people who did not attend the workshop, so to further disseminate the product. The experts involved truly appreciated the Handbook and highlighted its practical effectiveness and inner potentialities: *their commitment had been to provide the Handbook to authorities and mayors at local level, with the aim to test it and use it during an emergency, so to eventually include the product in their current standard disaster management procedures.* Two sub-sections from

Mobilizing citizens have been already included in the “Civil Protection Plan for Families” (“Piano protezione famiglia”)⁷.

⁷ Further information at this link: <https://www.protezionecivile.gov.it/it/pubblicazione/protezione-civile-famiglia/>.

5. MONITORING THE PRODUCTS APPLICATION IN BROADER CONTEXT: THE INCLUDING CITIZENS HANDBOOK

5.1 The integration of the Including Citizens Handbook in the User Guidance

As stated in D5.4 (Fonio and Tzavarella, 2022, see p. 3), the LINKS Framework 'provides products for stakeholders by combining knowledge and experiences about how social media and crowdsourcing (SMCS) are used in Disaster Risk Management (DRM)'. The last version of the Framework encompasses a *User Guidance* to provide an intuitive and easy access to the products through the LINKS Community Center (LCC). The rationale behind the User Guidance are the thematic questions that are linked, via thematic areas, to the LINKS products. By clicking on the navigation compass, the potential users can choose between two core themes that provide support in planning strategically the use of SMCS in DRM: i.e., *engaging with citizens* and *improving communication*. Each thematic area contains three sub themes in the form of guiding questions, which have been identified through the process of consultation between the partners and the desk research.

The Including Citizens Handbook could provide valuable resources about both thematic areas in the following way.

Under the theme *Engaging with citizens*, the product would support practitioners in:

- *Mobilising citizens*, a learning module on how to coordinate spontaneous aids from citizens, and a second one on how to create messages that motivate action;
- *Mobilising volunteers*, which provides information on how to mobilise spontaneous and affiliated volunteers through SMCS before, during, and after a disaster.

Under the theme *Improving communication*, the product would support practitioners in *Targeting communication*, which is divided in the following sub-sections:

- *How can you target citizens?* meaning resources on how to prepare the population in case of evacuation or in-sheltering, as well as a learning module on how to communicate risk using different media.
- *How can you target vulnerable groups?* Which points to three sections of the product, i.e., how to create an accessible social media post; how to solve potential accessibility issues; how to connect accessibility problems to actions.
- *Ensuring credible information*, that guides to a learning module on how to exchange information from authorities to citizens and from citizens to authorities;
- *Making information accessible*, which leads to two sets of guidelines on how to ensure the accessibility of the information a practitioner wants to provide; how to communicate risk using different social media.

The sections represent paths that are matched to the specific sections of the Handbook through a bridging page between the LINKS Community Center (LCC) and the product itself. The bridging page (see image below) contains a brief introduction to the product (its objectives and the target users) and directly links to its four core-sections, each one shortly presented (see at https://links.communitycenter.eu/index.php/Including_Citizens_Handbook). As stated in D7.6 (Schmidt et al., 2023), the bridging pages provide a solution to the integration of the Handbook, namely a platform within a platform (the LINKS Community Center), as well as an entry point for the users.

Figure 4. The bridging page between the LCC and the Handbook

About the Handbook

The Including Citizens Handbook is a digital toolkit specifically addressing Disaster Management Organizations, first responders, and decision makers. It can also be used by businesses and academic researchers. The product has a two-fold aim:

1. It provides insights and instructions on how to communicate with citizens on disaster management processes by using social media platforms. Multiple resources, tools, and guidelines are designed to cover different vulnerability profiles.
2. It provides guidance on how Disaster Management Organizations can include citizens and their unique resources and skills into disaster management processes.

The Including Citizens Handbook is divided in four sections, each providing in-depth insights into disaster management and operation procedures:

1. Communicating Risk

"Communicating Risk" focuses on how to best raise awareness and motivate protective actions among different types of citizens. The chapter is relevant for people working with risk communication before, during and after a hazard.

[Take part in the "Communicating Risk" course](#)

2. Making Information Accessible

"Making Information Accessible" deals with several aspects related to the accessibility of information in different phases of disaster management. It covers multiple vulnerability profiles and provides solutions and guidelines on how to effectively spread messages via social media on issues concerning good-practices and so on.

[Take part in the Accessibility course](#)

[Read the "Making Information Accessible" handbook as PDF](#)

3. Mobilizing Citizens

"Mobilizing Citizens" deals with the physical mobilisation of citizens before, during and after a hazard, but it also covers aspects related to the mobilisation of aid as well as social activism. It provides guidelines, insights, and tools for different types of practitioners.

[Take part in the Mobility course](#)

[Read the "Mobilizing Citizens" handbook as PDF](#)

4. Mobilizing Volunteers

"Mobilizing Volunteers" is concerned with different aspects of how Disaster Management Organizations can leverage digital platforms to coordinate and mobilize spontaneous volunteers. Here, Disaster Management Organizations can learn how to use these platforms to, for example, onboard spontaneous volunteers.

[Take part in the "Mobilizing Volunteers" course](#)

5.2 User stories in cross-case scenarios

As described above, by following pre-defined questions, the stakeholders can navigate and explore the Framework's products according to their aim. As they want to include SMCS in their communication strategies and actions, the Handbook provides learning modules and guidelines tailored to their needs.

Within the LINKS project, the 'user story' approach has been essential to include the stakeholders' perspective and assess if the products of the LINKS Framework can meet their needs and aims, as shown in D5.5 (Fonio, 2023, in part. Sec. 2.1; 2.1.1; 2.1.2; 2.1.3). Consistent with this method, the team worked with four partner (three LINKS partners and two externals) so to develop a narrative of the multiple types of navigation experiences across the Including Citizens Handbook.

This approach helped to collect feedback, to monitor the product, and potentially to integrate changes. Among the goals of the exercise was to evaluate the Handbook within multiple contexts involving users from different backgrounds (practitioners, municipalities, academics, NGOs). The other objective was to apply and disseminate the Handbook within LINKS partners organizations as well as in the broader context.

The following sections focus on the navigation experience, motivation and utilisation of two out of four legs of the product, i.e., *Making information accessible* and *Mobilizing citizens*, both developed by the University of Florence (UNIFI).

5.2.1 Exercise with Die Deutsche Hochschule der Polizei (DHPol)

The Die Deutsche Hochschule der Polizei (DHPol) is involved in the LINKS project in the German case, i.e., terrorism attacks. DHPol is a special high learning university founded in Münster, Germany, that offers comprehensive teaching and advanced training addressed to police officers from Germany. DHPol was interested in developing a communication strategy that would guide the information flow between police leaders, executive staff, and the community.

DHPol is interested in both legs (*Making information accessible* and *Mobilizing citizens*) in the following way:

- The section *Making information accessible* can be useful to teach crisis communication to German police spokesperson, as they are interested in engaging with different groups of people;
- The section *Mobilizing citizens* comes in handy for the command staff, being more involved with the practical coordination of citizens in emergency.

Making information accessible can support DHPol's communication department in providing information and solutions on how to communicate with vulnerable groups through social media.


The Handbook is available on the LINKS Community Center (LCC) by clicking on the icon, which leads to the product's landing page. The four sections of the products are displayed and DHPol decides to delve into the section *Making information accessible*.

An index opens on the left, with the main focus areas: material accessibility; physical and sensory accessibility; cultural accessibility; relief accessibility. Four additional sections (action 1-4) are immediately below, and they are designed to provide guidelines and tools aimed to overcome accessibility problems.

DHPol has already defined the target of their action, which is to gather more information about material accessibility. Hence the link on 'Material accessibility' is selected: DHPol can scroll the page and address the type of knowledge it needs (data on material accessibility; definitions; detailed insights on the topic).

Figure 5: Graphic interface of the Handbook related to 'Material Accessibility'

Material accessibility



To access material resources that can satisfy basic needs in hazardous contexts.

Accessibility is strictly connected to the vulnerability of people and places. It can be defined as the ability to use the resources that ensure livability, which depends on the socio-economic relations established in a society. Accordingly, accessibility strictly depends on the level of development as well as on the power relations on both local and global scale.

"Accessibility is the precondition to guarantee integration without barriers"

In particular, social and spatial disparities are strongly affected by limited access to new technologies, sources of information and means of representation. Thus, accessibility is a necessary precondition to the well-being of others. In relation to social media and crowdsourcing, material accessibility refers to the access to communication and information systems as well as to technological devices in general. Moreover, it deals with the role that social media and crowdsourcing could have in easing the access to relief systems. Vulnerability can be exacerbated by the lack of access to the virtual space: a person can be deprived of the possibility to receive information and to be duly represented in the process of rescue request and response. According to recent studies, although ethnic or health disparities can limit the access to Internet, these same factors do not affect the use of social media in a significant way.

④ FOCUS ON MATERIAL ACCESSIBILITY

Accessibility relies on the availability of new technologies and other services without material limitations. Notwithstanding the efforts to develop design innovation in order to increase the global access to internet, there are still significant limitations that prevent vulnerable and marginalized people from accessing digital tools. As a matter of fact, the access to digital resources during disasters can be limited by pre-existing barriers:

- Language (i.e., people who cannot use common language)
- Socio-economic status
- Geographical impediment (i.e., people who live in areas with no access to Internet)
- Lack of familiarity with the basic functions of social media

Moreover, DHPol can be interested in additional resources about accessibility of information: following the path, DHPol decides to focus on physical and sensorial accessibility, being related to material accessibility. At the question *'Do you think DHPol would use this section and how'*, the user gives a positive answer, as it addresses the need of German police officers to have a basic background on the main accessibility problems. In addition, it would help them to reconsider their approaches to risk communication when it comes to vulnerable groups. Hence 'Material accessibility' would facilitate this process by providing access to knowledge that has been distilled from the LINKS Knowledge Base on vulnerability and risk perception.

DHPol is also looking for guidelines and possible suggestions on how to include vulnerable groups in disasters through a tailored communication strategy. Henceforth, the Action 3 'How to set up your communication channel' is found particularly interesting. The user decides to access this sub-section and a series of recommendations on how to craft an accessible and inclusive social media post are displayed.

5.2.2 Exercise with the Safety Region of South Limburg (VRLZ)

The Safety Region of South Limburg (VRZL) is involved in the LINKS project as a public organisation that is tasked with ensuring the safety of those who live, work or are visiting the region of South-Limburg. As part of the LINKS project, the VRZL focuses on the risks surrounding industrial hazards as the Chemelot industrial site is the largest industrial threat in the region. The region of South-

Limburg is located in the southeastern part of the Netherlands, bordered by Germany (on the Eastern side) and Belgium (on the Western side).

The VRZL is interested in using the Including Citizens Handbook as (quote) *'an onboarding guidebook to have in your back pocket'*, i.e., a tool to instruct interns or new colleagues who don't have a specific background in crisis communication. Hence, the VRZL is open to receiving general knowledge on how to mobilize citizens and has, as eventual target users, people who need to become familiar with the topic.

According to this purpose, the user chooses one out of the four legs of product, i.e. *Mobilizing citizens*, being an issue particularly relevant for VRZL due to the proximity of Chemelot to many residential neighbourhoods. The section "How social media and crowdsourcing could help in disaster mobility" represents a good start for the navigation as it provides a quick overview on the main issues related to mobility and SMCS.

Figure 6: Graphic interface of the Handbook about 'Mobility' section



LINKS
Strengthening links between technologies and society for European disaster resilience

Mobility refers to the physical movement of citizens and resources from one place to another.

How can we
Mobilise Citizens
in the Aftermath of a Disaster?

LINKS

Mobility is closely related to the level of accessibility of resources and materials aids, as well as to the connectivity of a territory, i.e., the availability of means of transport. Disasters can cause the disruption of people's capacity to move or force them to leave in order to find safe shelters. Mobilizing citizens also means to create situations of social participation through the promotion of initiatives and forms of activism. Social networks and crowdsourcing platforms could play a pivotal role in this regard. For example, they could help to monitor people during evacuations, or support the organization of groups and social movements. For this reason, connectivity is an essential precondition to mobility. We can define mobility in different ways, that correspond to the four sections of developed in this part of the Handbook

- [Physical mobility](#) MORE INFO HERE
- [Immobility](#) MORE INFO HERE
- [Cultural mobility](#) MORE INFO HERE
- [Temporal mobility](#) MORE INFO HERE

ACTIONS:

- [Preparedness activities](#) ACTION 1A-B-C
- [How to mobilize after a disaster](#) ACTION 2
- [Coordinating spontaneous aids](#) ACTION 3

The VRZL is also looking for additional information and more specific definitions of 'mobility': the next step would be to delve into the other sub-sections, and one caught the user's attention, i.e.,

the one on 'Cultural mobility'. This sub-section can help the user to learn about notions such as 'shared awareness', as well as the potentialities of SMCS in promoting social campaigns. Mobility then can be regarded as a wide concept that also entails the virtual mobilization of ideas, in the sense of encouraging forms of activism.

As stated, *the VRZL user would opt for the Handbook as a tool to instruct interns and new colleagues on the uses of SMCS in disasters, particularly in relation to the mobilization of citizens.* For this reason, the type of navigation would differ from the one seen in the previous paragraph: instead of choosing specific sub-sections, the VRZL would recommend the user to look at the whole section, starting from the introduction, so to offer a complete background. Interns or new colleagues unfamiliar with crisis communication can best begin with an introduction into what crisis communication, mobilization, or volunteerism entails, before jumping right into the more advanced subject matter.

5.2.3 Exercise with the Frederiksberg Municipality (FRB)




Frederiksberg Municipality (FRB) is situated in the middle of Copenhagen and is involved in the LINKS project as part of the Danish case (i.e., flooding hazard). Its main focus is to develop risk awareness communication strategies on flooding between authorities and citizens. In addition, the municipality is also engaged in finding solutions for climate adaptation in urban areas, through research activities and planning.

Consistent with the interest of the Frederiksberg municipality, that is developing a strategy on how to better engage with citizens and to keep them aware of the flooding risk, the Accessibility section of the Handbook was the one immediately chosen by the user. The participant was interested in finding practical recommendations on how to overcome accessibility issues when it comes to engaging with vulnerable groups such as the elderly. *In this case, the user experience was defined by a 'problem – solution narrative': 'If you are in a hurry because a hazard just struck the community, you would look for solutions rather than background information, which would be equally useful but in the preparedness phase',* said the user.

The action n.3 *How to set up your communication channel* was perceived as the most useful in this regard: the clear and straightforward display of "do" and "avoid" actions when it comes to drafting an informative as well as *an inclusive* social media post, provides an immediate solution to accessibility problems.

Figure 7: Graphic interface of the Handbook related to 'Accessibility'

How to ensure accessible information in case of disaster ?

Social media could be one important communication tools to disseminate information in hazardous contexts. However, these platforms might also propagate disinformation and affect negatively the process of disaster response by worsening situations of social exclusion.

We can define accessibility in different ways, that correspond to the four sections of developed in this part of the Handbook

- Material accessibility MORE INFO HERE
- Physical and sensorial accessibility MORE INFO HERE
- Cultural accessibility MORE INFO HERE
- Relief accessibility MORE INFO HERE

ACTIONS:

- How to manage **FIRST APPROACH WITH PEOPLE** ACTION 1
- Identification of **ACCESSIBILITY PROBLEMS** ACTION 2
- Set up your **COMMUNICATION CHANNELS** ACTION 3
- Connect **PROBLEMS to SOLUTIONS** ACTION 4

Download the Handbook !
Here you find an easy-to-share PDF version of the Handbook on Accessibility

5.2.4 Exercise with two PhD candidates involved in Disaster Risk Management related research

Even though the Including Citizens Handbook is specifically designed for practitioners and stakeholders involved in DRM activities, the product could be of interest to researchers and the scientific community. For this reason, the team decided to involve two Italian PhD candidates in a user story exercise on the Handbook. The users were selected according to the topics of their respective research activities, as they specifically deal with the integration of crowdsourcing into disaster management strategies.

Both users already had familiarity with the product thanks to a workshop on the Handbook that took place at the LINKS Final Event in Rome (16-17 October 2023). One of the PhD candidates, as part of his research activities, studied the LINKS Framework and the LINKS SMCS Libraries, hence he already had experience of the application of the user guidance within the LINKS Community Center (LCC) and the interaction/connection between the products. The user was specifically interested in the Accessibility part of the Handbook since one of the focuses of his research is how to guarantee access to the relief system to people with hearing impairments. The Handbook, according to his navigation experience, could be a product of interest to researchers and academics who would

need/want to monitor the new technologies available for disaster management involving social media and crowdsourcing. 'The Handbook could be definitively included in research activities aimed to collecting information on the state of the art of new resources for disaster management, to gain more knowledge on the so-called *ground truth* of new technologies, tools, and learning platforms developed in recent years', he stated.

The second user, a PhD candidate from Università del Piemonte Orientale, who agreed with the general vision and opinions of the first one, added a few more comments. In her specific case, her PhD research is centred on disaster medicine and global health. According to her experience of the Handbook, *she advises the inclusion of the platform in the learning activities affiliated, promoted, or organized by Italian universities*. The product could be useful as an introduction to courses about disaster management, as it provides an accessible and straightforward knowledge on risk communication and accessibility of information.

5.2.5 Exercise with International NGO (Italian offices)

The NGO involved in the exercise is a widespread international organisation and federation with around 50 offices around the world, including Italy. Here, the group is particularly engaged in programs relating to human rights, their equal distribution, and resilience. As for the latter, these are activities focused on participation, social accountability, disaster risk management, and recovery. In recent times, the Italian offices of the mentioned NGO have been involved in cases such as the earthquake in Emilia-Romagna (2012), Aquila (Abruzzo region, 2009), and in central Italy (2016-2017). Specifically, it participated with interventions such as support for the activation of civic experiences (citizens' committees); identification of local needs; relationship between citizens and institutions; access to information.

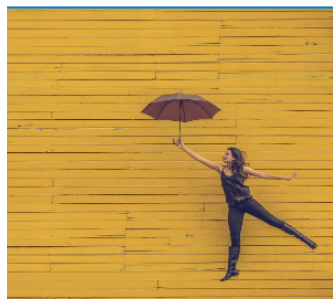
The NGO Italian program is always looking for new strategies to involve citizens to understand their needs, being aware of factors such as *diversity and intersectionality*. At the same time, through social campaigns, the organization works directly with citizens with the aim of including them as bearers of quality information useful for the institutions.

Communication with citizens is key, especially when it comes to provide information on how to mobilize. With this purpose in mind, the NGO Italian offices user opts for the learning module of the Handbook about citizens' mobilisation (*Mobilizing citizens*): how to mobilize citizens represents a topic of interest since the mentioned NGO is also, at international level, a first response organization that works closely with people, and considers it essential to provide correct and timely information. In Italy, the NGO has had experiences in participatory civil protection planning.

Again, according to this purpose, the user is guided towards the sub-section 'Physical mobility' and subsequently 'Immobility', being closely connected and useful for a first response intervention. It is clear that, in the case of this precise organisation, *the navigation experience is guided by a perspective of degrees of priority of an emergency*.

Figure 8: Graphical interface of 'Physical mobility'

Physical Mobility



It deals with people's capacity to move as well as to the movement of resources and aids in hazardous contexts

The effect that disasters can have on people's mobility strictly depends on the hazard type. Hazards have been generally divided into two distinct categories: natural disasters (e.g., earthquakes, floods etc) and man-made disasters (e.g., industrial spills and terrorism).

"Social media can help monitor **people's reactions** as well their psychological condition so as to more effectively **support the evacuation plans.**"

Disasters can cause severe damages to the infrastructures (collapse of a building for example), hindering or preventing people from moving from one place to another. Even the availability of means of transport could be negatively altered or abruptly interrupted. During risk situations, from earthquakes to droughts, people are forced to leave their homes in order to reach assembly points and thus find temporary shelter. We must also consider the effects that a disaster can have on orientation: people might lose their usual point of reference since hazards can alter the appearance of both urban and natural scenarios. In recent times, social media and crowdsourcing have proven to be very useful resources in this regard. In the case of aid mobilization processes, these tools could support supplies planning by effectively showing how to distribute basic items according to people's actual needs, without leaving behind those who are more vulnerable.

① FOCUS ON PHYSICAL MOBILITY

Natural disasters and climate change played a key role in migration flows. Climate or environmental migrants are people who are forced to leave their native habitats temporarily or permanently due to environmental hazards. According to the United Nations High Commissioner for Refugees, starting from 2008, an annual average of 21.5 million people have been forced to move due to climate change and related natural disasters. Almost 1.2 billion people are expected to be displaced globally by 2050 for the same reasons. Still according to the UNHCR's report, in 2020, almost 95% of displacement due to conflicts occurred in countries particularly vulnerable to the effects of climate change.

Subsequently, the user continues consulting the platform by choosing 'Action 2: How to mobilise after a disaster'. This list of information can in fact be useful both for citizens and for associations involved in risk awareness and disaster management: *'it is important to have a clear and suitable framework of information for online dissemination especially when it comes to mobilizing people immediately after a hazard'*, states the user.

In conclusion, an organisation like the mentioned NGO is interested in using the Handbook as a vector of knowledge and good practices to be circulated among partner organisations, small municipalities, especially those in central Italy (areas at high risk of earthquakes), and individuals.

6. MONITORING THE PRODUCTS APPLICATION IN BROADER CONTEXT: FEEL SAFE

The Feel Safe platform (Figure 6 shows the graphical interface), available both in Italian and English, offers 7 thematic destinations, each of them deepening a particular aspect related to Disaster Risk Reduction and risk mitigation. Destinations range from reducing vulnerabilities to increasing awareness, expanding important crosscutting aspects such as communication in emergencies and preparedness and finally, extending knowledge on specific risks such as earthquake, fire and climate change.

Feel Safe also includes a collection of stories and readings where you can browse and download free content related to DRR and other relevant topics.

Feel Safe was developed in consultation with 50 students from the project's partner school Fanciulli. The children participated in the design of the website and content. The website was also subject to guided test activities which involved other schools and the Italian Association of Geography teachers. The content of the website was also validated by a group of experts consisting of project's partners, advisory board members and other external stakeholders.

Feel Safe was also published into two Italian scientific papers, namely 'Quaderni di Comunità' and 'Rivista di Sicurezza e Scienze Sociali'.

On the 17th of October 2023, Feel Safe was officially published and for this occasion Save the Children hosted a Links Community Workshop jointly with the Italian Civil Protection. Moreso, a webinar opened to Italian primary and secondary schools was conducted and a social media campaign targeting practitioners begun in early November (already reaching out to approximately 2,000 people on Facebook). SCIT is using Google Analytics to collect on a biweekly basis data on access and use of the website and its resources and the first report will be available by the end of November. Moreover, from November 2023, Save the Children initiated a Feel Safe project with 5 primary and secondary school from the city of Faenza (harshly hit by the floods in May 2023) involving 70 classes in 10 hours of workshops based on Feel Safe content (approximately 1,500 students).

Figure 9: Graphic interface of 'Feel Safe'



By the end of the year, the analysis of success concerning the website and the success of the activities carried out with the schools will provide Save the Children with a first amount of data and feedback to carry out a first evaluation of the product. Funding was already secured to continue develop content and features of the product in 2024.

7. CONCLUSION

The present deliverable finalised the activities conducted by WP2 as part of the Knowledge Base (KB) and the implementation of the products, throughout three and a half years of work within the LINKS project. The report had two main purposes:

- To present a consolidation of the KB, whose foundations could be found in D2.1, D2.2, and D2.5, followed by the monitoring and the assessment of its application within the LINKS Consortium and in the broader context through dissemination activities and implementation.
- To provide an overview of the latest implementation of the two products developed under WP2 (the Including Citizens Handbook, i.e., Accessibility and Mobility sections, and Feel Safe), which are deeply rooted in the KB on Disaster Risk Perception and Vulnerability. This phase of implementation and monitoring covered the last six months of the project (end of May-November 2023).

The Knowledge Base on Disaster Risk Perception and Vulnerability (DRPV)

What conclusions can we draw after approximately three and a half years of work on the LINKS project? Advanced digital applications, especially social media, since their functioning is based on their extensive and constant use, allow the establishment of a privileged communication channel with the community. It is therefore an unprecedented progress in the history of humanity, both in terms of the quantity of information that can be collected, and of its speed (i.e., its instantaneousness). So how is it possible to take maximum advantage of technology in situations of maximum risk for humans? WP2 conducted scientific research and field tests with practitioners and was able to see that *without trust in institutions, it is not possible to fully take advantage of social media*. Consequently, the phenomenon of disinformation and misinformation must be a study priority to draw as many practical recommendations as possible on how to limit the generation of false information that can hinder people's well-being. This context also includes the spread of radicalism and extremism to the detriment of the most vulnerable groups: already poorly represented today, they could be subject to further marginalization. The scientific community has the task not only of producing studies on how it is possible to stem these phenomena, but also to focus on the ways in which *diversity can be dynamic and a resource for increasing common resilience*.

The poor access if not the total lack of access to technologies and the internet are central issues that cannot be underestimated: in fact, in the policy brief on inclusiveness produced by WP2 (see Annex II), the topic was also treated on the basis of information on resilience of small rural communities and their traditions, from which researchers can draw significant knowledge and lessons that the modern technological world should not underestimate.

The work conducted by WP2 within the LINKS project aimed to engage with disaster management organisations on multiple levels to integrate strategies on how to engage with citizens in different phases of a hazard (before, during, after), stressing the notions of *inclusivity* and *diversity*. Since the beginning of the project, knowledge on how hazards impact groups with different needs, due to physical limitations, socio-economic factors and cultural conditions, has been key to understand *how to address vulnerability*. One of the priorities of WP2 in developing the KB on DRPV was to understand disaster risk perception, in particular the core factors of risk and specifically in relation to vulnerability of citizens within the socio-economic context on which they depend. Henceforth, the research had focused on the identification of the main perception variables with a multi-dimensional model to addresses the multiple elements (internal and external to the person) that condition risk perception.

The Including Citizens Handbook and Feel Safe

Acknowledging the need for a better understanding of vulnerability and accessibility issues and the potential advantages of social media, had been the driving force behind the original conception and further development of two products, the Handbook and Feel Safe.

- The Handbook has been designed to provide stakeholders, first responders, technicians, volunteers with high-level knowledge and recommendations on how to communicate with citizens through digital solutions and social media. The product encompasses four thematic areas that had been identified as key for effective risk reduction and disaster management: how to communicate risk; how to make information accessible; how to mobilize citizens; how to engage with volunteers. These thematic areas correspond to the core sections of the product: *Communicating risk; Making information accessible; Mobilizing citizens; Mobilizing volunteers*.
- Feel Safe is centred on the education of minors, hence it provides trans-generational solutions on how to communicate with kids about risk and disasters, with the purpose of reducing their exposure to risk. *It shifts the priority to children as active parts to community resilience building*.

Future directions

As for the future of the Knowledge Base on DRPV and the products developed by WP2, a consistent dialogue with the Italian partner, Province of Terni (PDT) on the use of the Handbook and Feel Safe, will be kept in WP2's agenda. The outcomes on the long period of the employment of the resources provided by the products will be monitored and potentially disseminated through scientific papers, so to ensure the impact of the KB both in practice and research. An additional activity beyond the project will entail the sharing of the videos integrated in the Handbook to further disseminate the KB not only on DRPV but also on disaster management processes.

The vision is for Feel Safe to become a known tool in Italy and worldwide in support to any educational contexts to conduct activities related to children and disaster risk reduction. Part of this vision is also to open the website to a continuous collaborative process to ensure production of new and updated resources to improve the user's experience and the positive impact on children. Feel Safe has the potential to be recommended by the Italian National Civil Protection as a tool for the implementation of mandatory Disaster Risk Reduction (DRR) activities at school. Moreover, Feel Safe can promote the importance of Child centred DRR globally to ensure participation of children into DRR actions and enhance disaster preparedness education programs.

8. BIBLIOGRAPHY

- Acikara, T., Xia, B., Yigitcanlar, T., & Hon, C. (2023). Contribution of Social Media Analytics to Disaster Response Effectiveness: A Systematic Review of the Literature. *Sustainability*, 15(11), 8860. <https://doi.org/10.3390/su15118860>
- Alburo-Canete, K. Z., Clarin, C., Velmonte, K., & Codinera, M. (2023). No One Left Behind? A Case for Disability-Inclusive Disaster Risk Reduction in the Philippines. In G. Bonifacio, & R. Epe (Eds.), *Disasters in the Philippines: Before and After Haiyan* (pp. 220-247).
- Babcicky, P., Seebauer, S., & Thaler, T. (2021). Make it Personal: Introducing Intangible Outcomes and Psychological Sources to Flood Vulnerability and Policy. *International Journal of Disaster Risk Reduction* (58): 1–16. <https://doi.org/10.1016/j.ijdrr.2021.102169>
- Bolin, B., & Kurtz, L. C. (2018). Race, class, ethnicity, and disaster vulnerability. In H. Rodríguez, W. Donner, & J. E. Trainor (Eds.), *Handbook of disaster research* (2nd ed., pp. 181–203). Springer. https://doi.org/10.1007/978-3-319-63254-4_10
- Bonati, S. (2021). Disaster vulnerability knowledge base – A Consolidated Understanding of Disaster Vulnerability in Social media and crowdsourcing. *Deliverable 2.1 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from: from <http://links-project.eu/deliverables/>
- Bonati, S., Pazzi, V., & Graziani, F. (2021). First DRPV-Methodology for the LINKS Framework and the Case Assessment. *Deliverable 2.3 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No.883490). Retrieved from <http://links-project.eu/deliverables/>
- Clark, N., Fonio, C., Lüke, R., Bonati, S., Nardini, O., Graziani, F., Claessens, M., Rijkx, L., Andersen, N., Thayssen, J., Rammert, S., Hammachers, & A., Hingmann, N. (2022). First LINKS Case Report. *Deliverable 6.4 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://linksproject.eu/deliverables/>
- Dhakal, S., Zhang, L., & Xuan, L. (2021). Understanding Infrastructure Resilience, Social Equity and their Relationships: Exploratory Study Using Social Media Data in Hurricane Michael. *Natural Hazards Review* 22(4). [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000512](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000512)
- Domingue, S. J., & Emrich, T.C. (2019). Social Vulnerability and Procedural Equity: Exploring the Distribution of Disaster Aid across Counties in the United States. *The American Review of Public Administration* 49(8): 897–913. <https://doi.org/10.1177/0275074019856122>

- Fauzi, M.A. (2023). Social media in disaster management: review of the literature and future trends through bibliometric analysis. *Nat hazards* 118: 953-975. <https://doi.org/10.1007/s11069-023-06079-7>
- First, J., Mansoo Yu, M., & Houston, J.B. (2021). The Disaster Adaptation and Resilience Scale: Development and Validation of an Individual-Level Protection Measure. *Disasters* 45(4): 939–67. <https://doi.org/10.1111/disa.12452>
- Fonio, C. & Larruina, R. (2023) D5.5 Final version of the LINKS Framework. Deliverable 5.5 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://linksproject.eu/deliverables/>
- Fonio, C. & Clark, N. (2021a). Work Plan for the LINKS Framework. *Deliverable 5.1 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from: <http://links-project.eu/deliverables/>
- Fonio, C. & Clark, N. (2021b). First Work Plan for the Five Cases. *Deliverable 6.1 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from: <http://links-project.eu/deliverables/>
- Fonio, C. & Clark, N. (2021c). Second work plan for the five cases *Deliverable D6.2 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved [date], from <http://linksproject.eu/deliverables/>
- Fonio, C., Tzavella, K. (2022). Second version of the LINKS Framework. *Deliverable 5.4 of LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://linksproject.eu/deliverables/>
- Froio, C., Nardini, O., & Graziani, F. (2023). Case assessment regarding DRPV. Deliverable 2.5 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/>
- Gooden, S., Jones, D., Martin, K.J., & Boyd, M. (2009). Social Equity in Local Emergency Management Planning. *State and Local Government Review* 41(1): 1–12. <https://doi.org/10.1177/0160323X0904100101>.
- Ishtiaq, N. (2023). *The use of social media during 2022 flooding in Pakistan: a study of the national disaster management authority crisis communication* [Master Dissertation], Jonkoping University, 1-75. <https://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-62285>

- Kim, J.H., & Sutley, E.J. (2021). Implementation of Social Equity Metrics in an Engineering- Based Framework for Distributing Disaster Resources. *International Journal of Disaster Risk Reduction* 64: 1-11. <https://doi.org/10.1016/j.ijdrr.2021.102485>.
- Kirby, R., Reams, M. & Lam, N. (2023). The Use of Social Media by Emergency Stakeholder Groups: Lessons Learned from Areas Affected by Hurricanes Isaac and Sandy. *Journal of Homeland Security and Emergency Management*, 20(2), 133-168. <https://doi.org/10.1515/jhsem-2021-0031>
- Larruina, R., Clark, N., Graziani, F., Froio, C., Roeloffs, E., Luke R., Habig, T., Andersen, N., Fonio, C. & Hamachers, A. (2023). The Second LINKS Case and Broader Context Report. Deliverable 6.5 of *LINKS: Strengthening Links Between Technologies and Society for European Disaster Resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/> 883490)
- Larruina, R., Clark, N., Graziani, F., Froio, C., Roeloffs, E., Lüke R., Having, T., Andersen, N., Meyer, L., Hingmann, N. & Hamachers, A. (2023). Final report on the LINKS Framework application in a broader context. Deliverable 6.6 of *LINKS: Strengthening Links Between Technologies and Society for European Disaster Resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://linksproject.eu/deliverables/> 883490) .
- Lam, N.S.N., Meyer, M., Reams, M., Yang, S., Lee, K., Zou, L., Mihunov, V., Wang, K., Kirby, R. & Cai, H. (2023). Improving social media use for disaster resilience: challenges and strategies. *International Journal of Digital Earth*, 16(1), 3023-3044, DOI: [10.1080/17538947.2023.2239768](https://doi.org/10.1080/17538947.2023.2239768)
- Moghadas, M., Fekete, A., Rajabifard, A. (2023). The wisdom of crowds for improved disaster resilience: a near-real-time analysis of crowdsourced social media data on the 2021 flood in Germany. *GeoJournal* 88, 4215–4241. <https://doi.org/10.1007/s10708-023-10858-x>
- Nielsen, A.B., Bonati, S., & Blom Andersen, N. (2023). Discover the dynamics: an intersectional analysis of overt and hidden vulnerabilities to flood risk in urban Denmark. *Landscape and Urban Planning*, 237. <https://doi.org/10.1016/j.landurbplan.2023.104799>
- Pazzi, V., Morelli, S., & Bonati, S. (2021). Disaster Risk Perception Knowledge Base - A Consolidated Understanding of Disaster Risk Perception in Social media and crowdsourcing. Deliverable 2.2 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/>
- Phraknoi, N., Sutanto, J., Hu, Y., Goh, Y.S., Ean, C., & Lee, C. (2023). Older people's needs in urban disaster response: A systematic literature review. *International Journal of Disaster Risk Reduction* 96. <https://doi.org/10.1016/j.ijdrr.2023.103809>

- Rivera, J. D., & Knox, C. C. (2023). Defining Social Equity in Emergency Management: A Critical First Step in the Nexus. *Public Administration Review* 83(5): 1170–1185. <https://doi.org/10.1111/puar.13574>
- Saja, A.M.A., Teo, M., Goonetilleke, A. & Ziyath, A.M. (2018). An Inclusive and Adaptive Framework for Measuring Social Resilience to Disasters. *International Journal of Disaster Risk Reduction* 28: 862–873. <https://doi.org/10.1016/j.ijdrr.2018.02.004>
- Sciarretta, E., Sposato, M. (2023). Final report on the development and distribution of dissemination material and on the execution of the LINKS Framework sustainability strategy. Deliverable 9.6 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/>.
- Schmidt, E., Habig, T. & Marterer, R. (2023). Final Report about the online community management and quality assurance. Deliverable 7.6 of *LINKS: Strengthening links between technologies and society for European disaster resilience*, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Re-trieved from: <http://links-project.eu/deliverables/>
- Sendai Framework for Disaster Risk Reduction 2015–2030 (2023). Main finding and recommendations of the midterm review of the implementation of the Sendai Framework for Disaster Risk Reduction (2015-2030): 1-20. <https://sendaiframework-mtr.undrr.org/publication/report-main-findings-and-recommendations-midterm-review-implementation-sendai-framework>
- Sumaylo, D.J. (2023). When information is critical and access becomes difficult. In *Engaging isolated communities in disaster preparation and communication in the Philippines*. Springer Nature (2023). https://doi.org/10.1007/978-981-99-4697-6_2
- Tate, E., & Emrich, C. (2021). Assessing Social Equity in Disasters. *Eos* 102. <https://doi.org/10.1029/2021EO154548>.
- Tounsi, A., Temimi, M., & Lipizzi, C. (2023). Exploring Social and Geographical Disparities During Hurricane Ida Using Geolocated Social Media Content. *SSRN Product and Services* 12(3). <http://dx.doi.org/10.2139/ssrn.4484915>
- Whytlaw, J. & Hutton, S.N. (2023). Changing disaster vulnerability and capability in aging populations. *Natural Hazard Science*. <https://doi.org/10.1093/acrefore/9780199389407.013.434>
- Yıldırım, S.D. (2023). Integrated disaster management experience of people with disabilities: A phenomenological research on the experience of people with orthopedic disabilities in Türkiye. *International Journal of Disaster Risk Reduction* (88). <https://doi.org/10.1016/j.ijdrr.2023.103611>

Yuliana, Y. (2023). The Role of Media for Communication During the Disaster. *Jurnal Studi Ilmu Sosial Dan Politik*, 3(1), 1–7. <https://doi.org/10.35912/jasispol.v3i1.1940>

9. ANNEXES

9.1 Annex I: Literature Review (2023)

A selective overview of the most recent literature (2023) concerning vulnerability and risk perception, with a focus on the usage of social media and crowdsourcing. Papers dealing with case studies outside Europe are included as they help to highlight how different social characteristics (e.g., ethnicity and socio-economic status) relate to vulnerability across different contexts.

Reference	Synopsis	Key words
Acikara et al. (2023)	The paper offers a useful and comprehensive review of the most recent literature on the use of social media analytics in disaster response. It relies on the PRISMA protocol to retrieve journal publications.	Hazard: multi-hazards; natural hazards Genre: literature review
Fauzi (2023)	The study provides a useful and comprehensive review of the most recent literature on social media and disaster management and collect future trends as well. 862 journal publications retrieved from web of Science.	Hazard: multi-hazards; natural hazards Genre: literature review
Kirby et al. (2023)	The paper provides a comparison in the use of social media by governmental and non-governmental organizations, taking the response to hurricanes Sandy and Isaac (U.S., 2012) as two exemplary cases.	Hazard: hurricanes Geographical focus: US, 2012 Social media
Ishtiaq (2023)	The research study collected data from Twitter and Facebook concerning citizens response to the flooding that occurred in Pakistan in 2022. The event had been taken as an exemplary case of disaster communication as local administrations used social media to keep the population informed and alerted.	Hazard: flooding Geographical focus: Pakistan 2022 Genre: Thesis dissertation
Nielsen et al. (2023)	The article defines vulnerability “as the conditions determined by physical, socioeconomic and environmental processes, which increase the susceptibility of a community or individual to the impacts of climate change”. It highlights how disaster management organisations tend to overlook vulnerable groups in their communication strategy and encourages an implementation of solutions to include marginalised people.	Hazard: urban flooding Geographical focus: Copenhagen Vulnerability and information technology
Lam et al. (2023)	The paper focuses on the pros and cons of the usage of Twitter, based on the online response to three hurricanes (Isaac, Sandy and Harvey) that hit the U.S. in 2017. The essay proposes to use the mitigation phase as a phase for organisations to enhance two-way communications with citizens so to increase their digital literacy. Moreover, social media companies (e.g., Twitter)	Hazard: Hurricane Geographical focus: U.S., 2017 Crowdsourced social media data

Reference	Synopsis	Key words
	should make their platforms easier and more accessible, keeping in mind the existence of different groups of users.	Twitter
Moghadas (2023)	The essay provides an insight into the interpretation of Twitter metadata, based on experience (flooding in Germany in 2021). It highlights the existence of a “spatio-temporal pattern” of social media use by people living in affected areas, who tend to post more information, compared to the online activity of unaffected users. “This can provide localized and near-real-time information about evolving disaster situations for decision makers and residents”.	Hazard: flooding Geographical focus: Germany, 2021 Crowdsourced social media data Twitter
Phraknoi (2023)	The paper provides a systematic review of approximately 120 scientific publications concerning older citizens response to disaster and concludes that the scientific community still needs to address the specific needs and challenges of older people in disaster.	Hazard: multi-hazards Genre: literature review
Rivera & Knox (2023)	The article provides two different definitions for “social vulnerability” and “social equity”, hence focusing on the second one. It regards “social equity” as the “the conceptual and holistic equalization of the effects of characteristics that make a population socially vulnerable to a hazard”.	Hazard type: multi-hazards Disaster management and social equity
Sumaylo (2023)	The chapter deals with the problems related to accessibility of information in disasters and focuses on marginalized groups. It challenges the idealized notion of society as a homogeneous community.	Hazard: multi-hazards Access to communication Marginalized groups
Tounsi et al. (2023)	The paper studies the temporal and geographical distribution of Tweets during extreme weather conditions, that eventually led to Hurricane Ida in 2021. The location of Tweets could be advantageous for local administrations and first responders to identify the most affected areas, and even to prevent massive losses of lives.	Hazard: hurricane Geographical focus: U.S. (Hurricane Ida, 2021) Social media (e.g. Twitter)
Whytlaw & Hutton (2023)	The article deals with the integration of the elderly into disaster management, through multiple services to mitigate their vulnerability to disasters.	Hazard: multi-hazards Vulnerable groups (i.e., the elderly) and integrated disaster management
Yıldırım (2023)	The article highlights that people with disabilities are more affected by disasters than other citizens. To lower their level of vulnerability to disasters, disaster management organizations and local authorities should actively include this group into the disaster management process.	Hazard: multi-hazard (including men made hazards) Geographical focus: Turkey Vulnerable people (physically disabled)

Reference	Synopsis	Key words
		and disaster management
Yuliana (2023)	The paper addresses the relevance of language in communicating with citizens through social media in disasters. It also provides literature review of this topic.	Hazard: multi-hazard in multiple cases Social media

9.2 Annex II: Policy Brief

The present document can be also retrieved from the LINKS Guidelines Library at the following link:

[https://links.communitycenter.eu/index.php/Accessibility for all: fostering inclusive use of social media in disaster risk management](https://links.communitycenter.eu/index.php/Accessibility_for_all:_fostering_inclusive_use_of_social_media_in_disaster_risk_management)

POLICY BRIEF

NOVEMBER 2023

Accessibility for all: **Fostering inclusive uses of social media in disaster communication**

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LINKS

Strengthening links between technologies and society for European disaster resilience



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



Accessibility for all: Fostering inclusive uses of social media in disaster communication

In recent decades, many organizations working in the field of disaster risk management have adapted to using social media in their communication processes. This allows organizations to improve their collaboration with many different parts of society, including the increased opportunity to engage with people with different abilities and vulnerabilities. As a widespread communication system, social media has become an indispensable resource to analyse the needs of different groups, to craft tailored communication messages, and to mobilize communities in times of disasters.

However, disaster management organisations and policy makers continue to deal with several challenges when it comes to inclusive communication through social media with diverse groups, including the most vulnerable and disadvantaged. They face difficulties ensuring that the information they share on digital channels is accessible to all parts of the population, that it is understandable and actionable (meaning that people can take the necessary actions based on the information), and that information and knowledge sharing is multi-directional.

These challenges can be overcome by targeting accessibility issues in all phases of the disaster cycle (i.e. before, during, and after). In this case, the concept of accessibility refers to ensuring inclusive, reliable approaches for making social media channels and information accessible, which has a potential to address and reduce vulnerability and to strengthen resilience within local communities.

This policy brief provides evidence-informed recommendations for more accessible and inclusive uses of social media to improve disaster communication. The recommendations are based on the outcomes from the LINKS project, an extensive study across Europe on the uses of social media in disaster risk management under the EU Horizon 2020 Framework. The recommendations are designed to address disaster risk management stakeholders working at three levels: operational, strategic, and policy. This is done to show the interdependencies and conditions needed across the three different levels for the effective implementation of the recommendations.

Key Actions Points:

Disaster management organisations:

- ✓ Tailor your communication platforms, channels, and information to be accessible to all members of society, which means considering the needs of people with different vulnerability profiles, cultural backgrounds, and socio-economic conditions.

Strategists:

- ✓ Create a digital accessibility strategy for your organization, that will provide updated guidelines with clear actions for 1) acknowledging and assessing the specific accessibility needs of different groups of people and 2) incorporating that knowledge into your organization's information and communication processes.
- ✓ The accessibility strategy should incorporate an iterative roadmap, used to identify, and manage risks, gaps in policies, and needed technologies and resources; it should define priorities and milestones in terms of users' needs and digital accessibility validation, e.g. to measure if the different information and channels are accessible and useable to different users in different circumstances.

Policy makers:

- ✓ Promote and allocate resources to disaster management organisations for investments in inclusive disaster communication practices, digital applications, and expertise (e.g. trained digital mediators who are specifically trained to help people needing different accessibility needs).
- ✓ Implement policies and regulations which ensure the accessibility to disaster communication and information for all parts of the society.

How can we define accessibility?

In LINKS, we define accessibility as the quality of being able to be reached by everyone, including people with diverse needs. Accessibility needs to be inclusive, as society cannot be considered as a single homogeneous group made up of individuals with the same needs. Indeed, a society includes communities and individuals differentiated by cultures, values, beliefs and by diverse physical and intellectual skills. Therefore, the access to information and means of communication in disasters, through social media or other channels, needs to be tailored according to different needs. Evidence shows that the exclusion of different parts of the population from the digital world can exacerbate their exposure to risks. On the other hand, the outcomes from the research undertaken in the LINKS project confirms that the inclusion of these groups through increased access to relevant digital applications and information can bring diverse skills and knowledge into to disaster management planning and actions and strengthen the overall resilience of society. Below we define four core areas of accessibility, along with key recommendations at operational, strategy, and policy levels.





Material accessibility: Ensuring all parts of society have access to digital applications, skills, and information

Digital inclusion can be hindered by various factors: for example, differential access to technological applications like phones or computers due to socio-economic circumstances, unequal connectivity to internet or broadband due to geographical location, or varied levels of familiarity with the basic functions of social media due to exposure, age, and socio-cultural norms.

Recommendations at operational level:

- ✓ Provide access to information which does not require internet connectivity through medias such as radio, television, newspapers, informative pamphlets, and citizen groups and associations.
- ✓ Promote the use of emergency apps that can function without needing frequent updates to ensure compatibility with older digital devices.

Recommendations at strategy level:

- ✓ Integrate alternative communication strategies for those who lack digital devices, for instance relying on trained outreach personnel to spread risk information or to alert communities with emergency sirens and alarms systems, via landline phone trees, or by reaching people at home or at other in-person community spaces.

- ✓ Conduct an assessment of the accessibility to digital channels and information by different groups within the society, including minorities and the most vulnerable, by establishing relationships and consistent engagement with key representatives and members of those different groups.

Recommendations at policy level:

- ✓ Promote and fund educational activities for improving digital skills of individuals who have different levels of familiarity with technological devices such as smart phones or struggle with basic functions of social media.
- ✓ Enable and invest in digitally inclusive environments and equipment (i.e. more privacy preserving public Wi-Fi hotspots, charging stations).

Physical and sensory accessibility: Tailoring digital channels and information to specific physical and sensory needs

Physical and sensory challenges can hinder the access to digital information before, during, and after a disaster. On one hand the virtual world tends to exclude groups with diversities of this kind (e.g. visual, hearing, mobility), on the other it provides a series of resources that have potential to involve *everyone*. Indeed, technological devices and special apps can provide a series of features that can facilitate the access to information for people with specific needs.

Recommendations at operational level:

- ✓ Integrate keyboard navigation services into every organization's digital platforms (e.g. websites, apps), which provide specific functions to support the interaction with and navigation of the digital interfaces (e.g. without a mouse) for people with physical and sensory needs, such as persons with visual impairments and mobility issues.
- ✓ Promote and normalise the use of apps and platforms that provide features for persons

with physical and sensory needs, such as transcription support functions for people with hearing impairments.

- ✓ Provide the same information in different media formats (including images, video, and sound).

Recommendations at strategy level:

- ✓ Engage with individuals/groups with sensory and physical needs to learn more about their digital practices and requirements.
- ✓ Gain insights from assistive technology experts, such as digital mediators who are specifically trained to help people needing different accessibility accommodations (e.g. persons with disabilities).

Recommendations at policy level:

- ✓ Promote programmes with teaching activities on strengthening digital capacities, addressing the needs of both assistive technology experts and people with physical and sensory accessibility issues.
- ✓ Promote the recruitment and training of digital mediators, both within disaster management organizations and within the community.

Cultural accessibility: Ensuring the knowledge shared on digital channels is inclusive and recognizes the diversity of the society

Linguistic and demographic differences play an essential role when it comes to cultural accessibility in disaster communication. Factors such as age, gender, education, nationality, ethnicity, and economic differences, can affect the freedom of access to social media as well as different social media communication practices. These factors can influence if a group of people is considered as *advantaged* or *disadvantaged* in their accessibility to information communicated digitally in all phases of a disaster. Language can further impede access because social media, and digital technologies in general, often make use of English as the "common language". Though widespread, its use is neither consistent nor singular; words and phrases do not always carry the same meaning thus adding to the risks already being faced in times of vulnerability.

Recommendations at operational level:

- ✓ Be active on social media platforms used by groups who carry with them cultural communication practices that differ from mainstream Europe (e.g. WeChat and Weibo for the Chinese community).
- ✓ Communicate messages and information in plain language and avoid technical terms and the use of acronyms or symbols in your communication.
- ✓ Provide translation support (e.g. subtitles) on digital platforms and channels in as many languages as possible to reach different linguistic groups within the population.
- ✓ Use social media platforms and other information channels which employ safeguards to filter and block misinformation and offensive comments (i.e. hate speech, hoaxes).

Recommendations at strategy level:

- ✓ Work together with local representatives in the community for people with different cultural backgrounds to understand their needs, and tailor your communication strategies and messages accordingly.
- ✓ Implement safeguards (e.g. fact checkers, AI) to eliminate offensive messaging and to mitigate misinformation on the digital applications and information channels of your organization.
- ✓ Implement digital literacy campaigns and programmes which strengthen digital competencies, empower, and promote good practices for online safety for different groups of people in the population.



Recommendations at policy level:

- ✓ Establish local mechanisms and spaces, for instance physical meetings at a community centre or an online forum, to facilitate engagement among disaster management organizations, local community representatives, and other relevant actors to ensure that people coming from different cultural backgrounds are both heard and informed.
- ✓ Promote and allocate funding for digital literacy programmes, and towards the implementation of safeguards for online safety and the management of misinformation on the digital channels of public institutions.
- ✓ Set policy priorities towards the implementation of safeguards for the management of misinformation by social media platforms providers, which force accountability and responsibility.

Relief accessibility: Strengthen relief efforts by ensuring digital channels and information can be accessed and shared by all during disasters

Being digitally connected and informed also means being represented in society. The result of this precondition is the increased ability of people to ask for help and receive assistance. In this case, social media can function as an ally, by providing digital platforms where citizens can exchange information with each other in disasters and provide useful feedback to disaster management organizations and relief workers. The sense of a cohesive and united community, capable of communicating and providing mutual support, can be established even in the most severe disasters.

Recommendations at operational level:

- ✓ Use different social media platforms and channels to reach a more diverse audience, and to increase situational awareness during disasters.
- ✓ Promote the use of official channels (even in preparatory phases) to ensure people access reliable and verified information.

Recommendations at strategy level:

- ✓ Consider the use of digital platforms and apps which can enable direct, two-way exchange of information and needs with citizens during and after the response phase of a disaster.

Recommendations at policy level:

- ✓ Promote and facilitate cooperation among different authorities and other relevant stakeholders in preparatory phases, for aligning expectations and ensuring stronger coordination of emergency messaging and information across communities during disasters.

Key Messages

- ✓ **Accessibility in disaster communication includes challenges for the population related to material, physical, and cultural barriers to accessing and sharing information and knowledge on social media platforms and digital applications.**
- ✓ **In particular, those who are the most vulnerable, including people with disabilities, low-income groups, and the elderly, face additional/unique accessibility challenges that prevent them from receiving and sharing reliable and up-to-date information and exacerbate their exposure to risks**
- ✓ **Addressing these accessibility issues in disaster communication can strengthen collective risk awareness by ensuring that all parts of the population have access to reliable information, and that the information has been shared in a way that all stakeholders can understand and benefit from.**
- ✓ **Access to information should therefore be crafted and delivered according to the diverse needs and skills of different members of the population, in all phases of disasters.**

FURTHER READING

Bonati, S. (2020). Disaster vulnerability knowledge base - A Consolidated Understanding of Disaster Risk Perception in Social Media and Crowdsourcing. Deliverable 2.1 of LINKS: Strengthening links between technologies and society for European disaster resilience, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). <http://links-project.eu/deliverables/>

Pazzi, V., Morelli, S., & Bonati, S. (2021). Disaster Risk Perception Knowledge Base - A Consolidated Understanding of Disaster Risk Perception in Social Media and Crowdsourcing. Deliverable 2.2 of LINKS: Strengthening links between technologies and society for European disaster resilience, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). <http://linksproject.eu/deliverables/>

Froio, C., Nardini, O., & Graziani, F. (2023). Report on the Monitoring DRPV – related Broader Context Application. Deliverable 2.6 of LINKS: Strengthening links between technologies and society for European disaster resilience, funded by the European Union's Horizon 2020 Research and Innovation Programme (No. 883490). Retrieved from <http://links-project.eu/deliverables/>

Andersen, N, Nielsen, A. B., Raju, E., Patil, T (2023). Policy Brief: Targeting Communication in Disasters, LINKS project <https://cloud.links.communitycenter.eu/index.php/s/boiypA-NyHPn7ZQF>

*This document is the result of a co-production process involving experts, scientists, and practitioners, working in the Horizon 2020 project LINKS – Strengthening links between technologies and society for European disaster resilience. The results are derived from a specific LINKS product called the **Including Citizens Handbook**. The Handbook addresses disaster management organizations, policy makers, businesses, first responders, and scholars, providing resources on different topics related to accessibility of information, mobilization of citizens, risk awareness, and volunteerism, with a practical and practitioner-driven perspective. Visit the Handbook at the QR code below, and find out more about LINKS at <https://links-project.eu/>*



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Suggested citation

Froio, C., Nardini, O., Clark, N., Patil, T. (2023). Policy Brief: Accessibility for all: fostering inclusive use of social media in disaster communication, LINKS project.

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9.3 Annex III: Results from the online survey on the Including Citizens Handbook (Making information accessible and Mobilizing Citizens)

ACCESSIBILITY								
	Action_1		Action_2		Action_3		Action_4	
	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility
Social Scientist	9	7	8	7	8	7	7	5
Researcher	10	9	9	2	10	4	10	3
Fire chair	5	4	7	5	9	5	3	2
Paramedic researcher	8	8	8	8	8	7	9	7
Employee	9	9	9	9	9	9	8	8
PhD student	9	9	9	9	8	8	8	8
PhD student	6	6	10	7	4	5	5	6
CP technician	8	6	8	7	9	8	8	7
Account manager	10	5	6	6	10	10	7	7
CP technician	6	6	9	9	8	8	7	7
Emergency coordinator	9	9	8	7	10	8	8	7
Official	10	8	10	8	10	8	10	8

MOBILITY										
	Action_1a		Action_1b		Action_1c		Action_2		Action_3	
	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility
Social scientist	10	8	9	8	10	9	9	6	10	9
Researcher	10	10	10	10	10	10	10	3	10	10
Fire chair	7	7	5	5	5	5	5	5	4	3
Paramedic researcher	10	8	8	8	6	7	8	6	9	9
Employee	8	8	9	9	9	9	9	9	9	9
PhD student	9	9	9	9	10	10	10	10	9	9
PhD student	9	8	3	6	8	8	5	6	3	3
CP technician	10	9	9	8	9	8	8	6	9	8
Account manager	10	10	10	9	10	8	10	10	10	10
CP technician	7	7	6	6	6	6	6	6	8	8



MOBILITY										
	Action_1a		Action_1b		Action_1c		Action_2		Action_3	
	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility	Usefulness of the action	Feasibility
Emergency coordinator	6	4	9	5	5	4	6	4	4	3
Official	10	9	10	9	10	9	10	9	10	9