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LINKS

Strengthening links between technologies and society for European disaster resilience

D3.1 DMP KNOWLEDGE BASE

A CONSOLIDATED UNDERSTANDING OF SOCIAL MEDIA AND CROWDSOURCING IN DISASTER MANAGEMENT PROCESSES

Research Report

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EXECUTIVE SUMMARY

About the project

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

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

Bringing together 15 partners and 2 associated partners across Europe (Belgium, Denmark, Germany, Italy, Luxembourg, the Netherlands) and beyond (Bosnia & Herzegovina, Japan), the project will develop a framework to understand, measure and govern SMCS for disasters. The LINKS Framework consists of learning materials, such as scientific methods, practical tools, and guidelines, addressing different groups of stakeholders (e.g. researchers, practitioners, and policy makers). It will be developed and evaluated through five practitioner-driven European cases, representing different disaster scenarios (earthquakes, flooding, industrial hazards, terrorism, drought), cutting across disaster management phases and diverse socioeconomic and cultural settings in four countries (Denmark, Germany, Italy, 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

In a changing technological landscape to address disasters, and with increasing diversity of stakeholders in disaster risk management, this deliverable aims to provide a state-of-the-art of the existing academic literature linking SMCS with disaster management processes (DMP). This is to improve institutional resilience; and map existing European *formal* governance processes in relation to SMCS and disasters across three levels of government: Global, European and national. This document is a research deliverable that will support in building the DMP knowledge base (KB) and a methodology specifically focusing on DMP for an iterative case-based assessment of the LINKS Framework.

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Methodologically, this deliverable is a result of a structured review of empirical sources i.e., *texts* in the form of research publications, policy frameworks, guidelines, and evaluations of various tools for disaster risk management. Conceptually, we focus on formal governance structures as a key aspect for understanding how SMCS are supporting or constraining resilience-building efforts. We use multi-level governance and resilience theory as the foundation to conduct this review.

In the knowledge domain that this deliverable addresses, 'Disaster Management Processes' (DMP), we analyse how SMCS affect the management of disaster risk across all phases of the Disaster Management Cycle (DMC) and how SMCS platforms can support disaster management organisations in strengthening resilience. While this deliverable takes the first step in establishing a consolidated understanding of DMP in relation to SMCS and institutional resilience, its clear connections to the two other knowledge domains (DRPV and DCT addressed in forthcoming deliverables 2.1 (Bonati, 2020), 2.2 (Pazzi et al., 2020) and 4.1 (Habig et al., 2020) of the LINKS project) cannot be ignored. The three domains are simultaneously emblematic for three crucial dimensions of resilience building: investigating interactions among social, institutional and technological dimensions while recognising diversity at the individual, institutional and systems levels. Furthermore, the outcomes from the studies across the three domains form the foundational knowledge bases on which the LINKS project is built.

The key findings from the review in this deliverable are as follows:

- SMCS studies are heavily case-study oriented and point to the need for more comparative and interdisciplinary analysis of SMCS in DMP. Further, there is an overwhelming majority of studies focusing primarily on disaster response and preparedness pointing to the need to focus on overall disaster risk management;
- Public authorities have a passive and ad-hoc approach to using SMCS in DMP. Increased focus on the needed support (e.g. learning, training and resources) is crucial for a more active and strategic engagement with SMCS technologies for improved DMP;
- Citizens participate both actively and passively in DMP through SMCS and are not bound to the disaster-affected area. Nevertheless, we know little about the publics that engage in DMP through SMCS. We contribute with a preliminary typology of SMCS publics in DMP which will be further developed during the course of the project;
- Misinformation, disinformation and ethical concerns of privacy are fundamental barriers to authorities for the use of SMCS in DMP. These challenges are confirmed during the ongoing COVID-19 pandemic;
- At a policy level, while we notice efforts to strengthening formal institutions governing and guiding digital platforms globally and at the EU level, there are minimal efforts at the national and sub-national levels in this regard.

Going forward, there is a need to deepen our understanding of the role of SMCS in disasters on the various socio-political contexts and the intra-organisational dynamics. Further, there is a need to

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focus on more people-centred SMCS research; and a strong need to fill the gaps on ethics, privacy and normative issues; and efforts must focus on all phases of the DMC. Furthermore, our review indicated a strong need for understanding the interactions and outcomes of the access and application of DCTs among vulnerable groups and the governance thereof. Over the coming years, the LINKS project will work to explore these and other gaps identified in the three knowledge domains of DRVP, DMP, and, DCT through case-based assessments of the LINKS Framework.

This research deliverable provides useful insights to different stakeholders. While the state-of-the-art provides a solid overview for the research community, the gaps highlighted are important to policy discussions. Further, the registry of policies, guidelines and frameworks would be useful to different practitioners working with disasters and SMCS.

Moving into the next phase of the LINKS project, this deliverable informs the DMP-oriented methodology, deliverable 3.2, with three overall tangible outputs that will feed into the DMP methodology:

- An overview of the existing knowledge of how SMCS is used in the context of DMP and the research gaps where LINKS can make a substantial contribution to the field;
- The first draft of a tailored conceptual model, the *DMP Resilience Wheel*, which supports the further assessment of the current and future use of SMCS in DMP;
- Registries comprising existing policies, guidelines and frameworks guiding SMCS use in DMP (Section 5 and Annex III).

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LIST OF ACRONYMS

Abbreviation / Acronym	Description
CCA	EU Emergency and Crisis Coordination Arrangements
CECIS	Common Emergency Communication Information System
CPM	Civil Protection Mechanism
DCT	Disaster Community Technologies
DMC	Disaster Management Cycle
DMP	Disaster Management Processes
DRPV	Disaster Risk Perception and Vulnerability
DSA	Digital Service Act
EEAS	European Union External Action
EECC	European Electronic Communication Code
EmerGent	Emergency Management in Social Media Generation
ERCC	Emergency Response Coordination Centre
EU	European Union
GDPR	General Data Protection Regulation
GOAN	Global Outbreak Alert and Response Network
HNS	EU Host Nation Support Guidelines
IASC	Inter Agency Standing Committee
ICRC	International Committee of the Red Cross
ICT	Internet Communication Technology
IPRC	EU Integrated Political Crisis Response arrangements
IRFC	International Federation of Red Cross and Red Crescent Societies
ITU	United Nations Agency for Telecommunication
SMCS	Social media and crowdsourcing
UN	United Nations
UNICEF	United Nations Children's Fund
OCHA	The United Nations Office for the Coordination of Humanitarian Affairs

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VGI	Volunteered Geographic Information
VOST	Virtual Operations Support Teams
WHO	World Health Organisation
WP	Work package

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DEFINITION OF KEY TERMS[1]

Term	Definition
Citizens	Citizens can be considered via the same levels as the other stakeholders, and for LINKS, particular relevance should be given to local citizens who are likely to be impacted by the case assessments. LINKS identifies two key sub-categories of citizen stakeholders: Civil Society and Vulnerable Populations (LINKS Glossary and D8.1).
Crowdsourcing	Describes a distributed problem-solving model where the task of solving a challenge or developing an idea is "outsourced" to a crowd. It implies tapping into 'the wisdom of the crowd' (definition builds on Howe, 2006; see also LINKS Glossary).
Governance	The process of making decisions. Refers to more than the formal institutions and organisations through which the management of disasters is or is not sustained. It comprises the mechanisms, processes and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences. It should be noted that governance is not government, even though government is often part of governance (definition builds on Rosenau, 1995; see also LINKS Glossary).
Disaster Community Technology (DCT)	A DCT is a software(-function) for interaction with, within or among groups of people who have similar interests or have common attributes (communities) in case of a disaster as well as performing analysis of these interactions (LINKS Glossary and D4.1).
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 (UNDRR, 2016).
Disaster Management Processes (DMP)	A collective term encompassing a systematic series of actions or steps taken to reduce and manage disaster risk. Disaster management processes are often associated directly with the phases of the DMC. In the context of LINKS, we specifically refer to DMP as the policy frameworks, tools and guidelines developed to govern disasters across all phases of the DMC (LINKS Glossary).
Institutions	Institutions are social structures that are composed of regulative, normative and cultural-cognitive elements that provide stability and meaning to social life. Institutions provide the 'rules of the game' and define the available ways to operate by discouraging, constraining or encouraging given behavioural patterns (Scott, 2001).

[1] All definitions are retrieved from the LINKS Glossary (forthcoming)

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LINKS Framework	A set of learning materials, such as methods, tools and guidelines for enhancing the governance of diversity among the understanding of SMCS in disasters for relevant stakeholders. Methods in LINKS refer to approaches that will enable researchers and practitioners to assess the effects of SMCS for disaster resilience under diverse conditions. Tools are practical instruments supporting first-responders, public authorities and citizens with the implementation of SMCS in disaster and security contexts. Guidelines are recommendations for improving national and regional governance strategies on SMCS as well as introductions and explanations of how to apply the methods and tools under diverse conditions (LINKS Glossary).
LINKS Knowledge Bases	The outputs and knowledge obtained from the assessment of three knowledge domains. This knowledge is used to develop the LINKS Framework (LINKS Glossary).
LINKS Knowledge Domains	The three crucial domains of analysis for studying European disaster resilience and SMCS. These include: Disaster Risk Perception and Vulnerability (DRPV), for assessing changes in the citizens' perception of disaster risks induced by SMCS, as well as assessing the changes in the vulnerability of practitioners and citizens. Disaster Management Processes (DMP) for analysis of how SMCS changes the procedures and processes within the crisis and disaster management. Disaster Community Technologies (DCT), for assessing SMCS related technologies used by practitioners (and citizens) in disasters (LINKS Glossary).
Resilience	The ability of individuals, institutions, and systems to recover from disturbance and to develop and adopt alternative strategies in response to changing conditions (definition builds on Tyler & Moench, 2012; see also LINKS Glossary).
Social media	A group of Internet-based applications that build on the ideological and technological foundations of the Web 2.0 and that allow the creation and exchange of user-generated content. Forms of media that allow people to communicate and share information using the internet or mobile phones. Web 2.0 is the Internet we are familiar with today in which people are not just consumers of information but producers of knowledge through social networking sites and services like Facebook, Twitter and Instagram (definition builds on Kaplan & Haenlein, 2010).
Sustainable Advanced Learning	A maintainable and evolving collection of knowledge and best practices produced for and by relevant stakeholders. Sustainable advanced learning entails a cognitive dimension (the capability to gain in-depth knowledge of crises and crisis response) and a social dimension (the ability to implement the knowledge into new practices) (LINKS Glossary).

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1. INTRODUCTION

Disaster risk management brings together many different actors ranging from public to private and non-governmental organisations. Among them, public authorities play a huge role in managing risks for disaster resilience. Due to a variety of spatial, economic, legal and cultural conditions in Europe, Disaster Management Processes (DMP) are many and diverse. However, even between comparable countries in Europe, DMP vary substantially in terms of hazard profiles and socio-economic status. Furthermore, these diverse DMP, have to deal with a new set of disasters emerging from potential cross-sectoral challenges: natural hazards (flooding, earthquakes) connected to the climate crisis; technical hazards (nuclear and chemical, power, infrastructure collapse); and security incidents (terrorist attacks; cyber-attacks). In addition, with the severity and variety of disasters increasing, the latest incidents such as forest fires in Portugal in 2017; the earthquakes in Greece and Turkey in 2020, the terrorist attacks during the ongoing COVID-19 pandemic have shown that disasters are not individual isolated events but a problem of interconnected systemic risk. It has been extremely challenging to design disaster risk management solutions particularly in the context of changing technologies and global risk uncertainties. In a changing technological landscape, these situations require a diverse set of organisations to not only respond and coordinate their actions but truly to collaborate and to bring citizens to the heart of decision-making processes.

The LINKS project will go beyond the present state-of-the-art by providing a better appreciation of and concern with information technologies, communication systems and digital platforms – which are increasingly utilized to answer the challenges outlined above. Well-functioning DMP have to deal with this host of challenges and simultaneously do so from very different points of departure. For this purpose, public authorities increasingly rely on Disaster Community Technologies (DCT).[2] These technologies allow for faster information exchange and communication between response organisations and affected communities, which can significantly improve DMP. DCT defines the broader category of social media and crowdsourcing technologies as the specific technologies and platforms used in DMP.

In the context of the increased use and application of SMCS technologies and platforms, we critically explore the current ways in which disaster management processes, tools, mechanisms and practices can strengthen resilience by relying on SMCS. The first step of this exploration is the development of this knowledge base (KB). In LINKS, the three KBs are defined as the outputs and knowledge obtained from the assessments of the knowledge domains (LINKS Glossary). The KBs are foundational for the development and evaluation of the LINKS Framework throughout the project. In the context of the DMP knowledge domain this first version of the KB has a threefold objective:

[2] Disaster Community Technologies (DCT) for SMCS. A full conceptual assessment of SMCS and DCT is provided in D4.1 (see Habig et al, 2020).

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- First, to conceptualise and operationalise resilience in the context of SMCS use in DMP (conceptualisation);
- Second, to provide a state-of-the-art of the existing academic literature linking SMCS with DMP (step one of the analysis);
- Third, it maps existing European *formal* governance processes in relation to SMCS and disasters across three levels of government: Global, European and national (step two of the analysis).

Methodologically, this deliverable (D3.1) builds on a comprehensive structured literature review of peer-reviewed scientific papers, European projects' deliverables and policy frameworks guiding SMCS use in DMP (Section 2 and Annexes I-IV). This deliverable also draws on knowledge from workshops and meetings with practitioners working in crisis and disaster risk management fields. These activities were used to validate and contextualise some of the assumptions and practical implications of this DMP KB.

The deliverable has a specific focus on the (formal) institutional perspective to understand the effects of SMCS use for disaster governance. The output of the first step of the analysis (the state-of-the-art) is a conceptual model, *the DMP Resilience Wheel* (presented in Figure 10 below) that supports the further assessment of the role and effect of SMCS in DMP in the methodology and the case-based assessment of the LINKS Framework. The output of the second step of the analysis (the DMP mapping) is a comprehensive overview of the existing policy landscape that authorities currently have to navigate when using SMCS in DMP. Together, the three main elements in this deliverable (the conceptual framework, the state-of-the-art and the mapping of policy frameworks) provide insights into barriers in policy and practice in applying and implementing the use of SMCS in the management of disasters for enhanced resilience. We elucidate current institutional arrangements guiding and constraining the use and implementation of SMCS in DMP and take the first steps towards a systematic, consolidated understanding of governance practices associated with disaster resilience and their relations to SMCS.

The findings from these analyses are used to inform the upcoming methodologies to be used in different cases and the LINKS Framework but may also inspire policies and practices more directly. For instance, consider a heatwave and a long-lasting drought in Europe where many communities face water shortages and consequent restrictions on water consumption. A scenario that may cause public criticism of authorities' inclusion (or lack thereof) of citizens in DMP. In such a scenario, the DMP KB has the potential to help authorities see the potentials and pitfalls in using SMCS to engage citizens in DMP; understand drivers for creating inclusive DMP, and to formulate indicators for improved disaster resilience. The registries of existing guidelines, policies and frameworks in this KB can provide the authorities with know-how on how to engage with the individual components of the DMP Resilience Wheel and an overview of the existing regulatory landscape that one should be aware of.

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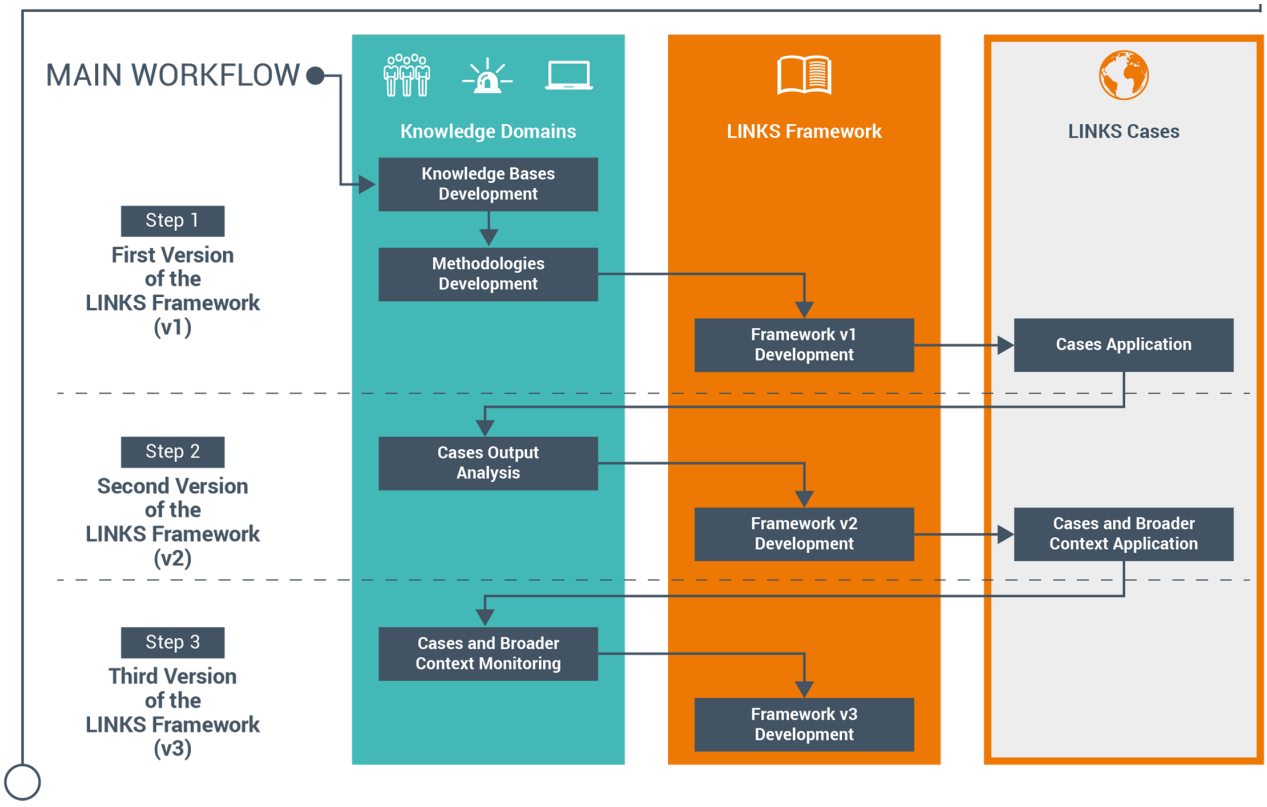
The above scenario also points to the importance of sustainable advanced learning. Authorities and other stakeholders must be able to gain and implement knowledge from this KB, as well as contribute to advancing the knowledge on DMP and SMCS within ever-changing environments of diverse socio-cultural and technical conditions. In this regard, this research deliverable provides novel insights on the role of SMCS in DMP, which are relevant for wider research communities with interest in disaster risk management. Moreover, the DMP KB will inform the future content and methodology for the case-based assessment of the LINKS Framework through various learning materials, such as methods, tools and guidelines, established for different sets of actors (Fonio & Clark, 2021: D5.1).

LINKS will also translate the knowledge gathered within this KB into focused DMP methodologies at different iterations in the project as illustrated in Figure 1 below.

Figure 1: Workflow of LINKS



Source: LINKS

The first methodology (D.3.2) will test and refine the knowledge base provided in this deliverable through case-based assessments of the LINKS Framework carried out across the five LINKS scenarios (floods in Denmark; droughts and terror attacks in Germany; earthquakes in Italy and industrial hazards in the Netherlands) (Fonio & Clark, 2021: D6.1). Together with the KBs and methodologies on DRPV (D2.1, D2.2 and D2.3) and DCT (D4.1 and D4.2), the first inputs are established for the

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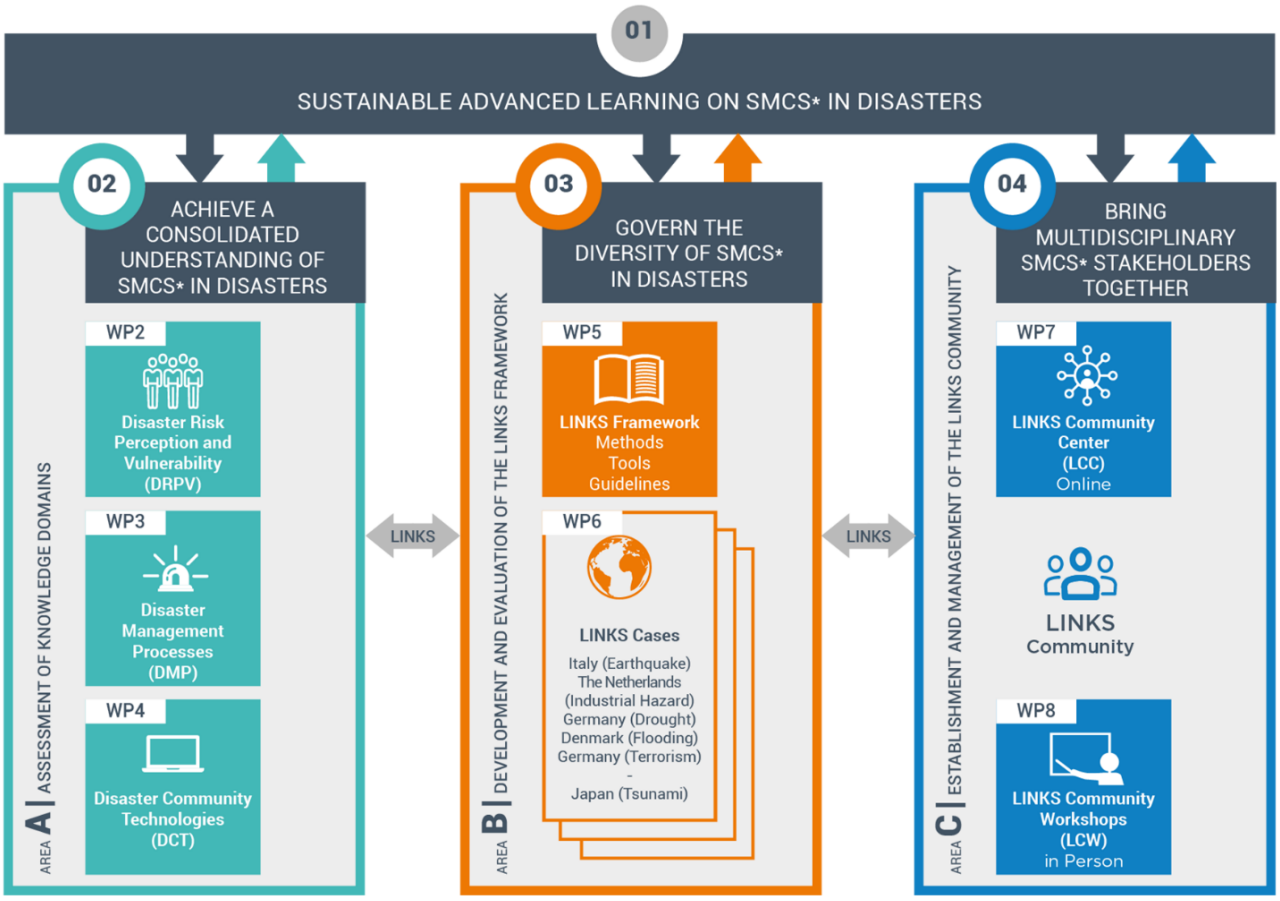
assessment of the LINKS Framework. Furthermore, the KBs will deliver inputs for a community platform (the LINKS Community Center (LCC) (WP7)) supporting the sustainability of the knowledge and learning produced throughout the entire project for the LINKS community (WP8), on the uses of SMCS in DMP. The positioning of the three KB within the overarching workflow of LINKS is shown in Figure 2 below:

Figure 2: Concept of LINKS



Source: LINKS

In the following section (Section 2), we present how we studied texts in the form of academic literature and policy documents to meet the two objectives of this deliverable. Section 3 places the study of management processes and formal governance arrangements within the LINKS project and points to four key drivers for understanding resilience in the context of DMP. Section 4 is the most extensive and provides the first step of the analysis (the state-of-the-art). It is structured according to the four resilience drivers that we identify in Section 3 where the question of decision-making processes is elaborated on extensively to capture the changed governance dynamics characterising the use of SMCS in DMP. Section 4 ends with the first draft version of the DMP Resilience Wheel and organises the knowledge explored in Section 4 into an elaborate set of characteristics of appropriate SMCS use in DMP for enhanced institutional resilience. Section 5 covers the second step

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in the analysis – the mapping of formal frameworks – and provides short descriptions of the policy frameworks we identify across global, European, and national levels. Section 6 is a short and concise concluding section providing future directions for understanding SMCS in DMP. Here, we suggest two essential 'turns'. The first is a turn towards an increased focus on people and power. This includes attention to political, organisational, ethical, and social conditions for the use of SMCS in DMP. The second is a turn from preparedness and response to long-term recovery and prevention as well as a focus on the interdependencies between the four phases, their mutual support for increasing capacities across all phases. Building on these 'turns', we highlight some potential areas of importance for the development of the LINKS Framework.

This deliverable must be read in combination with Deliverable 2.1 (D2.1) focusing on how vulnerability is conceived and analysed in the existing literature and how it is affected by SMCS in disasters and Deliverable 2.2 (D2.2) on risk perceptions in the context of disasters and SMCS. Further, Deliverable 4.1 (D4.1) presents the knowledge base on DCT providing us with an in-depth understanding of the currently existing tools and technologies for disaster risk management with a focus on SMCS.

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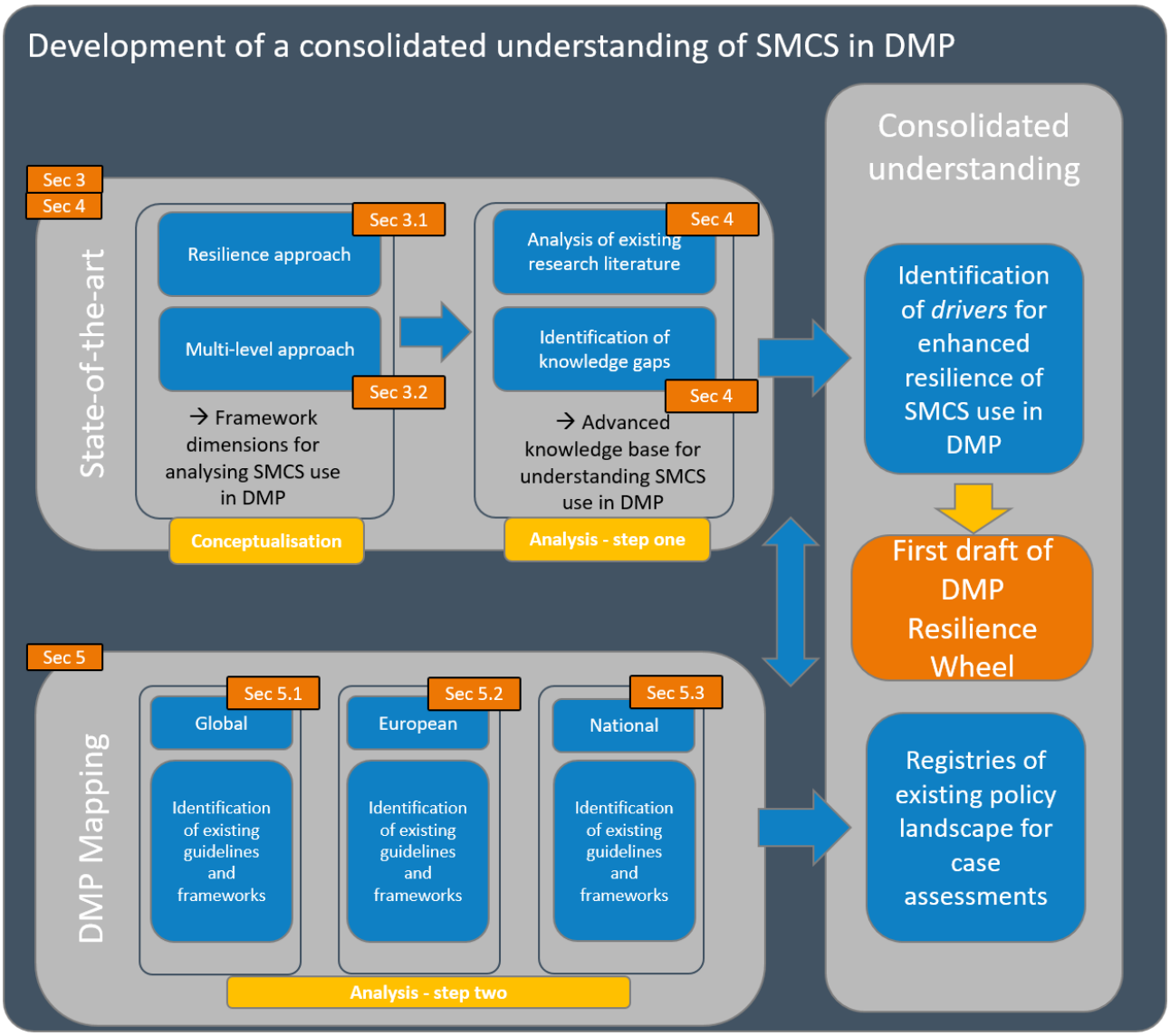
2. RESEARCH DESIGN AND METHODS

The complete research design for this deliverable is visualised in Figure 3 and described in the subsections below. Figure 3 gives an overview of the complete process of developing a consolidated understanding of SMCS in DMP. Section 3 describes the conceptual framework guiding the two analytical steps and providing an overarching theoretical lens to sort the material collected for D3.1. The two-step analysis comprises a comprehensive structured literature review and an initial mapping of the current formal frameworks guiding the use of SMCS on global, European and national levels.

Figure 3: D3.1 Research Design



Source: Authors' adaptation from D4.1

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In the following sections, we present and discuss how data was collected and why texts were selected as the primary source for creating a consolidated understanding of SMCS in DMP. The three subsections cover the selection of data sources (2.1), the collection of data (2.2), and the analysis and transformation of the text-based dataset into a consolidated understanding of DMP through a two-step analysis (2.3). Section 2.4 discusses some main limitations of our approach.

2.1 Data Sources

The primary sources for the two-step analysis are *texts* in the form of research publications, policy frameworks, guidelines, and evaluations of various tools for disaster risk management. The explicit focus on texts as sources reflects the analytical aim of providing a systematic review of existing research on SMCS in DMP as well as a mapping of formal DMP articulated in policy documents. While deeper and more contextualised questions of why certain SMCS are prioritised over others in DMP, as well as more detailed descriptions of the actors and organisations driving DMP are relevant, the purpose of this deliverable is to establish an overview of processes that currently guide disaster governance and the extent to which SMCS are considered in and affecting such processes. Subsequently, this initial overview of DMP and the role of SMCS provides the base for further analysis of why SMCS are included or not in DMP, their potential benefits and limitations and the contextualized interactions between technology and political developments where technical choices for disaster resilience are made.

Esmark and Triantafilliou (2006) distinguish between two pathways of informing collection and analysis of textual material. The first mode understands text as *representations* of policy and practice and the second mode understands texts as *discursive moments* that co-construct the practice they are describing (see Asdal & Jordheim, 2018 for elaboration on the second mode). There are profound differences between the two; however, both have valid inputs to how texts can be used as a primary source in research. The first mode encourages a more conventional reading of texts as sources for accessing past events, constructing chronologies of occurrences and establishing an overview of the DMP as they are formally described and articulated in texts. In the second mode, texts are sites around which politics occur and where claims of disaster governance are made. In this mode, we need to go beyond simple 'source criticism' (a critical understanding that texts are always written by someone for a purpose) and understand texts as political acts in and of themselves (Asdal, 2015; Asdal & Jordheim, 2018). The point is that texts are only interesting for our understanding of politics if they are actively circulated, used, followed, referenced, and acted upon. Documents kept on a dusty shelf somewhere are unlikely to influence the use of SMCS in DMP.

In this deliverable, taking a pragmatic approach, we combine the two modes (see Meilvang, 2019 for further elaboration). On the one hand, we do a structured search for all the texts that could potentially inform our analysis. On the other hand, we acknowledge that we do not collect everything that was ever written on SMCS in DMP nor are we capturing every possible policy

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framework relevant for the governing of SMCS in disaster. Rather, we capture the texts, which are actively referred to and followed and thus assumingly informing or acted upon in policy and practice and research.

In the context of this deliverable, we draw on three different groups of texts (see Table 2 in Section 2.2) to assess existing research on the role of SMCS in DMP (step one of the analysis) and to construct a landscape of existing policy frameworks and guidelines (step two of the analysis).

The first group of texts included comes from academic research in the form of journal articles, conference proceedings, and books. First, this allows us to create a state-of-the-art of existing knowledge of DMP with relation to SMCS. Second, the analysis of both official frameworks, guidelines and tools as well as the response and application of those texts require some familiarity and insight into the problems, discussions and progress of using SMCS in DMP. Reading academic literature thus decreases the risk of misunderstanding and misinterpreting current debates. Third, some research outputs may serve as reference points for existing DMP, and a thorough review of research frontiers thus informs how and why current DMP are constructed in certain ways.

The second group of texts concerns the wider discussion on the role of SMCS in DMP. This includes deliverables and recommendations from previous EU projects, reports and evaluations made by NGOs, consultancies and think-tanks. This second group provides alternative views of the use of SMCS in DMP and enables an analysis of the potential and limitations to current policy and practice. Furthermore, this group creates an opportunity to conduct an initial study of the official DMP policy frameworks, guidelines and tools as they are understood by actors that did not produce them (Pollitt et al., 2010). Consequently, they provide access to studying DMP in the context for which the formal policies were intended. Moreover, these texts may contain adjustments or criticisms of the original frameworks and are thus important for understanding the practice-side of DMP.

The third group of texts comprises texts articulating the official DMP. This group includes official policy frameworks, guidelines and documents that display the aim and scope of disaster risk reduction and communicate the processes directly associated with disaster risk management across the phases of the DMC. Additionally, this group includes legislative documents, evaluations and reports published and circulated by public authorities.

2.2 Data Selection and Collection

This section provides an overview of the types of text that were selected and how they were collected. The analysis of DMP is based on a structured review of the three groups of texts presented above. As this deliverable only examines the *formal* governance structures (see Section 3.1 for further explanation and justification), the scope is limited to texts formally describing and analysing the role of SMCS in DMP.

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In collecting concrete texts, we went through different steps. First, we took departure in a significant amount of EU studies that have produced deliverables on related topics over the past few years (see Annex II for a list of included EU projects). These provided a good overview of recent developments in both academia and practice and provided important sources for the further mapping of DMP in Europe.

Second, in order to fully capture the institutional landscape of DMP, Google, Google scholar, the Danish Royal Library, publishers' databases (e.g. Springer), and databases of relevant actors (e.g. EULEX) were used to search broadly for texts on DMP. All searches were done in English. We found more than 140 research papers published in the period from 2009 – 2020, which investigate the intersection between governance, disasters and SMCS. The keywords used to search for texts are presented in Table 1.

Table 1: Keywords Used in Text Search

Governance/management processes	Disasters & phases	SMCS
management, processes, procedures, resilience, risk reduction, governance, authority, government, institution, partnership, public, private, adaptation, service, guideline, framework, tool, act, law, communication (specifics – e.g. Sendai)	disaster, hazard, extreme event, emergency, crises, crisis, disaster management cycle, emergency management cycle, response, prevention, recovery, preparedness, mitigation (specifics – e.g. flooding)	technology, social media, data, crowdsource, sourcing, network, channel, information, information sharing, web 2.0, open data, big data, E-participation, E-governance, SM mining, SM scraping, SM screening, SM monitoring, tweet, post, platform, hashtag, crawling (specifics – e.g. Facebook)

Third, we asked partners in the LINKS consortium to develop specific country profiles that allowed us to investigate country-specific policies and practices in which the case-based assessments will be carried out (See Annex III for an overview of the profiles). This establishes the linkages between the consolidated understandings in this deliverable and the LINKS Framework, which will be developed from the three knowledge domains of the project. Further, the country profiles provide practical insights to national and local level DMP and thus create a basis for analysing DMP across different governance levels (see Annex IV for the qualitative survey sent out to LINKS consortium partners).

Fourth, we arranged biweekly meetings with the LINKS project partners working on the DRVP and DCT knowledge bases (WP2 and WP4) to identify synergies and overlaps and to ensure coherence between the different LINKS knowledge domains. For example, the vulnerability driver identified in Section 3 and subsequently analysed in Section 4.4 is a result of this collaboration and provides a

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direct attempt to integrate institutional resilience measures with questions of vulnerability (detailed in D 2.2).

The text selection is characterised by a certain degree of snowballing. On the one hand, this potentially leads to a skewed selection and a biased mapping of existing DMP. On the other hand, looking at DMP from different starting points should account for potential bias. Moreover, we conducted both informal and formal 'member checks' (Schwartz-Shea & Yanow, 2012) among LINKS consortium partners to ensure that our findings resonated with their experience from practising DMP and that frameworks, guidelines, and tools frequently used to guide DMP were included. The state of the art (review of academic papers on DMP and SMCS) as well as the mapping of formal DMP are based on the same text material but have different contributions to the consolidated understanding presented in this deliverable. An overview of the types of data and their analytical purpose is found in Table 2 below.

Table 2: Overview of Types of Texts and Their Analytical Purpose in Deliverable 3.1

Group	Number	Analysis in deliverable 3.1	
		Step 1: State-of-the-art	**Step 2: Mapping of DMP across EU levels**
Peer-reviewed research	<140	X	
Guidelines, reports, evaluations, assessments, concept-papers and deliverables from related EU projects	<60		X
Policy frameworks and legal frameworks	<15		X
Country profiles	5		X

2.3 Data Analysis

The following section considers how the selected texts were analysed and included in this deliverable. The main criterion for data inclusion was *saturation* where texts are included in the analysis until the point where new texts provide little or no new insights. Having this in mind, we included/excluded arguments in the dataset building on the following overall guidelines:

- The content/argument presented in the text should relate to the analysis, evaluation, design or implementation of SMCS in formal DMP.

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- The text was only included if it presented new/novel DMP or insights to DMP, which was not already covered by an existing text in the dataset. If two texts described the same DMP the most comprehensive one was selected.

Data were organised according to its type (e.g. research papers, policy documents) in separate folders in Nvivo12: a qualitative data-processing software, which we also used for further categorisation of data and coding purposes. For example, Nvivo allowed us to connect each text with overall attributes (e.g. policy framework, prevention phase, social media) creating a base for structured and rigorous comparison across data. Moreover, the software was used to code research publications for the state-of-the-art as well as the coding of the texts for the DMP mapping. Keeping all data in one Nvivo dataset ensured comparability, consistency across coding themes, transparency and potentially replicability of the analysis.

The team working on this deliverable decided early on to involve a subgroup of the LINKS consortium partners to discuss the early findings of the analysis of research literature. The purpose was to allow practitioners to provide their insights on the various subjects as well as to 'member check' the findings (Schwartz-Shea & Yanow, 2012). The subgroup consisted of the Danish partners and was thus biased towards flood risk management and the Danish institutional context of using SMCS in DMP. Nevertheless, it provided insights into how practitioners understood and valued the various conclusions. This step is crucial as it informs the next stages of the project in identifying research gaps and developing methodologies (to be established in D 3.2) which will be utilised during the LINKS case assessments. Reflections from the practitioners' that emerged through the country profiles and these Danish partner consultations are presented in "Practitioners' Viewpoint" boxes throughout the state-of-the-art in Section 4 (see an example on the right side of this page). The purpose of these boxes is to bridge the conclusions drawn from the literature review directly with practitioners' perceptions and interpretation of the scientific arguments at stake.

Presenting and reporting the outcomes of a data analysis always entails a balancing act between the level of detail and coherence in argumentation. As argued by Flyvbjerg (2011, p. 312) one should avoid only presenting data in support of one's interpretation and instead create room for 'readers of different backgrounds to make different interpretations'. Subsequently, alternative and competing accounts are included when they appear in the dataset.

PRACTITIONERS' VIEWPOINT

Throughout the first step of the analysis, (Section 4) boxes like this will provide a practitioner's viewpoint to supplement the findings from the research literature.

These boxes contain subjective reflections on how research findings match the everyday policies and practices of LINKS consortium partners and how these partners have approached the identified problems with concrete solutions.

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2.4 Limitations

The deliverable is submitted within the first six months of the LINKS project and the timeframe thus limits the type and amount of data informing the consolidated understanding of DMP in SMCS. Despite time constraints, three limitations are worth discussing further.

First, the deliverable only focuses on what we here conceptualise as formal governance structures (see Section 3 for a definition). The implication is that the deliverable does not capture the many normative and cultural aspects inherent to DMP, which presumably are important for understanding the use of SMCS and its effect on disaster resilience. Unfortunately, data does not allow us to make any assessment of the normative and cultural notions, however, when mentioned in research literature these are included.

Second, the explicit focus on formal governance structures further limits the scope of the analysis to the relationship between public authorities and citizens/private sector actors. While acknowledging the existence of independent and self-organised bottom-up, participatory, community, volunteer approaches, they do not play a prominent part in this first exploration of DMP. Third, the way the literature search was done only allows us to capture the processes that directly link governance processes to disasters. However, research and policy frameworks governing other aspects of society are likely to be relevant for DMP. This may include welfare policy, climate (adaptation) policy, and educational policy, which are all important for understanding resilience-building efforts. Presumably, this creates a bias towards DMP related to response as this phase is commonly associated directly with 'crises', 'emergencies' or 'disasters' (terms used in our search).

Fourth, despite our efforts to capture as much literature on SMCS in DMP as possible, our aim is first and foremost to provide a helicopter perspective of current policy and practice. Texts were only included if they addressed risk management processes, SMCS and had a disaster focus. This implies that many subfields that are likely to inform questions of SMCS in DMP (i.e. studies of expertise, cybersecurity, data privacy, information quality, or terrorism) are only investigated if they speak to all our criteria for inclusion.

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3. THEORETICAL FOUNDATIONS AND CONCEPTUAL FRAMEWORK

The term Disaster Management Processes is a specific LINKS project term that first and foremost encompasses a systematic series of actions or steps taken to reduce and manage disaster risk. It is thus closely related to the term disaster risk management which refers to the broader application of disaster risk reduction efforts aiming at preventing new disaster risk, reduce existing disaster risk and manage residual risk contributing to the strengthening of resilience and reduction of disaster losses (LINKS Glossary, forthcoming). Like the concept of disaster risk management, DMP are associated directly with the phases of the DMC (see also D4.1). In this deliverable, we limit our focus to governance aspects of the use of SMCS in DMP. In its most simple form, governance is understood as the process of decision-making (Tyler & Moench, 2012). The specific focus in this deliverable is on public authorities and disaster/crisis management agencies and the decision-making processes they engage in when managing disasters. This section presents the overall conceptual framework that guides the analysis of the document. It introduces *governance* as the main analytical lens through which we will address the role of SMCS in DMP and zooms in on the formal institutions conditioning decision-making practices as they play out in policy and practice. The conceptual framework has a triple purpose:

- First, to develop a conceptual model for assessing SMCS use in DMP.
- Second, to structure and categorise the current processes and practices of SMCS in DMP that we identify in the scientific literature.
- Third, to support the mapping of existing institutions that govern the use of SMCS in DMP across global, regional and national scales.

In Section 3.1, we begin by positioning this deliverable within the larger LINKS project. We argue that an explicit focus on governance structures is important for understanding how SMCS are supporting or constraining resilience-building efforts. Having presented the foundation and relevance of this deliverable, Section 3.2 lays out the blueprint for the two-step analysis. The first step is a 'state-of-the-art' where we analyse and assess the role and effects of SMCS in DMP as presented in the current literature. To accomplish this, we adapt and merge theoretical insights from *multi-level governance theory* (Marks & Hooghe, 2004) and *resilience theory* (Tyler & Moench, 2012). The governance framework assists in framing the layers and dynamics of governance, and resilience theory helps us conceptualise four drivers connecting governance structures with resilience building. Drawing specifically on the multi-level approach of the governance framework, the second step of the analysis is a concrete mapping of the existing policy frameworks that we identify across levels. The conceptual framework is summarised in Section 3.3.

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3.1 Definitions and Contributions

The term *resilience* is widely used across several disciplines, fields and professional communities. Yet little consensus exists on the term's definition and application. In LINKS, resilience is the ability of individuals, institutions and systems to recover from disturbance and to develop and adopt alternative strategies in response to changing conditions (LINKS Glossary). In this sense, resilience is a normative (positive) quality of a system, institution, or individual that increases the capacity to manage disaster risk (Adger, 2000b). In LINKS, we analyse within and across systems, institutions and individuals and contribute to an integrated and holistic understanding of resilience-building.

This deliverable addresses a 'disaster management processes' (DMP) knowledge domain. Here, we analyse how SMCS affects disaster risk management and governance. While this deliverable takes the first step in establishing a consolidated understanding of such DMP, its clear connections to the two other knowledge domains (DRPV and DCT- in the deliverables D 2.1, 2.2, and 4.1) cannot be ignored. The three domains are simultaneously emblematic for three crucial dimensions of disaster resilience: investigating interactions among social, institutional and technology systems. Importantly, the three knowledge bases derived from the studies across the domains contribute to the sustainable advanced learning component of the LINKS project, where learning is viewed as a crucial aspect for strengthening resilience at different levels and in different ways (see D5.1). The complementary, yet separate approach to characterising resilience is illustrated in Figure 4.

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Figure 4: The Role of Institutions for Disaster Resilience

Source: Authors adaptation of Tyler & Moench's (2012) urban resilience framework.

In this deliverable, we focus on the institutional dimensions of resilience. Institutions are the rule-like governance structures that guide human behaviour and exchange in social interaction (Hodgson, 2006; Scott, 2001; Tyler & Moench, 2012). Institutions are thus relatively stable structures that reduce uncertainty in decision-making and maintain continuity of social order (Scott, 2001; Ostrom, 2015). Institutions are both formal and informal and important because they are determinants of collective security, vulnerability and resource allocation (Adger, 2000a; Pelling, 2010). Focus on institutions are thus crucial for understanding processes, practices and outcomes of using technologies in disaster risk management.

For this particular deliverable, we focus on *formal institutions* or what Scott (2001) characterises as the regulatory institutional notion and how these formal institutions interact with technology

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systems, here SMCS, for improved disaster resilience. Particularly, in the second step of the analysis where we describe the policy frameworks that guide SMCS in DMP. Formal institutions prescribe how agents such as a community, an organisation or an individual should behave following regulations, policies, official guidelines, procedures and in accordance with organisational standards. As such, formal institutions emphasise conformity to legal and formally articulated procedures, which in turn create legitimacy and trust in certain processes and practices (Scott, 2001). In the context of the EU, the General Data Protection Regulation (GDPR), for example, is prescribing how private data on individuals should be treated (EU GDPR 2016/670). Moreover, we pay special attention to the institutional structures conditioning the governance of disasters.

The academic literature on disaster risk management provides plenty of examples of how institutions are crucial for creating and reacting to disaster risk. Classic examples are pricing structures, decision-making procedures, institutions of property, and tenure or standards to which infrastructure is built and maintained (McGranahan, 2002; Tyler & Moench, 2012). Similarly, social inclusion or exclusion in decision-making processes are often guided by both formal and informal institutions (i.e. who is seen as a legal constituent or legitimate stakeholder to a DMP) (Adger, 2000b; Agrawal, 2008; Mearns & Norton, 2010; Wisner et al, 2004). As argued by Moser and Satterthwaite, social marginalisation – the process where some groups are excluded from critical services, food supplies, and resources – is closely linked to institutions (Moser & Satterthwaite in Mearns & Norton, 2010). They provide the example of residence status as that gives access to services important to disaster risk management. Migrants, for example, have difficulties gaining access to basic services and social benefits and are thus likely to be more vulnerable to disasters, which was also seen during the recent COVID-19 pandemic (Raju & Ayeb-Karlsson, 2020).

This explicit focus on institutions provides insight into barriers in policy and practice in applying and implementing the use of SMCS in the management of disasters. Furthermore, it sheds a light on how some institutions are challenged by SMCS and in turn how current SMCS are challenged by institutional arrangements.

3.2 Conceptual Framework

In the following section, we lay out the blueprint for the two-step analysis presented in Section 4 and 5. To analyse the role of SMCS in DMP we draw on theoretical insights found in multi-level governance approaches (Section 3.2.1) and resilience theory in the context of governance (Section 3.2.2).

3.2.1 The Governance Framework

The governance approach was developed to describe and understand the complex decision-making dynamics taking place within the European Union (Marks et al., 1996; Marks & Hooghe, 2004). It

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recognises the value of including state actors along with sub-state, supra-state and non-state actors and describes two important conceptual approaches important to the analysis of SMCS in DMP:

- A multi-actor approach that escapes hierarchical and classical command-and-control depictions of DMP (Tierney, 2012). Political authority is diffused and horizontal structures of cooperation may coexist with more conventional modes of vertical governance structures (Bulkeley & Newell, 2015; Bulkeley & Schroeder, 2012);
- A multi-level approach that allocates authority across domestic and global levels (Marks & Hooghe, 2004).

Combined, they provide a lens for a deeper understanding of how decisions are made and add complexity to public policy analysis. These approaches give voice to the complex and polycentric allocation of authority beyond the conventional divide between national and global levels and emphasise how governance structures that condition world politics go beyond the nation-state (Rosenau & Czempiel, 1992).

In the context of this deliverable, these conceptions of governance broaden our understanding of the realm that authorities work in when they manage disasters. DMP appear as public, hybrid and private forms of governance and decisions are bound to structures that transcend our common fixation on the nation-state (Rosenau & Czempiel, 1992).

In the first step of the analysis – *the state of the art in Section 4* – the multi-actor approach provides a conceptual foundation for guiding the analysis of relationships and the effect of these relationships on disaster governance. While we do take departure in public and hybrid forms of governance, where public authorities are involved somehow, we focus on the changing relationships between actors rather than on presumed levels of authority (Acuto, 2013). Taking this further, inspired by the Crisis Communication Matrix (Reuter et al., 2011), we attempt to capture the multi-level and polycentric governance structure supported by SMCS. The matrix fleshes out the interactions between actors involved in DMP and was developed specifically in the context of social media communication to assess collaboration dynamics in crisis. The matrix conceptualises the digital relationship between actors as senders and receivers of digital content. Public actors and authorities (A) and citizens (C) are considered as main actors in sending and receiving information, which corresponds to our multi-level/multi-actor approach to understanding DMP. The matrix differentiates between forms of information flow, which is less relevant to the study of DMP, where the focus is on the effects of these matrix flows on governance structures rather than on the digital flows themselves. Within D4.1 the matrix will also be described and used further to develop the DCT-framework (see D4.1).

In the state-of-the-art, we use the matrix to zoom in on the type of actors involved in sharing, collecting and monitoring digital content (e.g. citizens and authorities) and to limit the type of interactions to the flows of digital content. The matrix does not account for *the market*, here understood as private actors (businesses). As governance essentially concerns the change from

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hierarchical to networked approaches of decision-making, the private sector cannot be ignored. This is also the case for DMP, where private sector actors may be implicated in the crisis (e.g. oil-spill), may be affected by the crisis like citizens and civil society or may be part of the solution (adjust production, financial support of relief efforts). Additionally, social media platforms are often owned and controlled by private actors and their interference with decision-making through SMCS has been much debated in recent years (Golovchenko et al., 2018). In order to account for market-based actors and institutions, we include these in our analysis of the information flow between authorities and citizens in a general conceptualisation of public-private relations as found in much work on governance (Osborne, 2006; Rhodes, 1996). While this constitutes a simplification of the complex relationships following from the use and SMCS in DMP, it provides a framework for talking about these changing relationships on a more general level with a particular focus on the interactions between public and private actors[3].

For the second step in the analysis, we solely draw on the multi-level approach. Here we map existing frameworks across international and national domains to identify and describe the institutions formally guiding the use of SMCS in DMP. The multi-level approach matches the notion of governance within the European Union and describes the re-organisation of authority as shared across multiple levels of government—subnational, national, and supranational (Marks & Hooghe, 2004). It acknowledges that national governments currently constitute formidable participants in EU policy-making, however, that control is slipping away. Supra-national and sub-national policy arenas are increasingly important policy arenas for understanding DMP. Having this approach informing our mapping of the current policy landscape, we look at the global, European and national levels in Section 5.

3.2.2 The DMP Resilience Framework

Building on the governance framework, the resilience framework promotes a more nuanced understanding of governance dynamics in relation to the idea of building resilience. To understand how the use of SMCS in DMP may strengthen resilience, we first need to understand what creates resilient DMP. Having this in mind, we here suggest *four drivers of resilience-building* that all relate to the altering of governance structures. These four drivers are inspired by the Urban Resilience Framework by Tyler and Moench (2012) in their work on governance and climate resilience. Through an assessment of the research literature on the relationship between institutional arrangements and cities' resilience-building efforts, they present a number of drivers that contribute to resilient governance processes. While the DMP investigated in this deliverable goes beyond the urban arena,

[3] The matrix rightly points to information flows among citizens (citizens to citizens) and among (authorities to authorities). While we do attempt to take these aspects into account in the analysis, the focus is on the changing relationship between public and private actors in disaster management.

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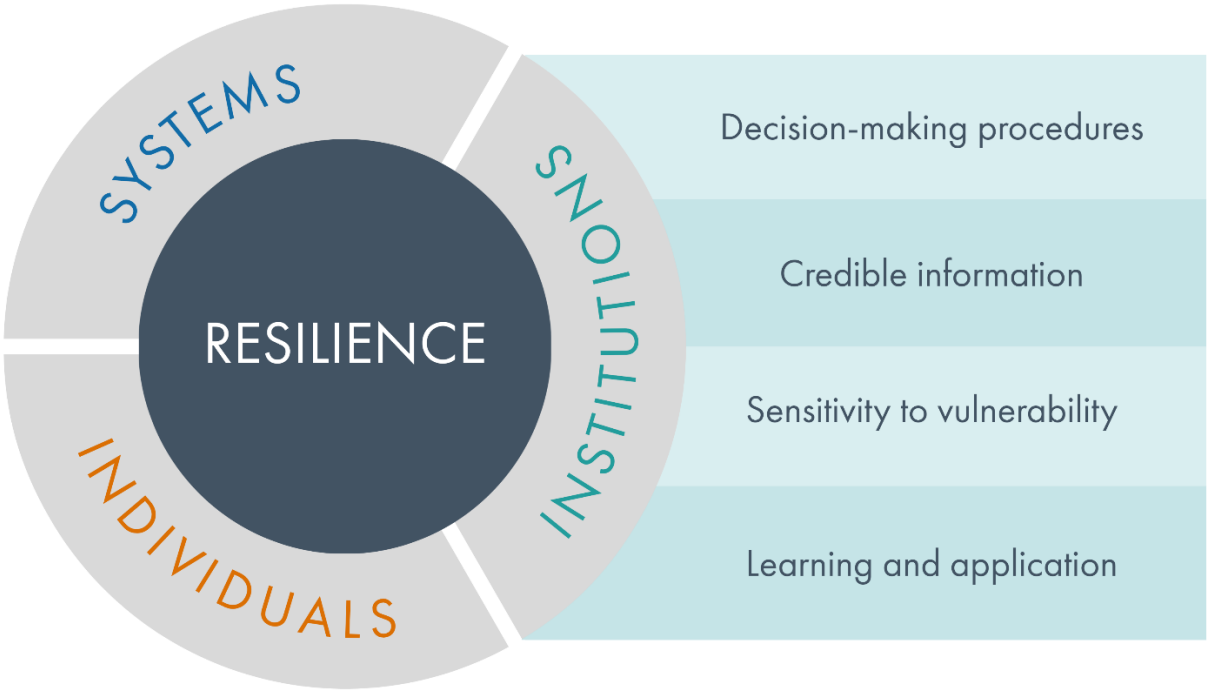
the Urban Resilience Framework considers a range of normative aspects associated with governance and institutional arrangements that may be considered very applicable to the analysis of SMCS in DMP. The key drivers for understanding successful institutions in guiding behaviour and enhancing DMP for greater resilience is summarised under four headings adapted from Tylor & Moench (2012, p. 137): Decision-making procedures, credible information access, vulnerability, and learning and application of new knowledge. The four drivers and their relation to institutional resilience are reflected in Figure 5.

Figure 5: Drivers of Institutional Resilience



Source: Authors' contribution based on academic literature on institutional resilience

Decision-making procedures are essential to understanding resilience-building efforts. Decision-making processes that build resilience for all groups are likely to be *participatory and inclusive*, allowing those most affected by hazards to play an active role in determining how best to avoid them (Bartlett et al., 2009). Additionally, they are likely to follow standard governance principles of outcome legitimacy (i.e. *efficiency and effect*) and *accountability* where key management actors are held responsible to affected populations (Mearns & Norton, 2010; Tyler & Moench, 2012). Attempts to build disaster resilience require coordinated actions by many different actors, thereby suggesting the need for new mechanisms for collaboration between various actors and sectors.

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Credible information. Public and accurate information is an important component of a positive institutional environment (Tyler & Moench, 2012). Authorities, as well as private and civil society actors, should have access to credible and meaningful information that enable decisions about risk and vulnerabilities. Especially when this is matched with credible and supportive advice on appropriate response such as evacuation routes and relief measures (Mearns & Norton, 2010). Furthermore, information should be presented in a meaningful and targeted form that creates trust and understanding among the affected populations (Alexander, 2014; Besaleva & Weaver, 2016).

Institutional sensitivity to vulnerability. In the social science literature on disaster resilience, the question of vulnerability is profound. Within LINKS, the important question of vulnerability is addressed in D2.2 of the LINKS project, however, also included in our institutional approach exploring resilience-building in disaster governance. Institutions that differentially constrain or promote rights and entitlements can limit the access to services and resources for particular groups in a society. Being entitled to make use of local ecosystems, to use critical infrastructure and to receive welfare, care, and help are paramount for understanding core vulnerabilities and for designing management measures (Tyler & Moench, 2012). In this deliverable, we distinguish between different types of institutional sensitivities related to questions of vulnerability. The four main 'vulnerability variables' identified in D2.1 – *diversity, accessibility, connectivity and mobility* – are guiding our analysis of vulnerability from a governance perspective. However, the focus of the analysis provided in this deliverable is strictly limited to the conclusions provided in the literature on the use of SMCS in DMP. As such, the deliverable provided in D2.1 on vulnerability should be taken into account for reflections and discussions of the complex and fluid relationship between vulnerability and DCTs.

Nevertheless, sensitivity towards *diverse dispositions* will be taken into account in the analysis of how institutions condition the use of SMCS in DMP. In particular, this concerns socio-political rights and entitlements and thus institutional capacities constructed by socio-economic and historical circumstances (Pelling, 2010). This includes questions of gender, age, income, and residence status, to name a few, which are factors that need to be considered when analysing the resilience-building potential of SMCS on DMP (Carley et al., 2016; Gill & Bunker, 2012; Harrison & Johnson, 2019). The second sensitivity concerns accessibility and this concerns the range of information and data resources, skills and knowledge to which professional response organisations and citizens communities draw upon when they assess and respond to disasters (Hakley, 2016). A third sensitivity concerns connectivity and refers to the fact that relationships between people, space and context matter for the performance of DMP (Christensen et al., 2016; Mercer et al., 2012). While this aspect is largely covered under the first dimension, *decision-making processes*, and in the section on multi-level governance (Section 5), we briefly reflect on these institutional re-arrangements for vulnerable groups within this dimension. Finally, we highlight the importance of institutional sensitivity towards mobilisation, which is an important aspect of DMP as it is associated with disaster situations including eviction and displacement. Unfortunately, the research is scarce

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on empirical insights on how – and to what extent – public authorities consider sensitivities to vulnerability when they use SMCS in their management of disasters.

Learning and application of new knowledge. Institutions that generate exchange and apply new knowledge, and learn from experiences, enhance resilience. A reoccurring dilemma in resilience debate is whether resilience involves the ability to return to status quo or the ability to 'bounce back better' after a disaster (Manyena, 2006; Walker et al., 2004). LINKS understands resilience as not only the capacity to respond and recover but also to learn and adapt. In that sense, we recognise the need for renewal, re-organisation, and development, which has gained currency in disaster management in recent years (Dahlberg et al., 2015; Haworth et al., 2018). Resilience approaches acknowledge the complexity of managing a range of interlinked stresses and shocks through experience (i.e. backwards-looking resilience) and strategic prevention and mitigation measures (i.e. forward-looking resilience) that enable systems, institutions and individuals to deal with the expected and unexpected crisis (Pelling, 2010). Consequently, the opportunities presented by SMCS for enhancing and strengthening disaster risk management may be understood in relation to the four phases of the DMC (Givoni, 2016). Resilience is thus conditioned by the capacities found across all four phases: Response, recovery, preparedness and prevention (Haworth et al., 2018) as well as their ability to inform one another. Capacities can be internal and external to communities or different actors involved (Rolsted & Raju, 2020). In an ideal world, required and inherent capacities are determined and fleshed out in the prevention phase, established during preparedness, implemented and put into action in a timely and efficient manner during disaster response and recovery. In this deliverable, the four phases are used to guide the question of learning in Section 4.5. The phases are fully explored and illustrated within Deliverable 4.1 of the LINKS project:

- The response begins immediately after the occurrence of a disaster and includes short-term actions to save lives, ensure public safety and health, protect property, and meet basic human needs for people affected;
- Recovery follows response activities and must start as early as possible and includes actions that strengthen the resilient re-organisation of the disaster-affected area. The restoring or improving livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development;
- Prevention and mitigation encompass the long-term measures (including structural conditions for vulnerability) to limit and prevent disaster risk. This phase includes actions taken to prevent or reduce the cause and consequences of disasters;
- Preparedness aims to build capacity to effectively anticipate, respond, and recover from disasters. It often includes training and education activities as well as the planning for disasters (i.e. what to do, where to go, or who to call for help in a disaster).

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The four drivers of institutional resilience and the initial subcategories to each of these drivers are all derived from theory on resilience and institutions. It is an attempt to explicitly articulate what drives institutional resilience in the context of SMCS. Simultaneously, it provides the first steps towards an *accessible* and to some extent a *measurable* approach to institutional resilience for SMCS-based disaster governance within the LINKS project. This framework will be further developed into a conceptual model, the *DMP Resilience Wheel* (Section 4.6 and Figure 10), informed by the insights from the research literature reviewed in Section 4.

3.3 The Conceptual Framework in a Snapshot

Table 3: Conceptual Framework

Step in the analysis	Overarching conceptual framework	Framework components	Conceptual dimensions
State-of-the-art	Multi actor and multi-level governance structures	Resilience	Decision-making
			Credible information access
			Vulnerability
			Learning and adaption to new pathways
Mapping of DMP across EU levels		Multi-level analysis	Global
			European
			National

Key takeaways from Section 3

Point 1: We focus on *institutions*, which are defined as rule-like governance structures that guide disaster risk management processes.

Point 2: Governance structures are assessed across actors and levels:

- We take a multi-actor approach, however, with a particular focus on the relationship between public authorities and citizens;

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- We take a multi-level approach and map governance structures across global, regional and national levels.

Point 3: Governance structures that strengthen resilience are likely to be:

- Participatory and inclusive processes allowing individuals and communities most vulnerable to disasters to influence decisions. Therefore, new coordination mechanisms for collaboration between actors and within organisations are typically needed;
- Allowing for easily accessible and credible information that enables timely response while limiting panic and uncertainty;
- Sensitive towards diversity, accessibility, connectivity, and mobility for vulnerable groups;
- Fostering learning and change across all four phases of the DMC and the strengthening of governance structures capable of supporting and adapting to new information, lend themselves to building resilience.

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4. STATE OF THE ART - SMCS AND THEIR ROLE IN DMP

4.1 Introduction

The benefits of using SMCS to support DMP are a relatively new discovery. Keim and Noji (2011) argue that the potential of SMCS for disaster governance became evident during the world response to the 2010 Haiti earthquake. Non-governmental actors have a longer and more profound experience with SMCS in terms of their development and application (see for example (Keim & Noji, 2011; Roche et al., 2013). D2.1, for example, shows how platforms such as MySpace were used by civil society actors during Hurricane Katrina in 2005, and Bonazzo (2016) notes how 9/11 inspired one of the first social media platforms, Meetup. However, the proliferation of SMCS in the context of disaster risk management has significantly changed since the first technologies were used in the early 2000s. This proliferation of SMCS and their role in DMP are explored in this section through a structured literature review of the existing scientific research. In Section 3, we defined DMP in the context of formal institutions. By doing so we connected DMP to the governance of political and economic structures, civil-society forces, the private sector, and to how organisations, communities, and societies interact and organise in cross-scalar arrangements to respond, recover, prevent, and prepare for disaster. Informed by concepts and literature on disaster risk management and disaster risk reduction, the particular focus on disaster governance insists on policy and formal institutional arrangements (Blanco, 2015; Tierney, 2012). Despite recognising the important interaction between multiple actors involved in different processes of disaster risk management, the explicit focus on governance enunciates the role of the authorities and 'government' in co-shaping and disaster risk management operational processes (Blanco, 2015). Focus in this section is thus primarily on the processes that involve governmental actors such as emergency services and civil protection agencies.

In this section, Section 4, we review the literature on the use of SMCS in DMP according to the four drivers found in the resilience framework presented in Section 3.2 and summarised in Table 3. We start by looking at decision-making processes and how these have changed in accordance with our understanding of multi-level governance (also presented in Section 3). Further, we pay attention to three components of good governance – efficiency, inclusion and accountability, which help us assess the extent to which we can understand SMCS as 'promoters of resilient institutions'.

In section 4.3 we look at the access to credible information and discuss some key limitations in relation to false information and ethical concerns. The third dimension, sensitivity to vulnerability, is presented in Section 4.4 and provides some fundamental reflections on how institutions guiding diversity, accessibility, connectivity, and mobility are crucial for assessing institutional resilience. Finally, Section 4.5 summarises many of the arguments presented in the review and connects them to the question of learning across the four phases in the Disaster Management Cycle.

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4.1.1 Methodological Characteristics of the Existing Research

While the following sections present insights provided by the more than 140 papers and book chapters we analysed for this deliverable (Annex I), this section briefly reflects on the nature of the research we encountered during our review. First, and foremost, it is notable that research on SMCS and disaster governance is limited. While the field seems to be growing, the development of SMCS continue to grow and change making it difficult to keep pace with the newest trends.

- The majority of the research is based on single case studies of a particular platform (SM, CS or CS through SM) used to prepare or respond to particular events (e.g. Hurricane Sandy). The few comparative studies show the potential of such approaches and the need for caution when applying insights from single case studies to speak broadly about SMCS in DMP. One example is Harrison and Johnson (2016) that compare the use of SM in DMP across the US and Canada. The study shows the importance of contextual conditions for understanding SMCS in DMP, and how these conditions become explicit when you compare across DMP. In the US, authorities are far more active in their engagement with citizens compared to Canada where the use of SMCS has a passive character. Local, political, organisational, and cultural conditions explain this difference in the use of SMCS and the study thus points to the importance of understanding socio-political factors for the successful use and implementation of SMCS in DMP;
- Most of the research is based in a North American context although we did encounter studies of flooding in a European context (e.g. Albris, 2018; Kumar et al., 2019), typhoons and earthquakes in Asia (e.g. Blanco, 2015; Kusumasari & Alam, 2012; Shaw et al., 2020), as well as insights on SMCS in crisis management in an African context (e.g. Nganji & Cockburn, 2020). This creates a bias towards certain types of disasters (e.g. Hurricanes) as well as a preference towards SMCS platforms such as Twitter, which is highly used in American politics and culture (see also Ludwig et al., 2017);
- A dominant feature appears to be in the field of crisis informatics, which looks at information flows and how such new flows affect the social structures and interactions. Interestingly, however, is the strong focus on the interactions between citizens and authorities as well as between citizens. Our literature search resulted in almost no studies on the role of SMCS at the inter-organisational level where public authorities communicate with each other.

Finally, an overall observation is that the majority of the texts considered in this review are techno-optimistic in the sense that they see great potential in SMCS improving DMP despite challenges (see for example Chan, 2012; Coppola, 2020; Gundecha & Liu, 2012). Altogether, these reflections call for some caution on how the conclusions drawn in this state-of-the-art are applied in more general terms. Moreover, it points to the need for more comparative and interdisciplinary analysis of SMCS in DMP – a gap that LINKS will endeavour to fill in upcoming deliverables where the focus is on the diversity between socio-political context and different types of disasters.

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4.2 Decision-making Procedures

Following the conceptual framework presented in Section 3, we begin by analysing how decision-making processes are changed and (potentially) strengthened with the introduction of SMCS in DMP. Focus is on essential features of 'good governance' (see Section 3.2) and to what extent SMCS foster *inclusiveness, efficiency and accountability*. Focus is on how authorities responding to disasters and other governmental actors communicate and coordinate actions with civil society and private sector actors using SMCS platforms. SMCS change DMP because they change information and collaboration dynamics between authorities and citizens. Regardless of the particularities of a governance system, participative and inclusive decision-making processes condition better disaster risk management (Vollmer et al., 2018) and SMCS platforms support such inclusive and participatory forms of disaster governance. In light of these re-defined interactions between government actors and non-governmental actors, two competing yet complementary observations are reflected in the literature. Section 4.2.1 on inclusiveness is thus the most extensive as it covers the essential question of changing relations between authorities and citizens. Despite being a central focus in the literature reviewed in this section, questions of inclusiveness seem to encompass questions of efficiency and some aspects of accountability. As such, processes, where SMCS are successfully put into use in DMP, are efficient because they are inclusive (e.g. involving people on the ground creates a faster and better overview of the situation). Section 4.2.3 looks at the question of efficiency while Section 4.2.4 looks at the question of accountability (and thus transparency) and how this component seems to be challenged by changing decision-making processes.

PRACTITIONERS' VIEWPOINT

Both Municipality of Frederiksberg (FRB) and the Greater Copenhagen Fire Brigade (HBR) experience a faster and more direct communication flow with citizens through SMCS platforms.

During flooding, HBR has used Facebook to provide a map of the flooded areas showing where citizens can pick up sandbags and take part in response efforts.

The Danish Emergency Management Agency (DEMA) has developed a mobile alert app, however, it is unclear the extent to which it is used. HBR and FRB experience that citizens rely on existing platforms they are familiar with when seeking information.

4.2.1 Inclusion and Participation

4.2.1.1 SMCS as a Shifting Mechanism

Given the massive trend in public policy to understand public-private relations as multi-actor and multi-levelled (e.g. Marks et al., 1996; Osborne, 2006), studies on SMCS in DMP also identify such a trend. Research on SMCS argues that this shift from *government to governance* is strongly enabled

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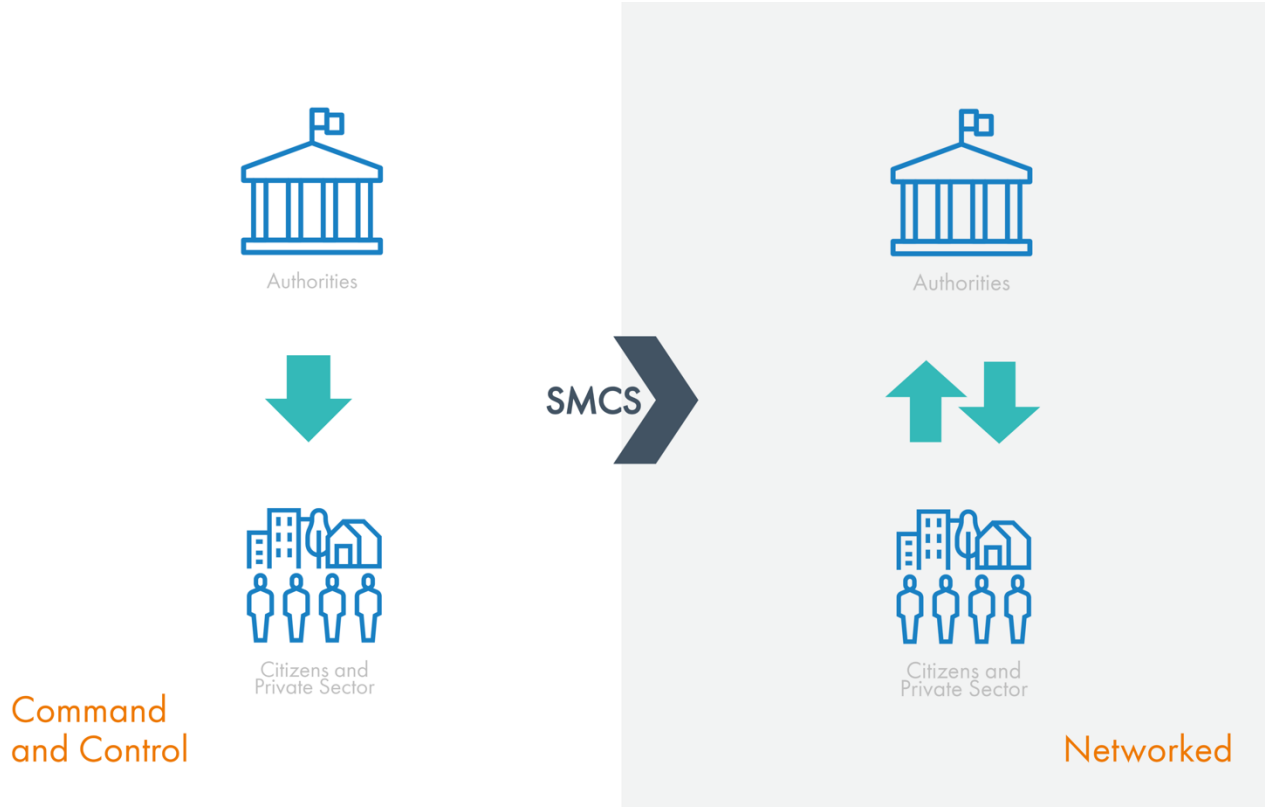
and supported by SMCS in the context of disaster risk management (Albris, 2018a, 2018b; Palen & Hughes, 2018). SMCS platforms change how citizens and other civil society actors get information and organise response activities. This empowerment of citizens challenges traditional DMP that take shape as government-driven, centralised, and hierarchical processes (Christensen et al., 2016; Dethridge & Quinn, 2016). This change is characterised by a shift in the direction of information from a top-down command-and-control approach (information going from authorities towards people) to a bottom-up and horizontal approach (from civil society and private sector actors to authorities) (Douvinet et al., 2017; Poljansek et al., 2017). Some scholars describe this shift as a shift in decision-making logics from command-and-control to collaborative models (Haworth et al., 2018) that facilitates multi-level governance and intersectoral cooperation (Waugh & Straib, 2006). Others portray it as a shift towards 'shared responsibility' (McLennan and Handmer, 2012), 'networked governance' (Christensen et al., 2016), 'community responsibility' (Elsworth et al., 2009), and 'self-organisation' (Givoni, 2016). Figure 6 illustrates this move from hierarchical top-down processes to decentralised and co-produced processes where non-governmental actors play an increasing and important part in DMP. The arrow pointing from authorities to citizens and private sector actors reflects the move of "power to the people" in disaster management enabled by SMCS (Dufty, 2012).

Figure 6: SMCS as a *Shifting* Mechanism



Source: Authors contribution based on literature search

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Most research focuses on how SMCS change disaster and risk communication as they allow for new ways of disseminating and sharing information (Boin & Lodge, 2016; Bunker et al., 2013; Crowe, 2011; Reuter et al., 2011) as well as new ways for people to seek out information, communicate and engage in collaborative activities (Crowe, 2011; Dethridge & Quinn, 2016).

4.2.1.2 SMCS as a Bridging Mechanism

Similarly, another group of research is conceptualising the role of SMCS in DMP as changing relationships between authorities, civil society and private actors. However, in contrast to understanding these changes as a move of power from government to multiple non-state actors, this second group argues that public participation and self-organisation activities were always part of DMP. Jin et al. (2014), for example, emphasise how voluntarism and citizen engagement originally was considered an issue because of convergence challenges. Convergence occurs when too many volunteers self-organise, participate and engage in disaster response and create liability and coordination issues for public authorities and first responders (Jin et al., 2014). Boin and Byander (2015) make a similar analysis and refer to the 'collaboration paradox' (not to be mistaken with the crisis management paradox) where governmental command-and-control processes exist alongside local groups and volunteers organising response activities on their own. Here, SMCS have the potential to bridge processes that exist and unfold independently and without being properly coordinated. The internal practices within authorities and citizen groups are not changing as a result of the availability of SMCS platforms. Instead, the spaces between citizens responders and authorities change through the accessibility of SMCS infrastructure that creates a bridge for interaction (Hughes & Tapia, 2015).

Figure 7 illustrates this mechanism of 'bridging the actors' who partake DMP through SMCS platforms.

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Figure 7: SMCS as a *Bridging* Mechanism

Source: Authors contribution based on literature search

In contrast to the argument presented by the first group of researchers, it is not a question of a shift in responsibilities but a question of bridging the actions of people, communities and groups that take responsibility.

4.2.1.3 Shifting and Bridging Roles of SMCS in DMP?

Both shifting and bridging mechanisms are important for understanding the role of SMCS in DMP. At a first glance, they reflect a competing understanding of the decision-making processes shaping disaster risk management nowadays. Nevertheless, we argue, the two mechanisms may very well be complementary rather than competing observations of the changing role of SMCS in DMP.

First, it is worth noticing how the effects of SMCS in DMP are portrayed similarly in both strands of literature: as 'networked' and co-produced forms of governance (Chatfield & Reddick, 2018). Second, it would be surprising if DMP were diverging from one of the most dominant trends taking place within public policy: the move from government to governance. Third, this shift towards networked DMP does not necessarily undermine the fact that disaster risk management has always relied on voluntarism and self-organisation among people in affected communities, particularly during the response phase.

As Christensen et al. (2015) argue that hierarchal and networked types of decision-making co-exist in disaster risk management; SMCS may enable both shifting and bridging mechanisms. The question is to what extent both mechanisms co-exist, if certain institutions and political systems support one mechanism over the other and whether the democratic potentials associated with the

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increased use of SMCS in DMP are strengthened or challenged by either mechanism. Different models of governance exist across different countries, and some are undoubtedly more hierarchical and others more decentralised. As argued by Harrison and Johnson (2016), different models of governance contribute to different uses of SMCS in disaster risk management. Therefore, we need a deeper understanding of the political and institutional context those authorities operate in when using SMCS is of paramount importance. Particularly, if interesting in the diversity aspect of SMCS in DMP. This is an area, which is under-researched in the current literature.

4.2.1.4 Forms of Inclusion and Participation

The sections above painted a broader picture of how SMCS have supported shifting and bridging mechanisms that change the relations between authorities and citizens. In this section, we connect these changes in public-private arrangements directly to some of the main characteristics of 'good governance'. The potential of greater inclusion of non-governmental actors in DMP is closely related to both bridging and shifting mechanisms described in Section 4.2. SMCS provide opportunities and new platforms for engaging citizens in DMP by both disseminating information to publics[4] and by engaging them in collaborative activities (Sutton et al., 2008; Vos et al., 2014). In line with the networked or co-produced approach to disaster risk management, a central argument in the literature is that command-and-control processes should be abandoned in favour of decentralised and inclusive processes (see for example Alexander, 2014; Bertot et al, 2010; Lang & Benbunan-Fich, 2012). This is not just a more efficient approach but also a more legitimate approach to making decisions (Poljansek et al., 2017).

In the next two sections, we focus on authorities and citizens, respectively and the extent to which SMCS facilitate inclusions and increased participation in DMP.

4.2.1.5 Engaging Citizens in DMP – Governmental Processes of Using SMCS to Reach the Public

Central to our understanding of the role of SMCS in DMP is the authorities' use and understanding of these tools. Since governments are the most important actors for initiating and facilitating disaster risk management and thus for the dissemination of these processes, social media should be prioritised in disaster risk management plans (Gizikis et al., 2017; M. Graham & Avery, 2013). Nevertheless, while the reported benefits of SMCS use for governments are vast, research shows that governments are often reluctant and hesitant to use social media applications (Harrison & Johnson, 2016; Roche et al., 2013). Given the strong role of private actors and citizens in developing these tools, this observation is perhaps less surprising (Harrison & Johnson, 2019). Graham and Avery (2013) conclude that governments are underutilising social media, while others observe an underwhelming amount of strategic thinking about SMCS in disaster risk management (Carley et al., 2016; Crowe, 2011; Graham et al., 2015). In addition, publics sometime view official sources as slow,

[4] Publics are groups of individual people acting as a unit through common ideas, agendas or technologies (Givoni, 2016).

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old-fashioned and outdated (Liu et al. 2016) leading publics to make sense of disasters through both official and unofficial sources (Sutton et al., 2008).

Crowe (2011) provides a useful categorisation of different strategies used by authorities to engage publics in DMP through SMCS:

- *Proactive use of SMCS* entails both dissemination, gathering and monitoring activities. According to Crowe (2011), it is the most complicated and demanding type of SMCS strategy for public authorities to engage with. Nevertheless, a proactive strategy is also likely to provide greater public inclusion compared to less active approaches (Harrison & Johnson, 2016);
- *Reactive use of SMCS* describes an engagement practice where authorities only disseminate or monitor public comments. Crowe et al., (2012) argue that this is the most common practice, as it requires little personnel, resources and time compared to the proactive approach;
- *Inactive use of SMCS* covers the least ambitious approach to SMCS. Here, authorities are completely inactive and ignore the significant impact of SMCS on disaster risk management.

Harrison and Johnson (2016) make similar observations about authorities' use of SMCS in DMP and distinguish between *active* and *passive* forms of SMCS use. While (pro)active approaches are rewarding in terms of legitimacy and efficiency, they often require extra resources and capacities which are not always held by governmental actors. While SMCS are becoming an integral part of disaster risk management (Boin & Lodge, 2016), the use of SMCS seems to be passive or reactive at best (Charalabidis et al., 2014; Harrison & Johnson, 2019). Research points to the fact that authorities are unprepared and without the capacity to deal with both dissemination, monitoring and gathering activities through SMCS platforms (Ansell et al., 2010; Graham et al., 2015; Hagen et al., 2018; Harrison & Johnson, 2019). A study done by Plotnik et al. (2015) concludes that only half of the included government agencies use social media. Others conclude that governmental actors mostly use social media for one-way information provision (Hagen et al., 2018). As the predominant use of SMCS is primarily to share information, some of the most innovative and potentially effective SMCS solutions are neglected (Ludwig et al., 2017). These conclusions raise several questions on how and to what extent governmental actors can increase their engagement with SMCS to improve DMP and whether this is desirable.

First, there appears to be a strong need for a strategic and pre-designed approach to SMCS in DMP where SMCS are included in both planning and execution of DMP (Chan, 2012; Graham et al., 2015). Such a strategy should clearly describe the objectives of using SMCS, who, how and procedures for evaluation (Gizikis et al., 2017).

Second, it seems that both researchers and practitioners need to address the organisational capacities and resources (or lack thereof) associated with the use of SMCS in DMP. Many governmental actors see SMCS as rapid and accessible channels for communicating and

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collaborating with citizens and private actors (Hughes & Tapia, 2015; Palen & Anderson, 2016; Schulz & Paulheim, 2013). However, integrating SMCS in governmental practices has encountered several barriers in terms of training, organisational processes, liability and limited resources (see also D4.1). Research shows that governmental actors lack the financial and human resources to efficiently make use of SMCS in DMP (Ansell et al., 2010). Given that governmental actors should integrate SMCS in their strategic approach to DMC, they need to build capacities and abilities to do this proactively and efficiently as disaster authorities are historically organised to accommodate hierarchical command-and-control approaches to disaster management (Kankanamge et al., 2020). The formalisation of SMCS in DMP thus needs to accommodate plans and approaches to avoid friction and ensure coherence with rehearsed and established practices (Ansell et al., 2010; M. W. Graham et al., 2015). Moreover, work procedures defined in and by SMCS need to reflect real processes on the ground (Ansell et al., 2010). A study by Avery et al. (2010) shows that governmental actors are slower to adopt social media platforms than actors in the industry. A similar conclusion is reached by Hagen et al. (2018), who also point to the slow adaptation levels found in local governments compared to their state and federal counterparts. Furthermore, research points to significant differences between the size of the governmental agency and the size of the community served by these agencies (Graham et al., 2015; Hagen et al., 2018). As such, local authorities working in urban areas exhibit more active use of social media compared to authorities working in suburban and rural areas. This conclusion points to the fact that formal and strategic integration of SMCS needs to take organisational capacities as well as local contexts into account.

Third, an overall need for a contextual understanding of the political and cultural aspects of both the general trust in public authorities, the role of citizen and non-state actors in local governments, and use the of technology. Carly et al. (2016) argues that authorities in the US generally believe that social media is the fastest way to communicate crisis information. However, this assumption requires that messages communicated on social media platforms reach the affected community and that people trust the messages provided by the authorities (see also D2.1 and D2.2). In connection with this argument, the existence of multiple SMCS can lead to confusion and miscommunication (Ansell et al., 2010). Governmental actors do not exist in a vacuum; they are deeply embedded in particular political, social, and cultural contexts and are rarely comparable across countries and regions. Political dynamics, agendas, and cultures influence the way different actors react to formal DMP (see also D2.2 for a similar argument).

4.2.1.6 Engaged Citizens in DMP - The Emergence of Publics Through Their Use of SMCS

The majority of the research takes a positive stance on the democratic potential of SMCS in DMP with reference to the engaging and inclusive nature of these technologies (Palen et al., 2010). The publics reflected in the literature can largely be divided into 'types' based on the extent to which they are impacted by disasters as well as the extent to which they actively engage with disaster management through SMCS. The first dimension captures the publics' physical and spatial

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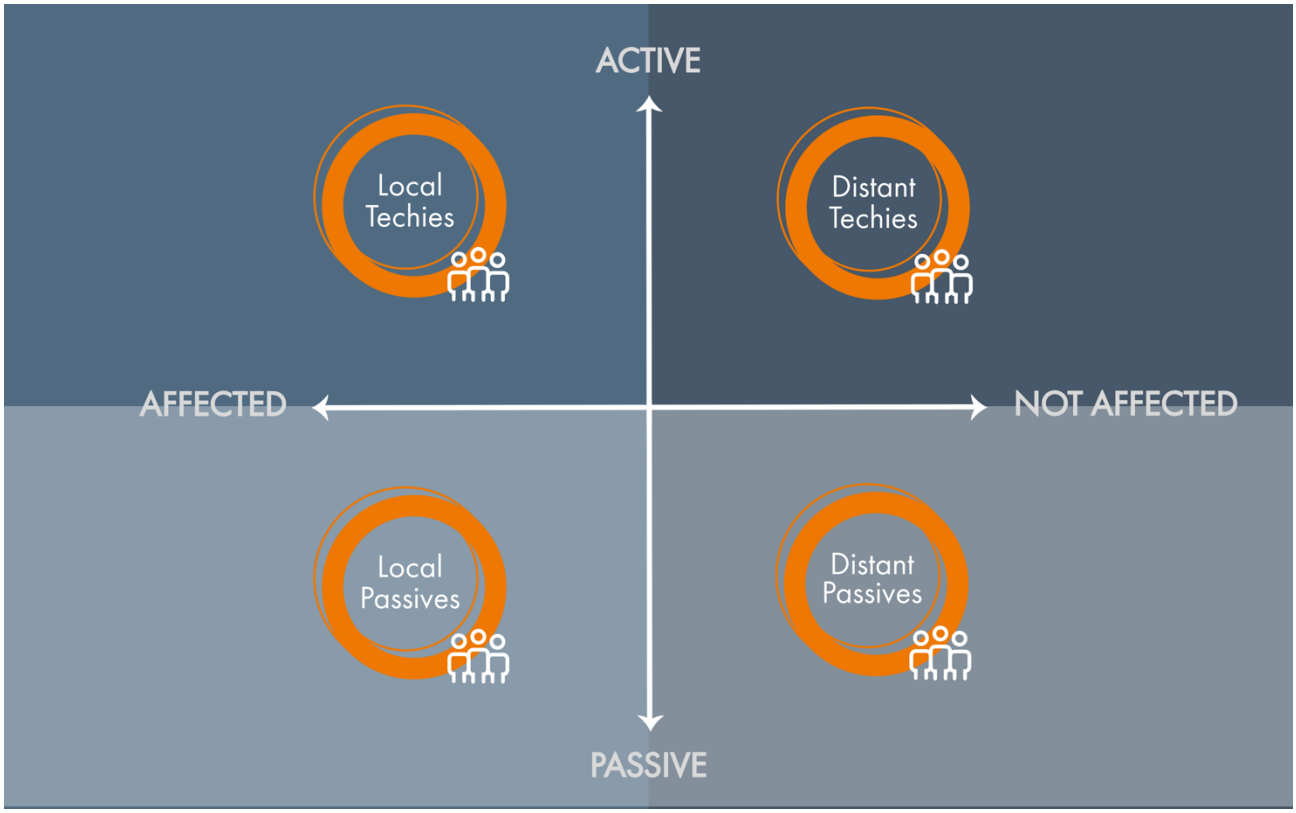
relationship to the disaster and range from affected (on-site in the impacted area) not affected (physically distant from disaster). The second dimension (degree of engagement) builds on the conceptualisation provided by Crowe (2011), however, we adapt it to capture publics' different ways of engaging with SMCS ranging from active to passive. Like Crowe (2011), the primary feature that distinguishes 'active' and 'passive' SMCS usage is the extent to which publics generate new content. By looking across these two dimensions, we capture four overall and *ideal types* of publics that we find in the literature on inclusion and participation in DMP through SMCS. It is worth emphasising how these types are based on continuums (degree of active participation and proximity to the disaster affected area), which indicate the diversity of public engagement within each of these simplified types. Moreover, this typology reflects the public that engages in DMP through SMCS. Consequently, it does not say anything about the disconnected or the people excluded from engagement via SMCS technologies. The typology of SMCS publics is presented in Figure 8.

Figure 8: Typology of SMCS Publics in DMP



Source: Authors contribution based on literature

The local techies: The first type of SMCS publics is active in its engagement with disaster risk management through SMCS and simultaneously directly impacted by the disasters. This group includes both pre-defined and spontaneous volunteers. Examples of pre-defined volunteers are

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professional first responders working for local or global NGOs, but who are geographically placed in the area that is (or predicted to be) affected. This type covers citizens that are educated and trained for disaster situations or/and assigned a particular role by the authorities for preparation. One example is the MAppERS project (see Frigerio et al., 2018) where a selected group of citizens were trained to make use of a crowdsourcing app that they installed on their own devices to support decision-making processes during flood events as well as to improve awareness in local communities. More spontaneous forms of voluntarism are often coordinated and supported by social media platforms such as Facebook and Twitter (Albris, 2018a, 2018b).

The local passives: The second type is less active in using SMCS to engage in DMP, however, impacted by disaster events. The most active citizens in this group may use SMCS to set the agenda, create awareness about the event (re-tweet where to find shelter (Xiao et al., 2015), while the more passive users simply monitor social media for information on how to react. The inactive users, people without access to ICT or without accounts for the platforms used by the authorities to disseminate data, are not included in decision-making processes through DMP and thus not part of the typology.

The distant techies: A third type is publics who are actively engaged in DMP but not directly affected by disasters in the area they support through SMCS activities. This comprises so-called virtual operations support teams (VOST) (Fathi et al., 2020) and digital volunteers who are placed all over the world but engage in concrete DMP through SMCS tools and platforms (Bessis et al., 2011; Holderness & Turpin, 2015; Tim et al., 2017; Xiao et al., 2015). Examples could be distant publics engaging through SMCS such as Crisis Mappers,[5] Humanitarian OpenStreetMap Team[6] and Ushahidi.[7]

The distant passives: A fourth and final type of publics is one not directly impacted by the disaster and with a passive approach to using SMCS to engage with DMP. This group contains citizens using social media to send money to response and relief activities, people who express sympathy with victims through social media platforms and people who set an agenda by liking and retweeting information. The most passive in this group are those who simply monitor and follow DMP as they play out on social media platforms.

The typology of the role of SMCS publics puts both affected people and communities as well as distant (digital) publics at the centre for understanding the role and effect of SMCS in DMP. It is worth noticing that these are types based on the many journal articles on the different types of public engagement supported by SMCS. Both of the dimensions are continuums to capture the variation in being active and passive and to acknowledge that there are different degrees. Individuals may also be part of different publics at different times, and many NGOs, for example,

[5] https://crisismapping.ning.com/
[6] https://www.hotosm.org/
[7] https://www.ushahidi.com/

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have boots on the ground (locals passive and active) while the staff is orchestrating the efforts from afar (distant passives or actives). As argued by Poljansek et al., (2017), the DMP unfolding in the aftermath of the 2010 Haiti earthquake was characterised by a collapse of local governmental infrastructures that together with SMCS platforms allowed global NGOs to quickly take over, set the agenda for the response efforts and allocating resources. NGOs facilitated a process of having boots on the ground but coordination and financial power from afar, which also came with massive long-term challenges.

While these four publics are indeed *ideal types* and thus simplifications of how different groups of citizens emerge and organise through SMCS, they tell us something important about the inclusion of civil society in DMP as well as something important about the change mechanisms brought by SMCS. Shifting mechanisms are thus not just a shift in power from public authorities to civil society and private actors, but a shift in power to civil society actors working in impacted areas as well as to actors working on ICT platforms from across the globe (Givoni, 2016). The shape and form of self-organisation and civic participation have changed with SMCS. Instead of being a local phenomenon of volunteers and community groups organising and partaking in management activities, SMCS opens up for people's participation from across the globe. The only requirement is access to internet-based communication tools. Simultaneously, SMCS create a bridging mechanism between the authorities who work in disaster-affected areas with the boots on the ground (Givoni, 2016).

Within the LINKS project, we will continue to develop and nuance this typology to increase its portrayal of SMCS publics. A first step is to identify and nuance the various roles that we can identify within each 'type'. Another is to link these 'types' to questions of representation and visibility of citizens based on the work carried out within the DRPV knowledge domain as well as to the DCT identified and analysed within the DCT knowledge domain.

4.2.2 Efficiency

The potential of creating *efficient DMP* is central to the discussion around the role of SMCS in DMP. Timely and accurate information can significantly improve DMP (Alexander, 2014; Frigerio et al., 2018) and SMCS offer inexpensive and quick tools to disseminate, monitor and gather knowledge and information. *Information dissemination* through SMCS provides an effective channel for authorities to communicate and enable the public to better prepare for and respond to disasters (Chan, 2012). Moreover, SMCS help authorities *monitor and gather information* in the sense of assessing the impacts of the disaster, providing assistance and coordinating action with civil society and private actors. SMCS provide a window to the scene of the event and create an opportunity for collecting information and footage of the immediate impacts of the disaster (Chan, 2012). As argued by Kirac et al. (2015) and Kirac & Milburn (2018) SMCS foster optimised response and relief processes where help is allocated where it is needed, quickly. Thus, SMCS enable collaborative decision-making by integrating a large amount of information from these platforms and fill the

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information gaps while providing comprehensive data for authorities and digital volunteers to analyse and plot.

Importantly, however, efficiency is dependent on a wide range of factors – from the credibility of data to the reach and perception of social media across different communities and groups of people (Sections 4.3 of 4.4). Technological know-how, education, age, language, economic status, gender, language and culture are all important contextual conditions for understanding efficiency on a deeper level (see Section 4.4, D2.1 and D2.2).

Finally, the effectiveness of SMCS is conditioned by the stability of the infrastructure and platform supporting the dissemination, monitoring and gathering activities. Large-scale disasters are often associated with the destruction of local (internet) infrastructure, thus potentially rendering large parts of the SMCS technologies obsolete. One example is the London power outrage in 2003 that highlighted the importance of relying on multiple tools for warning and information dissemination (Poljansek et al., 2017). It revealed the vulnerability of social media networks and power-dependent mediums such as smartphones. Consequently, the UK's Civil Contingencies Act advises the promotion of multiple communication systems such as battery-operated or wind-up systems alongside the use of SMCS platforms (Poljansek et al., 2017).

4.2.3 Accountability and Transparency

Questions of *accountability and transparency* are crucial for understanding governance structures that favour resilience and an aspect where SMCS seem to create some challenges for DMP. Questions of transparency are directly linked to the democratic virtue of accountability as transparency about how decisions are made goes hand-in-hand with a clear sense of responsibility. As DMP become less transparent, it becomes increasingly difficult to allocate responsibility for outcomes of DMP.

Starting with the transparency aspect, not much is written on whether those affected by particular disaster risk management decisions are adequately informed about the outcomes and the processes leading to those outcomes. SMCS may provide a forum where relevant decisions and strategies may be shared and explained (Boin et al., 2015). However, the few studies that engage in questions of accountability point to the fact that decentralised DMP make it significantly less transparent for both authorities, citizens, and private sector actors to get an overview of the processes unfolding as well as to grasp the link between processes and outcomes (Hughes & Tapia, 2015; Poljansek et al., 2017). One issue is that SMCS increase the complexity of DMP. Rather than relying on a single entry and a hierarchical order of command, multi-actor and multi-level DMP have multiple entries when citizens emerge and organise through SMCS.

On the one hand, research reflects an understanding of accountability closely linked to classical conceptions of state-based authority. The EU project TransCrises (Boin et al., 2015), for example, argues that the management task belongs to official policy-makers and that effective and legitimate

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crisis management is led by the state authorities (Boin et al., 2015). On the other hand, when DMP rely on the collaborative production, processing and use of SMCS generated information, publics are allocated decision-making responsibilities that affect the outcomes of DMP (Givoni, 2016). As Givoni (2016) argues, the seemingly laudatory inclusion of publics together with practical conduits for engagement, sharing and communication, reflects a neoliberal political ordering that, in the spirit of empowerment, entrepreneurship and community self-reliance, shifts responsibility from authorities to citizens and private actors. In other words, the shifting mechanism that we identified earlier on in this section is implicating a stronger focus on the individual responsibility of citizens and private actors as they become active partners in managing disasters.

Another practical implication of this shifting mechanism is illustrated by Albris (2018a). He points to the ill integration of citizen-driven networks on Facebook and the authorities' official response in the context of flood management in Germany. In this case, the local fire department experienced a reluctance from members of response networks on Facebook to cooperate and share their knowledge with government actors. SMCS re-enforces logics of self-organisation to management risk that we see in resilience-approaches (Haworth et al., 2018) and approaches drawing on both resilience theory and new public governance (Nielsen, 2020).

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4.3 Credible Information

The next dimension in the resilience framework concerns access to credible information. Resilience is conditioned on the extent to which decision-makers and public authorities, as well as private and civil society actors, have access to credible and meaningful information that enable judgements about risk and vulnerabilities and to assess options for response, recovery, prevention and preparedness. As already argued in Section 4.2, one of the main benefits of the use of SMCS in DMP is the access to - and the amount of - information. Furthermore, neither the information retrieved from SMCS technologies nor the SMCS service providers are neutral but rather embedded in ethical and political questions. Both of these observations create significant challenges to the use of SMCS in DMP and will be discussed in-depth in the following sections.

4.3.1 The Quality of Information

In its broadest sense, information quality refers to its reliability (Wang & Strong, 1996). Within the extensive literature on data and information quality, numerous dimensions are described to understand and measure the quality of data-based information (Alshikhi & Abdullah, 2018). These dimensions will not be described or applied in the context of this deliverable. However, a few key aspects will be highlighted as they speak directly to questions of the credibility of information. As such, questions of accuracy (also referred to as correctness) is of paramount importance and refers to the extent to which data represents reality. Other key aspects related to the question of information quality is the availability of data when needed (timeliness), the extent to which all necessary data is present (completeness), whether one collects the data needed (relevance) and importantly, the extent to which information is trustworthy.

On the one hand, SMCS technologies provide a new and improved opportunity for public authorities to access information, which might be of high quality. SMCS technologies can be used to instantly and spontaneously

PRACTITIONERS' VIEWPOINT

The Danish Emergency Management Authority (DEMA) has produced the campaign material "Tænk før du deler" [Think before you share] to counter the issue of false information. HBR and other Danish emergency authorities use this material to create awareness on false information and its consequences.

During the Corona crisis, HBR uses social media to disseminate material from the Danish health authorities. This ensures coherent and consistent information from Danish authorities.

Link to the material made by DEMA: https://brs.dk/da/borger/var-klar-nar-krisen-rammer/tank-for-du-deler/

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report disasters as they unfold, they help facilitate public alert, locate missing people and emergency management services and enable mapping of the disaster (Alexander, 2014; Kim & Hastak, 2018). There are numerous examples and best practices of how authorities, NGOs and even citizens may use particular SMCS technologies to improve DMP. The World Health Organisation (WHO) responded to the SARS outbreak through the Global Outbreak Alert and Response Network (GOARN) that provided real-time information from the field to decision-makers globally (Ansell et al., 2010). The application CrowdHelp was developed together with first responders and collects feedback from its users about their medical condition and combines it with data coming from sensors in smart devices (Besaleva & Weaver, 2016, 2013). Ushahidi is one of the most well-known and widespread examples of how a crowdsourcing platform enables publicly available and up-to-date crisis mapping through the integration of data from multiple platforms (Crowe, 2011; Dethridge & Quinn, 2016), and social media platforms such as Twitter, Facebook and are frequently mentioned as key tools for improved information on disasters (e.g. Hagen et al., 2018; Hiltz et al., 2020) along with a range of other tools (see for example Domdouzis et al., 2016; Douvinet et al., 2017; Eivazy & Malek, 2019; Frigerio et al., 2018; Gao et al., 2011; Havas et al., 2017; Turpin & Holderness, 2015). The list of SMCS technologies and functions, in LINKS referred to Disaster Community Technologies (DCT), is extensive and is thoroughly explored in D4.1.

Consequently, SMCS technologies provide new and increased access to information with the potential of improving DMP. Nevertheless, two major issues seem to critically challenge this benefit from using SMCS data in DMP: the issue of accuracy and the issue of relevant information.

4.3.1.1 The Issue of Accurate Information

SMCS allow anyone to publish information on the web. Few institutions are governing the quality of information (Omar et al., 2018) despite increased attention directed towards this particular concern (see Section 5). This creates some major challenges for the use of data coming from SMCS in DMP.

Two main categories are used to describe the intent behind false and inaccurate information spread on SMCS platforms. *Disinformation* is the information that is intentionally spread and deliberately misinforming. Disinformation plays a part in information warfare and is often initially disseminated by governments or intelligence actors as part of a tactical political manoeuvre to manipulate (Golovchenko et al., 2018). For example, the WHO has termed this as 'infodemic' in the context of the COVID-19 pandemic (Dutta & Raju, 2020). Misinformation is the circulation of false or inaccurate information without the intent to mislead (Søe, 2018). Both of these types of false information are part of the data landscape that authorities, citizens and private actors need to navigate when they use SMCS technologies to manage disasters (Gizikis et al., 2017).

In Canada, eleven out of fourteen disaster risk management organisations think the lack of trustworthy information accessed through SMCS is a concern (Harrison & Johnson, 2019). Judging from the literature on the role of SMCS on DMP this is a wide and fundamental concern of most

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governmental actors (e.g. Huo et al., 2011; Jin et al., 2014; Kankanamge et al., 2020). One concern is the need to verify the information and do constant 'fact checks' (Harrison & Johnson, 2019), another is to observe how false information is being shared and circulated on the SMCS platforms (Huo et al., 2011).

Interestingly, the move towards citizen inclusion through SMCS is both accelerating and countering the issue of inaccurate information. To understand the phenomenon, Golovchenko et al. (2018) looked at citizen engagement on Twitter following the Malaysia Airlines Flight 17 crash in 2014. Their study finds that citizens play an important role in both spreading and combating false information. On the one hand, citizens take part in spreading false information. On the other hand, citizens are also more engaged in opposing false information than state agencies and private actors (Golovchenko et al., 2018). This finding points to the shifting mechanism identified in Section 4.2.1. People have power in the debate over information through social media and take active roles in truth-making activities – a role which was formerly reserved to the state and mainstream media. Citizens are thus far from passive targets of manipulation and misinformation; they play active roles in promoting and countering false information. That being said, other studies find that spread of false information and unverified information on social media may cause panic, the adoption of irrational measures, as well as increased instability (Huo et al., 2011).

There are no clearly defined or regulated processes that guide who is responsible for the information. Currently, service providers within the EU are guided by a voluntary code of conduct on disinformation (see Section 5). This creates a massive steering vacuum in terms of placing the responsibility for monitoring and verifying the information. Scholars advise local emergency management services to quickly react to false information to prevent panic and irrational actions. While this can be done in partnership with citizens who can use SMCS to document the actual state of affairs (Gizikis et al., 2017), authorities seem to need additional resources to monitor and correct false information circulating on social media platforms (Gill & Bunker, 2012). Others find that citizens have higher trust in mainstream media (Jin et al., 2014) and that people are more likely to search for verification of information on social media compared to information accessed directly from traditional media outlets (Jin et al., 2014).

4.3.1.2 The Issues of Relevance and Perception of SMCS Information

The other major challenge regards the ability of different actors to assess the relevant data and make sense of the information they access through SMCS.

First and most importantly, the sheer volume of data constitutes a significant challenge. How does one process the huge amount of information or find a particular piece of relevant information among thousands of data points? (Alexander, 2014; Liu et al., 2016). Moreover, posts and tweets tend to vary in terms of what they cover: from showing sympathy with victims to providing useful information on the degree of devastation or the location of emergency management services (Imran

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et al., 2013). Hagen et al., (2018), for instance, find a surprising amount of 'noise' in a case study of the response to the Zika virus in a US context. Many tweets and retweets were about promoting particular political bills and political agendas related to public health services. Data comes in a variety of forms, which in most cases require some effort on the part of the users (Besaleva & Weaver, 2016). While there is a potential in 'big data', it requires know-how, the right technology as well as organisational resources and set-ups from both suppliers and users of services (Alexander, 2014; Hughes & Tapia, 2015). Currently, no common practice exists but promising developments are taking place with regards to the use of machine learning, entity extraction, and text classification techniques for data analysis (Besaleva & Weaver, 2016, 2013). Widely used SMCS technologies (DCTs), e.g. TweetTracker,[8] Twitcident,[9] Hootsuite,[10] and Artificial Intelligence for Disaster Response[11] (AIDR) are analysed and taken into account in D4.1.

Second, the information provided by SMCS needs to be relevant to decision-makers. Despite the interest in SMCS as disaster management tools, they may not provide a representative approach to monitor the needs and thoughts of the population in question (Carley et al., 2016). While data-driven approaches may appear objective, data are often biased and incomplete. Decision-making relying on Twitter, for instance, are unlikely to be representative of the entire population. Using and accessing SMCS that are not representative may reinforce existing structures of vulnerability (see also D2.1).

Third, receivers of the information provided through SMCS need to make sense of the information. Here both practical issues of information access, volume and more cultural-cognitive aspects are in play (see also D2.2 for further explanation of the cultural-cognitive aspects of information perception). The decentralised and fragmented nature where information is found through a variety of different SMCS is a clear barrier (Besaleva & Weaver, 2013). On the one hand, research shows that people use various media outlets to make sense of the information they receive on social media platforms (Liu et al., 2016). On the other hand, SMCS offers more options for accessing information from many different sources, however, often biased towards the types of discussions that suit one's perceptions of the world. In addition, authorities are challenged with phrasing and framing the information balancing the writing style and substance (Crowe, 2011). For instance, the language on SMCS is informal and conversational compared to traditional forms of communication used by disaster risk management organisations.

[8] http://tweettracker.fulton.asu.edu/
[9] http://twitcident.org
[10] https://signuptoday.hootsuite.com/emea-row-eur-pro-sem-branded/?utm_source=google&gclid=CjwKCAiA-_L9BRBQEiwA-bm5fhJ3wuj49RwvwqxhfRlFq7OF552SL1Xt4FPTn63OI741klqW9rK7CxoCT8sQAvD_BwE
[11] http://aidr.qcri.org/

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4.3.2 Ethical and Legal Concerns of Using SMCS in DMP

SMCS have opened up possibilities for automated mass surveillance of citizens (Joseph et al, 2018). Combined with a sophisticated monitoring system, governments can access user relationships, posts, locations and find patterns for further investigations. Authorities may have a vital interest in doing so in the name of efficient and life-saving response processes (Clark & Albris, 2020). At the same time, government agencies have a responsibility to protect privacy-sensitive data. Besaleva & Weaver (2016a) argue that a central issue is the changing landscape of information processing following from the use of SMCS. While traditional types of information channels (e.g. newspaper publishers) or real-world tools (e.g. medical applications) typically need to comply with established ethical standards and procedures (Besaleva & Weaver, 2013), using SMCS to collect and disseminate data about individuals is novel and constantly changing. Private and sensitive data are thus not as protected as traditional forms. A similar argument is promoted by central EU organisations (Council and Parliament) that have taken several steps in recent years to ensure the protection of data (see Section 5.2). The EU, for example, adopted the GDPR (EU GDPR 2016/670) to ensure ownership of one's private data and to streamline the many processes and practices for data protection within the EU Member States. The GDPR does allow for the processing of private data when someone's vital interests are at stake (having a list of missing people for example), however, this only encompasses a fraction of the potential data processing associated with disaster risk management if we understand disaster risk management beyond response and relief efforts (Griguer et al., 2019).

Even though the question of direct and intentional surveillance of individuals through SMCS is treated to some extent in European and national legislative frameworks (see Section 5.3) and various international guidelines (see Clark & Albris, 2020), the ethical and legal boundaries around the collection and processing of data are fuzzy. As argued, the very urgency underlying disasters (at least in response phases) may create both legitimate and legal reasons for bypassing ethical principles and standards. While public authorities are often subjected to protecting the rights of data subjects, this consideration needs to be balanced with the potential for minimising harm to people in disasters. In practice, striking this balance between ensuring the protection of private data while also ensuring the best possible response to a disaster, constitutes a major paradox for public authorities (see Section 5.3).

A final aspect concerns the fact that we cannot assume that all actors involved in disaster risk management have the same interest and follow the same standards and guidelines regarding data protection. Ethical issues may be different owing to who you are monitoring and what you are doing with the data in crisis, and the question thus becomes whether these data are and should be treated similarly across spatial boundaries (i.e. states) as well as to traditional data protection principles (Clark & Albris, 2020).

Publics involved in collecting and disseminating data are rarely guided by code of conducts or norm systems that comply with ethical principles and code of conducts guiding governmental actions and

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NGOs in the field (Berchtold, 2018). If data collection and analysis are done remotely, there is a risk of misreading the context and misinterpreting the results (Poljansek et al., 2017). Moreover, the shifting dynamics (see Section 4.2) which change the power dynamics between public and private actors are also creating concerns for the protection of privacy. A considerable amount of private tech companies are gaining influence in DMP through SMCS as they provide a large amount of the technical infrastructure. As such, the debate over data protection in DMP cannot escape larger discussions around the increasing empowerment of private companies and their business models (Poljansek et al., 2017). In general, there is a harsh critique of private service providers for the selling of private data and in connection, the lack of control that individuals have over their personal information (Ali, 2014). Having lost the exclusivity to produce and disseminate disaster information, governmental agencies are now dependent on citizen-generated data as well as on the SMCS platform service providers.

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4.4 Sensitivity Towards Vulnerability

Despite the great optimism over engaged publics, surprisingly few studies question 'the whom' of this engagement. As rightly argued by Givoni (2016) the type of 'publics' shaped by the use of SMCS in DMP is fundamentally different from the political and democratic publics normally discussed and conceptualised in democratic theory. Research on SMCS in DMP should thus be fundamentally more concerned and critically engaged with the people and groups benefitting from this power shift that we observe. If we accept that a shifting mechanism defines the new relationship between authorities and citizens, the critical question becomes: who gains power from this change in decision-making processes?

In the social science literature on disaster resilience, the question of entitlements (both formal and informal) is profound. Being entitled to make use of local ecosystems, to use critical infrastructure and to receive welfare, care and help are paramount for understanding core vulnerabilities and for designing management measures. Albeit playing a prominent role in resilience discussions, the relationship between entitlements (or lack thereof), SMCS and DMP remain surprisingly absent. Vulnerable groups are often side-lined in the crisis informatics literature which dominates much of the discussion of SMCS in DMP (Karanasios et al., 2019).

Understanding resilience as the capacity to respond to absorb disasters as well as the capacity to formulate alternative pathways moving forward (Tyler & Moench, 2012; LINKS Glossary), the varying capacities to reduce and deal with risk become important (Haworth et al., 2018). There are different ways of dealing with this question. In the following, we analyse the role of SMCS in DMP while being explicit attention to capacities constructed by governance structures. While D2.1 and D2.2 address these questions extensively, the purpose of this short section is to a) understand the role of institutions in relation to resilience and the use of SMCS in DMP and b) to link questions of vulnerability to questions of DCT and the governance thereof. As argued by Bonati (2020) in D2.1, sensitivity towards vulnerabilities is paramount for understanding the root causes of disasters. If SMCS are to strengthen resilience, we cannot avoid a discussion of how vulnerabilities and these technologies

PRACTITIONERS' VIEWPOINT

Save the Children Italy (SCIT) works specifically with the complex interactions between vulnerability, rights and access to information.

When unaccompanied minors arrive to Italy as migrants, SCIT offers counselling on rights and entitlements. Internet access and SMCS platforms support this work by channeling information about the Italian services.

Moreover, social media provides a platform through which migrants can connect with families, relatives and other networks important for coping with disasters when arriving and settling in a new country.

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interact. While SMCS may be used to pressure certain policies and regulatory frameworks (e.g. petitions for human rights) and thus potentially play a role in changing more fundamental governance structures important for DMP, sensitivities towards diversity, accessibility, connectivity and mobility are still largely absent from how the literature discusses the use of SMCS in DMP.

In the context of *diversity*, Haklay (2016) investigates 'participation inequality' in Volunteered Geographic Information (VGI): the phenomenon that a small percentage of digital participants contribute to a large proportion of the information output spatially and temporally. Key contributors to geographical information are not representative of the overall population, which should be taken into account when we analyse and process the data. Hakley (2016, p.41) formulates a general rule for crowdsourced geographic information: 'When using and analysing crowdsourced information, consider the implications of participation inequality on the data and take them into account in the analysis'. While this seems like a fundamental insight to all data processing, governmental authorities forget that SMCS data is created through a socio-technical process and often not representative of the population (Tufekci, 2014). Over focusing on social media may lead DMP to focus on those who produce a lot of data, and consequently, to reproduce response, and risk reduction in the views of digital volunteers. Studies show, for instance, an overrepresentation of urban populations in crowdsourced datasets (Hecht & Stephens, 2014) and how considerations of age and ethnic backgrounds are skewed in early warning systems (Tang & Rundblad, 2015).

Diversity, however, is also about diversity in dispositions creating different departure points for individuals to be included in DMP. Consequently, gender, age, economic status, and digital experience, to name a few, are factors that need to be considered when analysing the effect of SMCS on DMP (Carley et al., 2016; Gill & Bunker, 2012; Harrison & Johnson, 2019). A more nuanced understanding of SMCS engagement requires a deeper analysis of DCT in relation to these vulnerabilities. This also includes paying attention to the importance of language and framing in disaster risk communication to different risk cultures. Warner & Engel (2014) look at the role of disaster subcultures as a way of understanding how two different communities have developed different practices to deal with flood events. These risk cultures feature different beliefs and values important for their way of organising and managing disasters. Similarly, research shows how communication needs to be culturally sensitive and adapted to different cultural traits – from age, gender, and national contexts. This requires an understanding of the most popular social media tools but also the particular norms for communication style and tone (Poljansek et al., 2017).

Furthermore, DMP that use SMCS to guide management efforts should consider those people who *lack access* to technology. Computer illiteracy and digital divides are clear disadvantages in a world that increasingly rely on digital technologies. A study of Canadian emergency services indicates that the digital divide is a pressing issue for responding agencies. Particularly in rural communities and in communities with elderly populations (Harrison & Johnson, 2019). Lai et al. (2018) show how citizens in wealthy countries are more active in using advanced media technologies, like the

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internet, social media and mobile technology in disasters. Digital disparities are linked to access to technologies but also their different applications (D2.1). The digital divide is not only a concern in relation to SMCS but for information dissemination in general (see also Section 4.3 and D2.1). Additionally, SMCS may support the idea of 'self-help' and risk becoming a way for governmental actors to neglect responsibility and care for those who need it the most.

In the context of DMP, *connectivity* is paramount for understanding the changing institutional conditions supported by SMCS. These elements are to a large degree covered in Section 4.1 where we discuss how decision-making processes have changed with the use of SMCS and how this change is directly connected to an expansion of data-sources, new types of knowledge and greater inclusion of digital publics. This is, however, if governmental actors can effectively draw on this information, which does not always seem to be the case (see Section 4.1 and Section 4.3).

Real-time information and awareness of how a disaster is unfolding may direct the attention to vulnerable groups that are less visible in traditional media outlets. Graham et al. (2015) note how social media creates awareness among vulnerable populations and better involve them in decision-making practices. It creates a space for them to engage in dialogue and to express local concerns, which is particularly critical in remote areas, isolated communities and communities that are underserved (Keim & Noji, 2011). Gintova (2017) shows how the Canadian federal agency "Immigration, Citizenship, and Refugees" connects with refugees and immigrants via Twitter. SMCS thus offer a space not only for greater inclusion of publics but also for including individuals and communities who fall outside the radar in traditional command-and-control government processes. Albeit the policy landscape guiding SMCS in DMP is ambiguous and characterised by few requirements and regulatory frameworks, it is important for governmental agencies to recognise the importance of sensitivity towards connectivity issues (Harrison & Johnson, 2019).

Finally, *mobility* in the context of this deliverable concerns the ability to govern movements and displacement of people using SMCS. The literature speaks about the potential of SMCS to support evacuation and locate shelter during and immediately after a disaster (i.e. Chan, 2012). As pointed out in D2.1 Facebook and Twitter can be used to monitor people's reaction (Earle et al., 2012; Kongthon et al., 2014) and behaviour (Zou et al., 2018) during disasters, which can then feed into decisions concerning evacuation procedures and assessments of individuals' willingness to act and 'move' (D2.1). Similarly, Martín et al. (2020) have geotagged tweets to track population movements after Hurricane Maria in Puerto Rico, with the aim of capturing information on displacement and return. More long-term mobility trends (i.e. questions of displacement and migration) appear to be absent from the literature review for this deliverable.

In sum, there is a great need for a people-centred approach that focuses on the challenges of creating vulnerability sensitive approaches to DMP that consider how SMCS can support such sensitivity.

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4.5 Learning and Application of Knowledge Throughout DMC Phases

Institutions that generate, exchange, apply new knowledge and learn from experiences, enhance resilience. In the context of LINKS, this driver for institutional resilience is conceptualised as sustainable advance learning and involves the collection of knowledge and good practices over time. As argued in Section 3.2 a returning dilemma in the discussion over disaster resilience is whether resilience implies learning or the return to the status quo. In the context of this knowledge base, we connect the phases of the DMC directly with the idea of resilience as the capability to gain knowledge through the phases and implement this knowledge into new practices. Resilience is thus not just a question of the capacity to respond and recover but to learn and adapt the institutions that govern disaster management through time and across space.

Judging from the studies informing this knowledge base, it is evident that most research concerns the question of response. This bias is also reflected in this deliverable where most findings are based on studies of how public authorities and emergency services used SMCS to react and respond to a particular disaster. One reason could be that SMCS provide a platform for fast and intense communication, which is more relevant in the response phase compared to other phases (Abedin et al., 2014). A similar explanation could be a strong focus on communication (Albris, 2018a) or the embedded focus on 'response' among emergency managers and disaster agencies. This, however, does not imply that SMCS are irrelevant in other phases of disaster management and that the connection between the phases is important for the potential of learning and creation of alternative pathways.

PRACTITIONERS' VIEWPOINT

The Municipality of Frederiksberg (FRB) sees an increasing need to alter learning across the different phases of the Disaster Management Cycle.

Adaptation to increasing flood risk is often detached from the response phases as responsibilities belong to different actors and different government institutions.

FRB has increased their collaboration with the Danish emergency services and partakes in a well-functioning coordination and decision-making infrastructure on the executive levels.

4.5.1 Response

Starting with response, there is little doubt that SMCS potentially strengthen DMP. This phase is unique in the sense that it requires rapid information dissemination and a need for an immediate overview of the chaotic circumstances following the disaster. SMCS may support the speed and effectiveness of the response efforts. This includes immediate awareness to help authorities act on

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the disaster and awareness to help citizens keep informed, calm and alert (Chan, 2012). Furthermore, it can provide a platform to coordinate with citizens and to guide logistics around emergency services (Chan, 2012). A vast amount of data is generated during response and provides a window to the real-time developments on the ground, an overview of the devastations and a substantial amount of information about people affected by the disaster, as well as a direct link between authorities and people in affected areas (Anson et al., 2017; Yang et al., 2017). One example is the 2013 Typhoon Yolanda in the Philippines where more than 250.000 tweets were posted during the first 72 hours (Anson et al., 2017).

The FP7-project EmerGent[12] (Gizikis et al., 2017) advises a thorough evaluation where emergency management services look at their response processes: what worked, what did not work and how can the collaboration between authorities and citizens be improved in the response situation? Learning from previous practices should be an integral part of the response and feed into recovery, prevention and preparedness measures. While much data is generated during disaster response, it is analysed and translated into measures during recovery and prevention phases (Jamali et al., 2019). The guidelines developed by the EmerGent project (Gizikis et al., 2017), point to both quantitative and qualitative measures to evaluate the data gained through SMCS. Quantitative assessments can be done with several analytical tools to understand metrics and indicators such as the number of fans, visits, likes or posts on Facebook. For Twitter, information such as followers, tweets, retweets and the change of followers before and after the event may provide interesting information about how to adapt response processes. Which channels performed better, and which platforms reached most people? Qualitative measures may be used to understand the performance more in-depth. For example to analyse the feedback received by users. The EmerGent guidelines further stress the importance of communicating the results of evaluations widely among governmental agencies and suggest that they feed into a social media strategy to ensure improved performance in future events.

4.5.2 Recovery

When the immediacy of response has passed, recovery efforts begin and require longer-term planning and support to restore the situation. Recovery is a time when efforts move from logistics based coordination to more approach based coordination between different actors (Raju & Becker, 2013). As the literature tends to treat recovery as relief (providing shelter, food), long-term recovery efforts are rarely covered in the literature connecting SMCS with DMP. Gao et al. (2011) highlight the importance of SMCS in maintaining a connection between people during the recovery phase, while others emphasis how SMCS support recovery through the amount of big data available when response and relief efforts are over. This includes the mapping of damage in the short term (Joseph et al., 2018) and more long term evaluation of how to best rebuild societies using knowledge and

[12] www.fp7-emergent.eu

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experience from past disasters (Gizikis et al., 2017). SMCS can also help coordinate recovery efforts such as the provision of public health and safety services, provision of shelter for those affected displaced (Löscher et al., 2016).

Another important question is how SMCS users facilitate recovery processes in online communities? Like the context response activities, studies show that SMCS support coordination between affected communities (Jamali et al, 2018).

4.5.3 Prevention

Prevention understood as primary mitigating effects are rarely discussed in the literature. Like in the context of recovery, there is a wide acknowledgement of the potential of translating data generated during response into long term planning efforts. Databases play an important role in producing hazard maps and to support decision-making processes on how to reduce disaster risk (Joeseph et al, 2018). The big datasets with large coverage of people and vulnerable regions can lead to more accurate predictions. When social media data is paired with high-resolution satellite imagery, it can provide increasingly accurate maps of hazard zones and risk models of disasters to vulnerable areas (Joseph et al, 2018).

While these are important prevention measures, questions concerning vulnerability are fairly absent in the literature. This includes the extent to which SMCS play a role in adapting strategies and integrate questions of rights, diversity, and culture. One of the issues may be that governmental actors are organised in silos and those with responsibility for long-term thinking related to questions of mitigation and adaptation are placed in different parts of the organisation than agencies dealing with preparedness and response efforts.

4.5.4 Preparedness

Preparedness is understood as a condition for response in studies of the role of SMCS in DMP (Anson et al., 2017; Chan, 2012; Joseph et al., 2018). Particularly, the importance of training and preparing both agencies and volunteers in the use of SMCS platforms before disaster strikes. If adequate processes are set up before an event, they are more likely to be successful and increase resilience in response and recovery phases (Poljansek et al., 2017). Key preparedness opportunities include education and training, awareness, and knowledge dissemination as well as assigning roles to volunteer citizens (Poljansek et al., 2017). In contrast to response, preparedness is less data intense and more focused on setting up the best possible arrangements for the use of SMCS in DMP. As argued by Anson et al. (2017) social media may be used to build community resilience by enabling community members to establish digital networks prior to a disaster. (Frigerio et al., 2018) illustrate how authorities and local volunteers work together to set up collaboration infrastructure in a local community and how this initiative is simultaneously used to create awareness among people in a local community in Denmark. Disaster agencies may also monitor social media to identify emerging trends and potential hotspots that could become flashpoints for crisis (Chan, 2012).

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4.5.5 The Role of SMCS across Disaster Management Phases

The review of the existing literature illustrates an interesting conundrum in our knowledge of disaster management: While most of our focus in disaster management studies has shifted to look at phases that address root-causes to risk, studies looking at SMCS in DMP favour preparedness and particularly response phases. This observation illustrates the need for identifying the extent to which SMCS support all phases of disaster management and the need to move away from sole questions of response (Haworth et al., 2018). As argued in Section 3.1, the opportunities presented by SMCS for enhancing disaster risk management must be understood in relation to all four phases of the DMC. Resilience is thus strengthened by the increase in capacity across all four phases: Response, recovery, preparedness and prevention as well as their ability to inform one another (Haworth et al., 2018).

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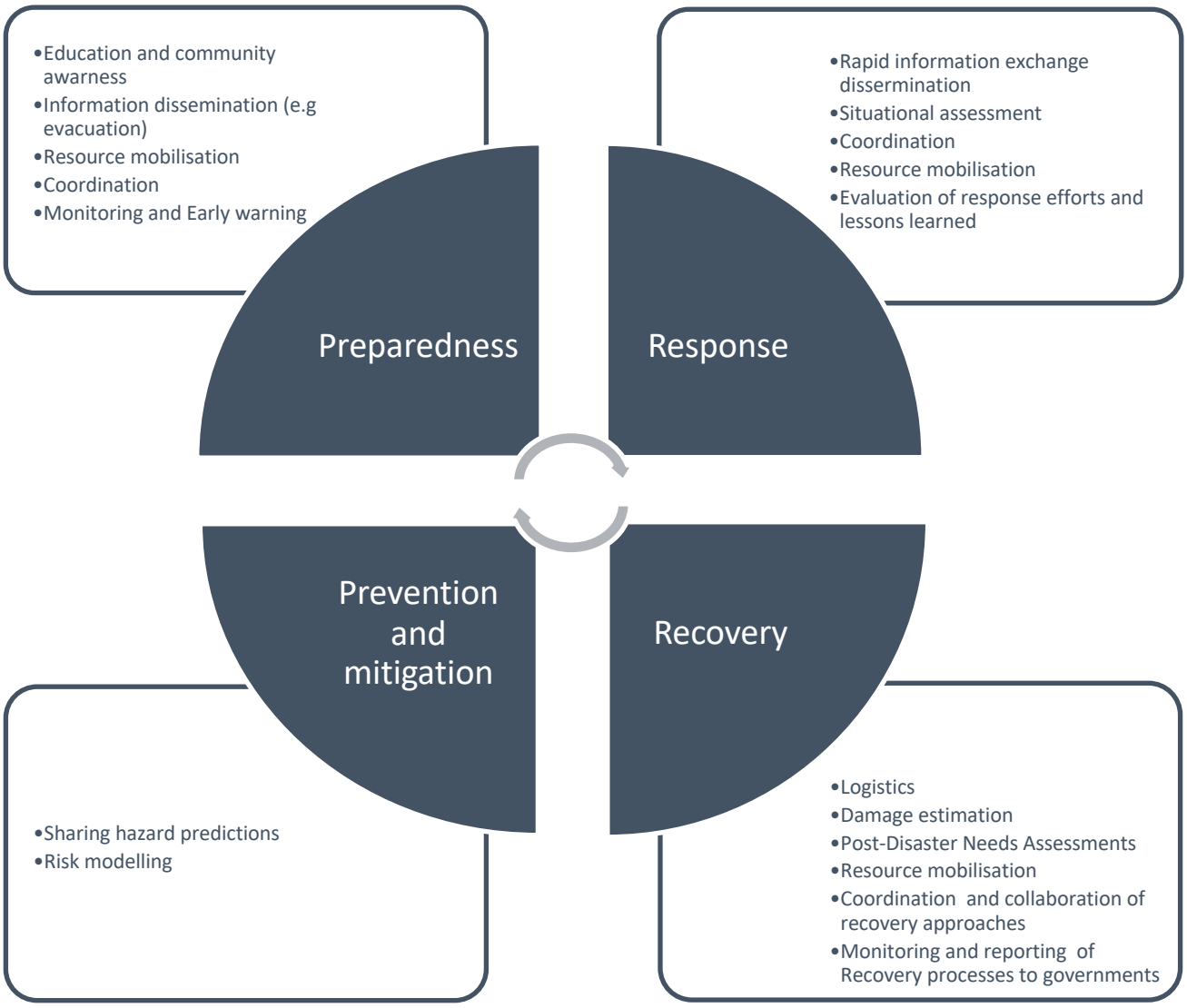
Figure 9: The Role of SMCS in DMP across Different Disaster Management Phases



Source: The figure is inspired by Joseph et al. (2018) but adapted to the functions ascribed to each phase in the literature

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4.6 The DMP Resilience Wheel: A Conceptual Model for Assessing Institutional Resilience

4.6.1 Concept Note

The DMP Resilience Wheel is a conceptual model built to support the assessment of institutional resilience across the five scenarios investigated in the LINKS project. The DMP Resilience Wheel draws on two important streams of inspiration, which is adapted from the findings presented in the state-of-the-art (Section 4).

- First, the four drivers, decision-making procedures, sensitivity to vulnerability, credible information and learning, were all identified by reviewing theories on the relationship between resilience and institutions and linking this to the question of technology systems and SMCS in particular. These four drivers were initially inspired by Tyler and Moench's (2012) empirical investigation of institutional dimensions enhancing climate resilience, and adapted here to the context of SMCS use in DMP;
- Second, visually and conceptually, the DMP Resilience Wheel is inspired by Arup's City Resilience Index (The Rockefeller Foundations & Arup, ny). The City Resilience Index is a conceptual policy tool that helps cities understand and respond to urban resilience challenges in an integrated and systematic way.

Against this backdrop, we suggest a model supporting disaster management organisations in their planning for use of SMCS in DMP. The four drivers - decision-making procedures, credible information access, vulnerability, and learning and application of new knowledge (identified in Section 3) - provide us with the first step towards understanding where the focus is needed for enhancing institutional resilience in the context of SMCS use in DMP. The next step is to characterize how resilience manifests in policy and practice when SMCS are successfully integrated with DMP. While this task is not finished with this deliverable, the state-of-the-art, gives us some initial answers to how we can characterise DMP aimed at enhancing institutional resilience through SMCS use in policy and practice.

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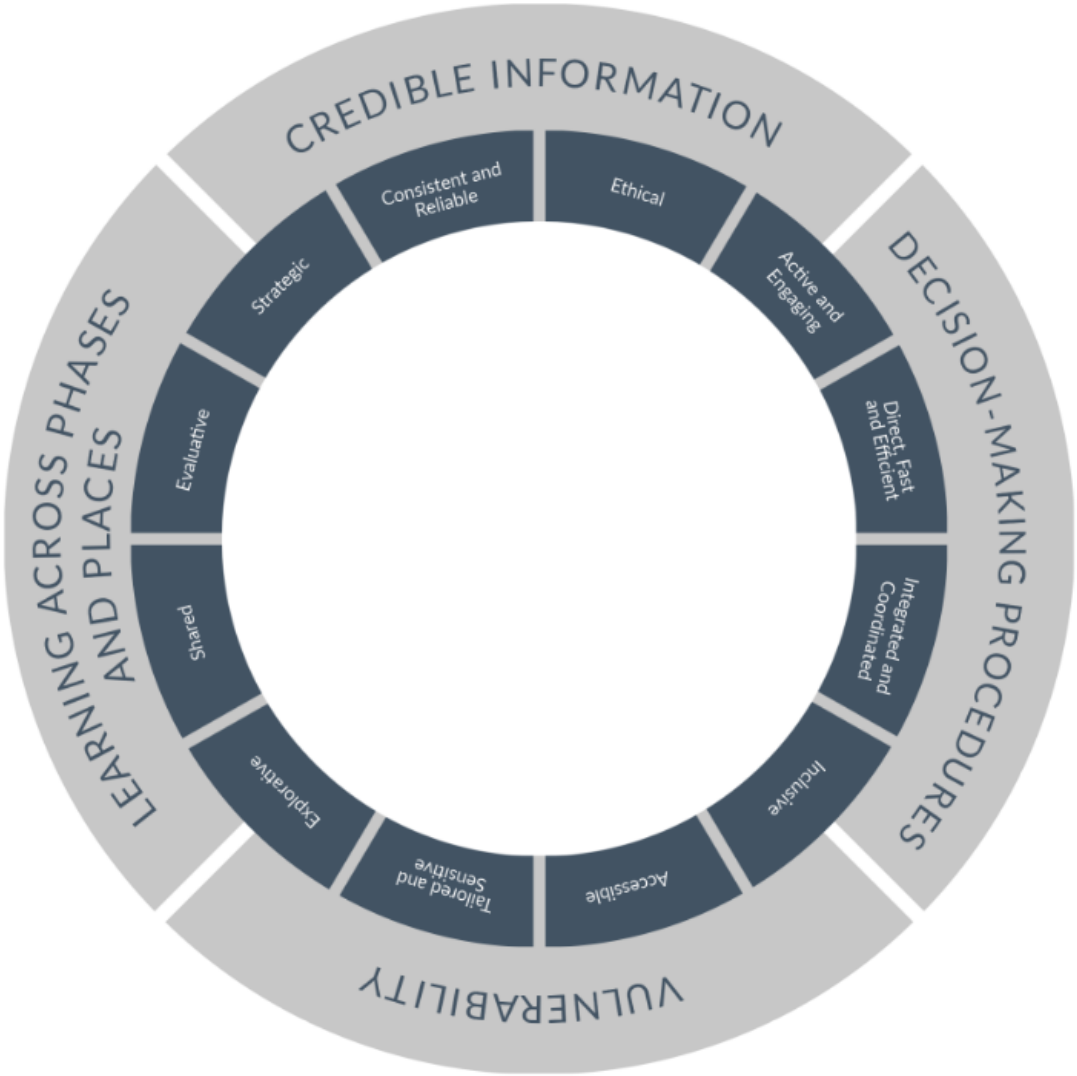
Figure 10: The DMP Resilience Wheel



Source: Authors' contribution based on Section 4, Tyler & Moench (2012) and the Rockefeller Foundation & Arup (ny).

While a detailed account of these four drivers for institutional resilience is provided in Section 3, the very characteristics associated with these drivers are identified from the state-of-the-art and presented here. Consequently, the systematic and integrated use of SMCS in DMP must have the following characteristics:

Credible information

- SMCS use is *strategic* and its purpose and audience are taken into consideration;
- Information communicated through SMCS is *consistent* and *reliable;*

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- The use of information obtained through SMCS platforms is grounded in *ethical* principles concerning privacy and data protection.

Decision-making procedures

- SMCS use is *active* and *engaging.* This maximises the potential in creating awareness and coordinating action and counters false information;
- SMCS use is *direct*, *fast* and *efficient* in communicating information and allocating resources in DMP;
- SMCS is *integrated* across DMP and coordinated with all actors working with DMP.

Institutional sensitivity to vulnerability

- SMCS use is *inclusive* when involving diverse communities, citizens and the private sector in DMP;
- Information communicated through SMCS is made *accessible* to all citizens across digital divides. This includes considerations about the extent to which information provided through SMCS also must be provided via other means for those outside the digital world;
- The use of SMCS is carefully *tailored* to diverse risk cultures and *sensitive* to a broad range of actors with different cultural, social and economic dispositions characterising the particular context.

Learning[13] across phases of the DMC

- Learning requires an *explorative* approach towards SMCS use in recovery and prevention phases;
- Learning must be based on *shared* practices and experiences of SMCS use across phases and places;
- Authorities should take on an *evaluative* approach to lessons learned within and across organisations working with SMCS use in all phases of the DMP

4.6.2 Practical Implications of the DMP Resilience Wheel within LINKS

The DMP Resilience Wheel is currently a draft model presented to assess institutional resilience. In the short term, the purpose of this model is to guide how the LINKS project addresses resilience in relation to the upcoming tasks on DMP (in LINKS Work Package 3). This first and foremost task is the development of a dedicated DMP methodology (T3.2) where the Resilience Wheel will be used to narrow down key concerns of institutional resilience building across the five case scenarios. This will help steer the project forward towards an improved DMP Knowledge Domain and later towards an improved and expanded version of the DMP Resilience Wheel.

[13] This approach to learning also feeds into the broader approach to the sustainable learning concept and LINKS learning model currently being developed (see D5.1)

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In the long term, the DMP Resilience Wheel may be turned into an actual and applicable tool for disaster management organisations that maps, guides and measures their approach to integrated and improving SMCS use in DMP. This will be a novel contribution from the LINKS project.

Before we get there, however, the DMP Resilience Wheel needs to be further developed and tested in close partnership with LINKS consortium partners as part of the development of the methodologies. This process will be carefully described and reflected upon in D3.2 and tested in Work Package 6 during the case-based assessment of the Framework.

Key takeaways from Section 4

- SMCS technologies are transforming DMP. They increase the power of civil society while simultaneously providing new tools for surveillance and the spread of false information;
- Both researchers and practitioners need to address the organisational capacities and resources (or lack thereof) associated with the use of SMCS in DMP. Particular governmental authorities underutilise SMCS in DMP due to lack of know-how, financial resources, and organisational structures;
- Citizens participate both actively and passively in DMP through SMCS and are not bound to the disaster-affected area. Nevertheless, we know little about the publics that engage in DMP through SMCS;
- False information and ethical concerns of privacy are fundamental barriers to authorities for the use of SMCS in DMP;
- The concept of resilience promotes the capacity to renew and reorganise. However, SMCS efforts tend to focus on reactive response and preparedness initiatives.

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5. MULTI-LEVEL MAPPING OF SMCS IN DISASTER RISK MANAGEMENT POLICY

Governmental actors are increasingly making use of SMCS in DMP. SMCS platforms provide a window of opportunity to manage disasters more efficiently and inclusively. Nevertheless, existing research shows that SMCS are often used in an ad-hoc manner, as mono-directional communication and without utilising the management potential provided by these technologies (Graham et al., 2015; Harrison & Johnson, 2019; Migliorini et al., 2019). Raising awareness of the need to build capacity in national governments' use of SMCS in DMP is coupled with the call for greater integration of SMCS in disaster risk management plans (Busà et al., 2015). If SMCS play a key role in DMP their aim and function ought to be reflected in relevant legal frameworks, policies and guidelines for disaster risk management (Gill & Bunker, 2012; Gizikis et al., 2017). Overall we have little knowledge of governments' use of frameworks and policies guiding SMCS in DMP (Chatfield & Reddick, 2018). As both SMCS and their formal integration in DMP are recent developments in disaster risk management, the landscape of regulatory frameworks, policies and guidelines are relatively limited. In this multilevel analysis, we provide an initial overview of the very fragmented landscape of frameworks guiding SMCS. This is not to be mistaken with a legal analysis nor a complete overview of every framework that may be important to the governance of SMCS in DMP. Rather, it provides a mapping of the frameworks that were referenced and circulated in the many documents that we analysed as well as the frameworks that came up when we conducted our literature search (see Section 2 for details on this).

It is important to emphasise that the main contribution of this mapping of the various frameworks is found in Annex III that provides a detailed registry of the policies and guidelines that we have identified across global, European and to some extent local levels (in the case countries LINKS will work with). This registry, along with the list of research and European Projects (Annex I and II), visibilises and gathers existing frameworks guiding the use of SMCS in DMP in one place. It provides a common ground for the LINKS consortium for addressing the further need for policies and guidelines and for adjusting and adapting the knowledge that already exists. The registry is thus an initial attempt to systematically uncover the policy landscape from which the DMP Methodology (T3.2), and ultimately the case-based assessment of the LINKS Framework, take their departures.

For this second step of the analysis, we solely draw on the multi-level approach presented in Section 3.2. The multi-level approach matches the notion of governance within the EU and describes the re-organisation of authority as shared across multiple levels of government—subnational, national, and supranational (Marks & Hooghe, 2004). It acknowledges that national governments currently constitute formidable participants in EU policy-making, however, that control seems to be slipping away. Supra-national and sub-national policy arenas are increasingly important to understand DMP.

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Having this approach informing our mapping of the current policy landscape, we look at the global, European and national levels.

We start with global frameworks (5.1), continue with the EU level (5.2) and end the section with a brief introduction to the SMCS landscape found in each of the LINKS case countries (5.3). The final section is motivated by an attempt to bridge this consolidated understanding of SMCS in DMP with future LINKS deliverables informing the LINKS case assessments.

5.1 Global Frameworks and Policies

Despite the 'global' nature of SMCS that we identified in Section 4.2, few global frameworks and guidelines guide their conduct in DMP.

The United Nations Office for Disaster Risk Reduction (UNDRR) has the oversight of and supports the implementation and evaluation of the non-binding *Sendai Framework for Disaster Risk Reduction* 2015-2030 (Sendai Framework). The framework comprises four main priority areas and expands the scope of the previous Hyogo framework for action with its focus on both natural and manmade hazards associated with environmental, technological and biological risks. The main aim is to reduce disaster risk by focusing on governance, understanding of disaster risk, resilience-building and to ensure long-term DMP that go beyond response (Amaratunga et al., 2017). While the potential role of technology is emphasised in the Sendai Framework, SMCS are treated through general declarations of intent. The Sendai Framework signals a mandate to science and technology communities to work with governments to strengthen resilience by developing and sharing know-how, technical solutions, and creating new innovative partnerships (Carley et al., 2016). It is not entirely clear where to focus those efforts and resources.

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) works to help people affected by disasters and so ensure that they receive assistance and protection. Responsibilities include the provision of telecommunications assistance and cooperation with the United Nations agency for telecommunication (ITU) in fulfilling the objectives of the Tampere Convention of the Provision of Telecommunication Resources for Disaster Mitigations and Relief Operations (ITU, 2020).

The Tampere Convention directly governs the use of telecommunication in disaster and relief and thus relevant for SMCS in DMP. The treaty establishes a legal framework for international cooperation between states, non-governmental actors and intergovernmental actors and covers both installation and operation of reliable, flexible telecommunication services within international humanitarian assistance. The aim is to reduce regulatory barriers and protect personnel providing telecom support during emergencies.

In addition, it is worth emphasising frameworks that guide data ethics and standards for data protection. As with both the field of disaster risk management and telecommunication, ethical and

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legal concerns of data privacy existing before SMCS became part of our vocabulary. Worth highlighting are the International Standards on the Protection of Personal Data and Privacy (*The Madrid Resolution*) adopted by the International Conference of Data Protection and Privacy Commissioners in Madrid in 2009 (ICDPPC, 2009) and the UN General Assembly Resolution 45/95 of 14 December 1990 adopting the *Guidelines for the Regulation of Computerized Personal Data Files* (Clark & Albris, 2020, p.3).

In terms of *global guidelines*, a number of UN organisations and NGO have published guidelines on how to successfully use SMCS in DMP as well as code of conducts on how to manage ethical challenges related to issues data protection. Most of these are directed towards humanitarian action and focus on the response phase. For instance, the OCHA, the International Federation of Red Cross and Red Crescent Societies (IFRC) and the International Committee of the Red Cross (ICRC) together published a guide on how to use social media to engage people affected by crisis in 2017 (see Annex III). Other examples are the UNICEF and the IASC who both have guidelines on the use of social media in communication and public advocacy, and which includes a step-by-step on how to approach various platforms such as Facebook, Youtube and Twitter (see registry in Annex III). A more technological view and analysis on guidelines for the use of SMCS can be found within D4.1.

The ISO 22329 - Security and Resilience – Emergency management – Guidelines for the use of social media in an emergency - is worth emphasising. The standard is currently under development but intends to guide on how social media can be successfully integrated with communications during a disaster (ISO, 2020).

5.2 European Frameworks and Policies

Disasters are far from a new concern within the territory of the Member States of the EU. However, despite a vast regulatory body, the use of ICT and in particular web 2.0 applications do not take up a lot of space in current frameworks governing disaster management. In addition: Europe's crisis management capabilities are still quite weak (Boin et al., 2013).

The LINKS project is interested in the capacities of the EU's multi-level system of governing to deal with the diversity of disasters using SMCS. There exist various institutional structures on both global levels and on Member State levels, which need to be coordinated and compliant with the structures at the EU-level. For the scope of this deliverable, we focus on the overall frameworks adopted by EU institutions and those, which are important to our understanding of SMCS in DMP. We identify three overall groups of frameworks and policies related to 1) disaster risk management, 2) telecommunication, and 3) data protection and credibility.

5.2.1 Disaster Risk Management

Within the EU system, cooperation on civil protection began at a ministerial meeting in Rome in 1885 (IFRC, 2010). Following this meeting, several resolutions were adopted and eventually the *Civil*

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Protection Mechanism (CPM) was formed in 2001. The CPM is the most important framework for emergency assistance on the EU level and has developed into an elaborate programme improving coordination between Member States (IFRC, 2010). The CRM's legal basis is Decision No 1313/2013/EU on the Union Civil Protection Mechanism by the European Parliament and Council. The CPM introduces the Emergency Response Coordination Centre (ERCC) as the backbone of the CPM (EU DG ECHO, 2020a). It coordinates and monitors the delivery of assistance to a disaster-affected country and provides emergency communication and monitoring tools through the Common Emergency Communication Information System (CECIS). The main purpose of CECIS is to host a database on potentially available assets for assistance, to handle requests for assistance based on these data, to exchange information and to document all action and message traffic. Contrary to the internet-based platform, the message exchange in CECIS takes place in an environment that is under full control due to the sensitive information stored and exchanged in this system. Since 2001 the CPM has handled 330 diverse events inside and outside the EU (EU DG ECHO, 2020b). It integrates all phases of the DMC – preparedness, response, recovery and prevention. In 2019, the CRM was updated with a European reserve (the rescEU) aimed at adding extra capacities to European disaster response and establishing a civil protection knowledge network (EU DG ECHO, 2020c).

A second instrument worth highlighting is the *EU Host Nation Support Guidelines (HNS),* which is essentially a working document aiming at providing guidance and support to participating states delivering assistance during a major emergency (European Commission, 2012). These guidelines have a specific section on communication, which describes media and communication as the host nation's responsibility, but which, nevertheless, encourage the planning and preparation of a communication strategy.

A third institution is the *EU Integrated Political Crisis Response arrangements (IPCR),* which reinforces coordinated response and fast decision making at a political level (IPRC Secretariat, 2013). The IPRC follows its predecessor, the EU Emergency and Crisis Coordination Arrangements (CCA) and was adopted on 25 June 2013 by the Council. The adaption of the arrangements reflects a turn in European crisis management as is requires Member States to engage on the highest political level, the Council (De Miguel Beriain et al., 2015). The framework relies on new bodies and tools to support EU's crisis response coordination and the Presidency's and the Council's decision-making. The IPCR also promotes a tool for information-sharing: a web platform, which is accessible for all relevant stakeholders at Member State and EU levels. The web platform is Council-owned, its access is protected, and it supports the timely exchange of information relevant to EU crisis decision-making. The IPCR Web Platform receives input (or contributions) from Member States, the Commission, the EEAS and the EU Agencies and acts as the IPCR communication hub. In crisis times, one or several crisis pages can be generated, depending on the situation and political needs. The IPCR web platform also allows information-sharing outside times of crisis, notably for preparedness purposes (Liberatore & Buckwell, 2019).

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5.2.2 Telecommunication

To support economic and social cohesion as well as a well-functioning internal market, Title XVI Lisbon TFEU on Trans-European Networks allows the development of trans-European networks in the areas of transport, energy, infrastructures and telecommunications. In the context of the LINKS project, the most interesting aspect is Article 155, which permits the EU to implement measures that ensure the interoperability of networks. Based on this, the EU has developed a regulatory framework for electronic communications mainly aimed at strengthening competition by improving market access (IFRC, 2010). Until December 2020, the framework consists of five directives (one general and four specific) and two regulations (EU DG CONNECT, 2019).[14] From December 21, 2020, the European Electronic Communication Code needs to be transposed into national law and the framework will then consists of (EU DG CONNECT, 2019):

- The European Electronic Communications Code 2018/1972/EU;
- The BEREC Regulation;
- The Directive on Privacy and Electronic Communications 2002/58/EC, amending Directive 2006/24/EC and the Citizens' Rights Directive 2009/136/EC;
- The Regulation on roaming on public mobile communications networks 531/2012/EU.

The European Electronic Communication Code (the EECC), establishes a framework for the regulation of electronic communications networks, electronic communications services and associated facilities and associated services (Vivier, 2019).

It is worth highlighting that the EECC is the main EU legislation on emergency communication, which includes voice communication but also text messaging, videos and real-time texts (Vivier, 2019). It states that all users should be able to access emergency services through emergency communications by using the common European emergency number (112) and that emergency services in the Member States should use handset-derived location to locate users. Transmitting location information should be free of charge for the end-user and location information should be provided for all kinds of emergency communications. Moreover, it promotes the transmission of public warning alerts via telephone networks and provides a legal basis for the mandatory implementation of warning systems for people in specific areas (Vivier, 2019).

The scope of the EECC expands the previous framework by including internet-based services in the definition of electronic communication services under EU law. Nevertheless, only number-based providers are subject to requirements to register with the competent authorities of the member states, guarantee the ability to dial emergency services numbers (i.e. 112), and ensure interoperability of their services. However, the EECC sets out various procedures to allow for the expansion of some of the regulatory provisions applicable to internet-based services over time

[14] The Framework Directive 2002/21/EC, The Access Directive 2002/19/EC, the Universal Service Directive 2002/22/EC and the Authorisation Directives, 2002/20/EC are repealed with effect from 21 December 2020.

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(Liberatore & Buckwell, 2019). In other words, the EECC emphasises number-independent communications services, such as WhatsApp or Facebook Messenger, are increasingly used and that these services may need to be regulated like number-based services. The EECC is complemented by various directives and regulations, including, for example, the e-Privacy Directive, the Telecoms Single Market Regulation, the Roaming Regulation, and the Radio Spectrum Decision (EU DG CONNECT, 2019).

5.2.3 Data Protection and Credibility

Section 4.3 established how *false information* and *ethical concerns* are some of the main concerns of using SMCS in DMP. The EU is similarly concerned about the manipulation of information and its consequences for the formation of public opinion, an adequate response to a crisis like COVID-19 and its implication for inciting hatred and violence (ERGA, 2019). European institutions counter false information through a number of measures.

This includes the development of a self-regulatory code of practice on disinformation for online platforms and the advertising industry (ERGA, 2019). Depending on the relevance to products or services, signatories are required to identify which of the commitments they will adhere to and how (ERGA, 2019). The signatories also commit to cooperating with the Commission in assessing the code, including providing information upon request and responding to questions. In October 2018, the *Code of Practice on Disinformation* was signed by Facebook, Google, Twitter and Mozilla, EDIMA (the trade association representing online platforms) and trade associations representing the advertising industry and advertisers. Microsoft joined in 2019 and TIKTOK in 2020 (EU DG CONNECT, 2018).

In 2016, the Commission agreed with Facebook, Microsoft, Twitter and YouTube to launch another voluntary measure to respond to the proliferation of racist and xenophobic hate speech online: the *Code of Conduct in Countering Illegal Hate Speech Online* (EU DG Communication, 2020)**.** The purpose of the code is to ensure that requests to remove illegal content are reacted upon quickly. By signing the code, platform owners commit to review the majority of these request within 24 hours and to remove the content if it does not comply with company guidelines, national legislation and EU law for illegal hate speech. Eight companies have adhered to the Code: Facebook, YouTube, Twitter, Microsoft, Instagram, Dailymotion, Snapchat and Jeuxvideo.com (DG Communication, 2020). This is particularly relevant for disasters where we see increasing use of SMCS because we have seen hate messages and false information spread against specific communities during the COVID-19 pandemic (Macguire, 2020).

As we write this deliverable, the Commission is busy consulting and drafting the *Digital Service Act* (DSA) – a package of measures to expand and update the regulatory framework for digital services currently regulated by the e-commerce Directive from 2000 (EU DG CONNECT, 2020). Consequently,

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the hate speech code, among other frameworks, is now being discussed in a wider regulatory process.

The DSA aims to strengthen the single market acknowledging the revenue associated with online digital advertising and the benefits of free online content and services while protecting citizens (IAB Europe, 2019). The DSA is developed with existing regulatory frameworks on data protection in mind. In particular, the *General Data Protection Regulation* (GDPR), which establishes the principles of data protection in EU member states.

GDPR, (EU) 2016/679, is a regulation that came into force in May 2018 and essentially regulates the way personal data is processed and treated. It updates the principles in the Data Protection Act from 1998 and is an attempt to keep up with the creation of large amounts of personal data. It has two primary goals:

- Provide citizens with control of their data;
- Harmonise the regulatory environment by unifying the regulation within the EU.

Essentially, GDPR alters how authorities, NGOs, and businesses handle the information of citizens and customers and is important to DMP as emergency services process large amount and multiple data (EENA, 2019). Thorough descriptions of the concrete implications and how to manage GDPR can be found in IN-PREP (Vollmer et al., 2018) and EmerGent guidelines (Gizikis et al., 2017). Ethical and legal questions of data protection and the protection of vital interest in disasters are also reflected in Section 4.3.

5.3 National Frameworks and Policies

While global and EU policies do influence the use of SMCS in DMP in some aspects, many decisions are left to national and subnational levels. This section provides a window into the current state of SMCS use in national DMP. We focus specifically on the four case countries that are included in the LINKS project and provide an initial assessment of the needs for knowledge and guidance. All of the information in this section stems from the short qualitative survey conducted among LINKS consortium partners (Annex IV). This section does not provide a complete overview of all initiatives taken in countries where the LINKS cases will take place. Instead, it provides an initial exploration of the formal activities linking DMP and SMCS and gives insight into the large diversity of policies and practices that guide disaster risk management across Europe. This compilation will continue to be part of LINKS as we move forward with the next steps of the project.

It is largely agreed among LINKS country teams that SMCS is widely used in DMP, however, that this application of SMCS happens in a steering vacuum. All four country profiles mentioned there are a few frameworks or guidelines that consider SMCS, but further emphasised the fragmented use of SMCS in DMP. As is reflected in the academic studies of SMCS, SMCS are seen as tools for

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preparedness and response and without strategic and holistic considerations for populations vulnerable to disaster risk.

Overall, this indicates a strong need for the formalisation of the practices guiding SMCS use in DMP as well as a greater awareness of frameworks and guidelines that do exist.

5.3.1 Germany

Germany has three main layers of government working with disaster risk management: national federation level, federal state level, and the municipal level. The federation is responsible for the protection of the population against war and other military conflicts. In all other cases, the 16 federal states (Länder) are responsible (Amaratunga et al., 2017). All three levels of government are constantly interacting with each other. The federation can make suggestions for the Länder and those are very often followed (like currently in the case of the COVID-19 lockdown). The technical and financial means of the Länder, however, are limited and thus need support from the federation level in many situations. The Länder can for instance ask for support from the 'Bundespolizei' (the federal police) under certain conditions such as a terrorist attack.

The main frameworks guiding DMP are regulations directed towards police units. The responsibility for crisis management lies with the Länder and each federal state`s government has the right and responsibility for policy formulation in the area of civil security, typically through its Ministry of the Interior (Amaratunga et al., 2017). When it comes to the municipal level, even though the federal states have the legislative and executive power, disaster relief is to a large extent planned and implemented on a local level (Amaratunga et al., 2017).

SMCS is used in DMP in the German context, however, few guidelines guide this. The only concrete example that we are aware of is the FWDv 800 where social media is mentioned as a channel for communication (Institut der Feuerwehr, 2017). In the case of the police, there are specific guidelines for public and media relations, however, they currently do not differentiate between social and 'traditional' media. Some federal districts have formulated their own social media guidelines.

5.3.2 The Netherlands

The main governmental agency responsible for DMP at the national level is The National Coordinator for Security and Counterterrorism under the Ministry of Justice and Security (https://english.nctv.nl/). Depending on the type of crisis (disaster) various agencies across national, provincial, regional (Safety Regions) and municipal levels are involved.

People in The Netherlands can be alarmed and informed by NL-Alert, the sirens, radio, TV, social media, news websites, www.crisis.nl, and the websites of the safety regions. Currently, however, NL-Alert is the most important tool to inform citizens about an emerging crisis situation. NL-Alert is one of the first implementations of the EU-Alert defined by the

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EECC using cell broadcast technology for public warning.[15] As NL-Alert works via cell broadcast, a service that can only be received by people with mobile phones, elderly people can be viewed as vulnerable. Hence, the NL-Alert technology will be broadened in the near future, so that, for example elderly, will receive a spoken NL-Alert via their landline phone number.

In reports from Safety Regions social media is mentioned as 'something important' but there are no central guidelines or standard operating procedures (van Duin, 2019). The Crisis Management Information System (LCMS)[16] is an online platform used by the practitioners (crisis management stakeholders) to share information via sitraps and GIS. This system can, however, only be used by practitioners and cannot be viewed by anyone out of the governmental crisis management process. In case of crisis, almost all safety regions use online social media monitoring tools, such as Coosto or OBI4WAN (these are commercial services), through which the public's eye on the crisis is analysed. Often, this analysis has important consequences for crisis management, as operational decisions (such as the way of communication) will be based upon social media analysis. In cases of a big crisis or disaster with many potential victims, the Dutch authorities can use the Slachtoffer Informatie Systematiek (SIS) (translated: victim information system). Through this system, victims are identified, after which relatives can contact this system in order to view if their relative or friend is one of the victims (and whether he or she is severely injured or not).

The fact that there are no rules or guidelines shows the needs in this area. However, much is being done by governments to use the current technology to inform the public as soon as possible. The old sirens are steadily being replaced by the NL-Alert system. The most important challenge for this system is to develop a tool through which all relevant citizens can receive information about a crisis (e.g., vulnerable groups). As such, this challenge is a pipe dream, but important nonetheless. Furthermore, distributing validated information as soon as possible is often an issue. For Regional or national news sites there is no absolute need to validate information upon distributing it. As such, they do not refrain from distributing false information about an incident.

5.3.3 Denmark

In Denmark, the primary public authority responsible for guiding authorities in general in disaster risk reduction and emergency management is The Danish Emergency Management Agency (DEMA). However, in actual crises and disaster response, the police have the responsibility for coordinating the involved authorities in a given operation, which also involves the task of communicating to the public and media. This concerns crises on both national, regional and local level.

DEMA has published several publicly available guidelines, which somehow addresses the question of communication, social media and the public. In addition to this, each authority holds its own more specific guidelines on how to manage the tasks of risk and crisis communication, however, these

[15] https://crisis.nl/nl-alert.
[16] https://lcms.nl/about-lcms

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guidelines are often not public due to the risk of exploitation (crime, terror etc.). These internal guidelines contain specific instructions for media monitoring, use of platforms, backend tools and media intelligence.

In Denmark, Facebook is (still) the dominating social media platform (DR, 2020). Thus, if public authorities want to share information with a broad audience through social media, they need a Facebook profile. Twitter has a very narrow user group: 8-10 % in 2018 and 2019 dependent on the data source (Danmarks Statistik, 2018; DR, 2020). Twitter users are mostly people with higher education working with politics, communication or journalism. When authorities apply Twitter they mainly communicate with journalists and editors on edited news media, and so they apply Twitter as a channel for pushing news (a modern kind of working with press releases).

National authorities carry out media monitoring during crises to monitor reputation and image of own organisation, to monitor rumours/misinformation/disinformation in order to correct stories that misguide the public and monitor the mood/atmosphere in the public during the crises in general. Besides, the police use social media monitoring to support crime investigation and to assist in prosecution (secure material like text, visuals etc.).

Social media is used comprehensively to disseminate information during crises, and the national authorities have a strong focus on their appearance on these channels. However, an interesting observation during the present COVID-19-crisis is that a comprehensive part of communication and information have been provided by traditional edited print and electronic media. A survey study recently published conclude that in March 2020 the public authorities and traditional edited news media are the most used source of information (Andersen et al., 2020). This result is backed by a report from DEMA (DEMA, 2019), which shows that Danes expect to get valid information from authorities through edited media like TV, radio, newspaper and news websites.

The COVID-19 crisis has provided one of the few examples of crowdsourcing within disaster risk management in a Danish context. An app 'SmitteStop' was developed to help track COVID-19 spreading.[17]

Most public authorities working with DMP hold the concern that the public misunderstands their presence on social media and write to get help in urgent matters, such as calling for assistance in case of emergencies, which the authorities are not able to provide since they do not monitor the social media 24/7. Another central issue is false information and the lack of trust in information provided by professionals.

5.3.4 Italy

Italy has three levels of government: national, regions, municipalities. In the field of Civil Protection, the most important and recent national act is the 'Decreto Legislativo 1/2018' (Civil Protection

[17] https://smittestop.dk/

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Codex). This act contains all aspect of Italian disaster risk management and follows key principles of the CRM and Sendai Framework. Each of the 20 Italian Regions must build the local civil protection system starting from this act, but they can have regional regulations too. In this way, sometimes differences exist between regions in terms of organisation.

On the municipal level, the mayor is the first and most important authority in the field of Civil Protection. This figure has direct contact with citizens, as chief of a community. This authority has very clear and important duties in this sector: 1) to inform citizen about risks; 2) to assistance citizen during an emergency; 3) to manage the rescue and response activities. Vulnerable people can be addressed in municipal civil protection plans, which are compulsory local documents that every Municipality in Italy must draft to deal with all the risks present in their territory. Save The Children Italia has produced guidelines that consider minors. In Italy, emergency plans are publicly available. Their communication is foremost done by the mayor. Each mayor is responsible for the means and strategy used. Regions and the National Government have a role in communication regarding their respective territorial competences.

Only in the last few years, with the arrival of social media, the sector of emergency media and communication started to be important within civil protection. As a consequence, vulnerable groups were included in questions of communication. SMCS are used at all levels to provide information and education in all management phases, but there are no specific guides for the use of SMCS. Local institutions (some Universities, some Municipalities etc.) use internal documents or guidelines, some of them taken from European Projects.

The main challenges include providing objective information and reaching people before they are influenced by false information. The information must be provided by the official, institutional accounts but they are not followed by many or shared and not everybody uses the same social media platform. Like in other case countries, professionals are reluctant to use SMCS because of technical, ethical and legal barriers.

In conclusion: similar to the fact that the landscape of disaster risk management laws, policies and plans across EU countries are different (Raju et al, 2017), the sections above clearly highlight the diversity and variety of governance mechanisms in relation to disasters and SMCS at national levels. There is very little guidance on how to govern SMCS in disasters at the national and sub-national levels. The qualitative survey among the different LINKS consortium partners indicates that rules, guidelines and policies with regard to SMCS in disasters are still in their infancy and need to be addressed more coherently across the EU and its different member states.

Key takeaways from Section 5

- The landscape of formal frameworks cut across global and EU-levels, but few directly engage with the role of SMCS in DMP;

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- The EU is strengthening its formal institutions governing the 'digital internal market' and we identify some recent initiatives potentially important to our understanding of SMCS in DMP;
- National and subnational entities are lacking guidance on how to integrate SMCS in DMP. This is reflected in the lack of formal governance structures on the national level as well as limited awareness of the guidelines that do exist.

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6. CONCLUSION

6.1 Summary

This deliverable provides a consolidated understanding of the use of SMCS in DMP. It is the initial knowledge base for one out of three knowledge domains. It addresses how formal institutions and actors increasingly rely on SMCS to promote faster information exchange and communication between public authorities, citizens and private actors in an attempt to improve DMP.

In this context, this deliverable has a threefold objective:

- First, to provide a conceptualisation of resilience in the context of SMCS use in DMP
- Second, to provide a state-of-the-art of the existing academic literature linking SMCS with DMP;
- Third, to map existing *formal* governance processes in relation to SMCS and disasters across three levels of governments: global, European and national.

In the conceptual chapter (Chapter 3, Table 3) we provide a framework for assessing and analysing the use of SMCS in DMP in the context of institutional resilience. We argue for a governance approach to assessing SMCS in DMP and point to two overall components that structure the two steps of the analysis. This includes a specific focus on *multiple levels* and *multiple actors* important for the governance of DMP. Moreover, we point to four drivers that are integral for strengthening institutional resilience: Decision-making, credible information access, vulnerability, and learning. In the first step of the analysis, *the state-of-the-art*, we look at how SMCS supports resilience-building across these four drivers. We find that SMCS platforms provide a window of opportunity to manage disasters more efficiently and inclusively. This includes the observation that citizens are included through both shifting and bridging mechanisms where governance is networked compared to traditional command-and-control processes. However, we also find that the use of SMCS in DMP creates several challenges related to politics, organisational set-ups, ethics, information quality and the type of citizens and private actors that are included in DMP through SMCS. One central observation is how governmental actors use SMCS in an ad-hoc manner, as mono-directional communication and without utilising the management potential provided by these technologies. This directly connects to a lack of resources and know-how, circulation of false information and critical ethical questions of protection of private information. In addition, we know little about the political context that surrounds the use of SMCS, and to what extent certain socio-political structures or environments promote or limit authorities' active use of SMCS in DMP.

While citizens and private actors seem to gain from SMCS, we find that certain groups of citizens (the digitally competent) are particularly included in DMP processes. Otherwise, we know surprisingly little about how people actively engage and benefit from networked government structures. Furthermore, we know even less about the people that are disadvantaged from these

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emerging techno-political structures. This lacking focus on vulnerability in the existing research literature is confirmed by Bonati (2020) in D2.1. Together, D3.1 and D2.1 thus point to a much needed discussion of how local vulnerabilities interact with SMCS and the attempt to strengthen resilience through the use of these platforms. This must be at the top of the agenda for researchers and practitioners working in the technology-governance nexus and to those addressing root causes of disasters. While SMCS may be used to put pressure on certain policies and regulatory frameworks (e.g. petitions for human rights) and thus potentially play a role in changing more fundamental governance structures important for DMP; aspects such as sensitivities towards diversity, accessibility, connectivity and mobility are still largely absent in the literature.

Finally, the concept of resilience promotes the ability to adapt and learn from experiences and past practices. However, a significant focus on response (and to some extent preparedness) in the existing literature makes it difficult to assess the degree to which DMP adapt and change in the light of the knowledge gained through SMCS.

In the second step of the analysis, *the multilevel mapping*, we map the policy landscape of SMCS in DMP across global, European and national levels. We find relatively few frameworks integrating both DMP and SMCS aspects, however, both disasters and ICT are increasingly important agendas. An observation worth of interest is that the EU has strengthened its formal institutions governing both disaster management and ICT in recent years (e.g. the EECC, GDPR and the Digital Service Act) and thus increased its authority through rules and standards guiding the use of SMCS in DMP. Nevertheless, many policy decisions continue to be placed at national and sub-national levels.

Zooming in on the national level, we find that government agencies apply SMCS in DMP in an ad-hoc manner, but lack standards and guidance on how to successfully integrate SMCS in DMP. Key issues here echo our findings from the state-of-the-art and include political, ethical and organisational barriers. This section looks specifically at the four case countries included in the LINKS project and provides an overview of the country-specific policies and actors. This section highlights the diversity and variety of governance mechanisms in relation to disasters and SMCS across the different LINKS case countries. The qualitative survey among the different LINKS consortium partners indicates that rules, guidelines and policies concerning SMCS in disasters are still in their infancy and need to be addressed more coherently across the EU and its different member states.

Overall, our mapping uncovers a need for formalised processes and practices guiding SMCS use in DMP. It thus points to the need to find and gain knowledge, but also to the need for guidance on the implementation and operationalisation of that knowledge.

6.2 Gaps and Future Directions

The state-of-the-art and the mapping of governance processes provide insights into barriers in policy and practice when applying and implementing SMCS in disaster risk management. We

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elucidate current institutional arrangements guiding and constraining the use and implementation of SMCS in DMP and took the first steps towards a systematic consolidated understanding of governance processes associated with disaster resilience and their relations to SMCS processes and practices. Building on this consolidated understanding, we suggest two 'analytical turns' for future research interested in the use of SMCS in DMP and to strengthen institutional resilience. Furthermore, both of these 'turns' will help close major gaps in the existing knowledge on SMCS platforms and DMP and, to certain degrees, inform the LINKS Framework.

First, our literature review shows a substantial gap in our knowledge about the interaction between people, power and technology. We thus suggest a turn towards placing people and power at the heart of questions of SMCS technologies. Instead of 'just' placing SMCS in the centre of our attention, we should focus on the power shifts that these technologies produce, the contexts in which they are supposed to be applied, as well as on the social and cultural condition that co-produce the outcomes of SMCS use in DMP. This turn will help us shed light on some of the major knowledge gaps on the effects of SMCS on DMP that reappear in current empirical studies. Examples could be (but are not limited to):

- *Political culture and systems*: For a greater understanding of SMCS use in DMP, studies of how different political systems, political cycles, political cleavages, and cultures affect authorities' use and perception of SMCS as beneficial tools for disaster risk management;
- *Intra-organisational dynamics*: The lack of studies on the extent to which SMCS can support cooperation between governmental actors are striking. (Reuter et al., 2011) conclude that cooperation between authorities is often not supported by social media platforms, however, that SMCS may support intra-organisational awareness and informal processes. The mapping of frameworks shows how collaboration platforms are set up by European institutions to support collaborations (e.g. the CECIS) and that concerns relating to information integrity, security and technology reliability are underpinning these solutions (Section 5.2 and Annex III). Nevertheless, the knowledge is scarce and future studies could explore the extent to which SMCS have a citizen-oriented scope;
- *Organisational set-ups:* For the successful use of SMCS in DMP, there is a need to focus on the difficulties in processing the data these platforms offer, the amount of organisational support in terms of IT and human resources as well as training and guidelines for its use. Along with the focus on political context, this may help us understand why most authorities take a passive approach to SMCS use in DMP and how this can be changed;
- *Distributions of rights and entitlements*: Despite the strong normative argumentation around the democratic potential of 'inclusiveness' found in SMCS use in DMP, we know little about the publics that benefit from this increased inclusion. The state-of-the-art indicates that the perception of 'publics' (or a crowd) changes through SMCS from an affected geographic locality to a different more dispersed public of interest. Research on SMCS in DMP should thus be fundamentally more concerned and critically engaged with the people

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and communities benefitting from this power shift that we observe. Taking insights from resilience theory and the vulnerability turn in disaster risk reduction approaches may be the first step to opening this black box;

- *Legal analyses and normative institutions:* It is difficult to escape that trust in information and issues of privacy are a major barrier to successful SMCS integration in DMP. Further legal analyses of how these issues are currently guided within the European Union in relation to both disaster risk management and the development of the digital internal market could potentially provide new insights for SCMS in DMP in the context of EU disaster governance. Moreover, studies of informal governance structures (cultural and normative institutional notions), their connection to trust and ethical standards would provide important insights on how to successfully use SMCS in DMP. A similar gap is identified by Pazzi et al. (2020) in D2.2.

Second, most studies have an almost exclusive focus on preparedness and response and the role of SMCS in these particular phases of the DMC. To strengthen resilience, we suggest a turn from preparedness and response to a more holistic approach including all four phases of the disaster management cycle. Understanding resilience as the capacity to respond to absorb disasters as well as the capacity to formulate alternative pathways moving forward (LINKS Glossary), the varying capacities to reduce and deal with risk are conditioned by decisions taken across all four phases of the disaster management cycle. As such, we need to turn our attention to long-term recovery and prevention of disaster risk creation to get the full picture. Closing this knowledge gap is likely to include a focus and inclusion of different actors and organisations who are involved with longer-term planning affecting overall DMP.

The consolidated understanding reveals that several empirical studies look at single technologies and their use in single events. Most of these case studies focus on the response phase but through a retrospective approach. This has implications for the conclusions made in the research literature and the nature of generalisations that one can make. Moreover, it points to the need for more comparative and interdisciplinary analysis of SMCS in DMP. The few comparative studies show the potential of such approaches and the importance of understanding SMCS within greater socio-political contexts and the difference between these. Research that wants to take the two suggested 'turns' seriously will thus have to consider larger N-studies, comparative approaches and in-depth analysis of the interaction between phases of activities related to long-term recovery and prevention. The options to provide new insights on the SMCS/governance nexus is, without doubt, many and with large potential to bring important insights for the use of SMCS in policy and practice.

Within each of the turns above, there are one or more practical implications for the LINKS Framework, which is a fundamental aspect of the LINKS project. These will be fleshed out further in the coming stages of the project. Consequently, this deliverable presented the first building block of the DMP knowledge domain of the LINKS project. Its key contribution to the project is its

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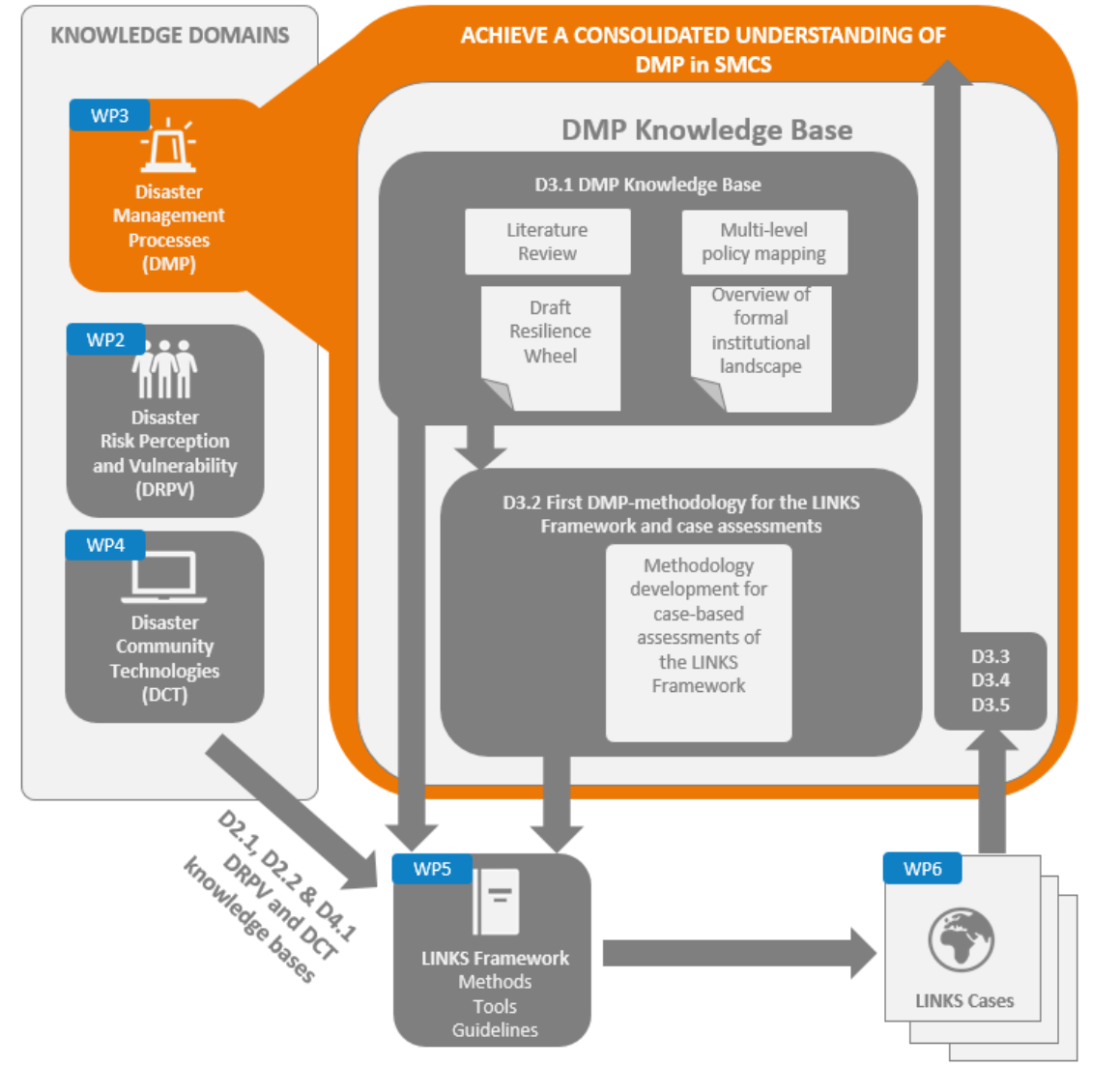
consolidated understanding of how SMCS in DMP has been studied by others and to list the potential and pitfalls for strengthening the links between technologies and society for improving European disaster resilience. Moreover, its main contribution was to map the policy landscape that currently guides the complex field of disaster governance with a particular focus on SMCS.

6.3 Next Steps in LINKS

Together with D2.1, D2.2 and D4.1, this deliverable on the DMP KB provides a foundation for supporting the evaluation and development of the LINKS Framework by pointing to the need for integration between these knowledge bases when moving forward. An overview of D3.1's position within LINKS is provided in Figure 11 below:

Figure 11: Workflow for addressing the DMP Knowledge Domain within LINKS



Source: Authors' adaptation based on D4.1

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In the upcoming deliverable within the DMP knowledge domain (3.2) a DMP focused methodology will be developed based on the consolidated understanding provided in this deliverable and with a close linkage to the development of the other three knowledge bases (D2.1, D2.2 and D4.1). The methodology will guide and support the case-based assessment of the Framework and ensure the much needed comparability between different cases and different use of SMCS in DMP. The methodology will thus address some of the identified gaps found across the knowledge bases. Moreover, the particular focus will be decided in close consultation with stakeholders across the LINKS consortium and the teams working with the specific LINKS cases. The long term aim is to achieve an extended and improved knowledge base of DMP for the development and evaluation of the LINKS Framework. Importantly, this will be done in two additional refinements of the KBs and methodologies, and through three iterations of the assessments of the Framework within the project (Figure 1 in Section 1).

For the DMP Methodology (D3.2), the identified gaps, the Resilience Wheel and the policies and guidelines will serve as concrete points of departure for developing the methodology. This is illustrated in Figure 12 below.

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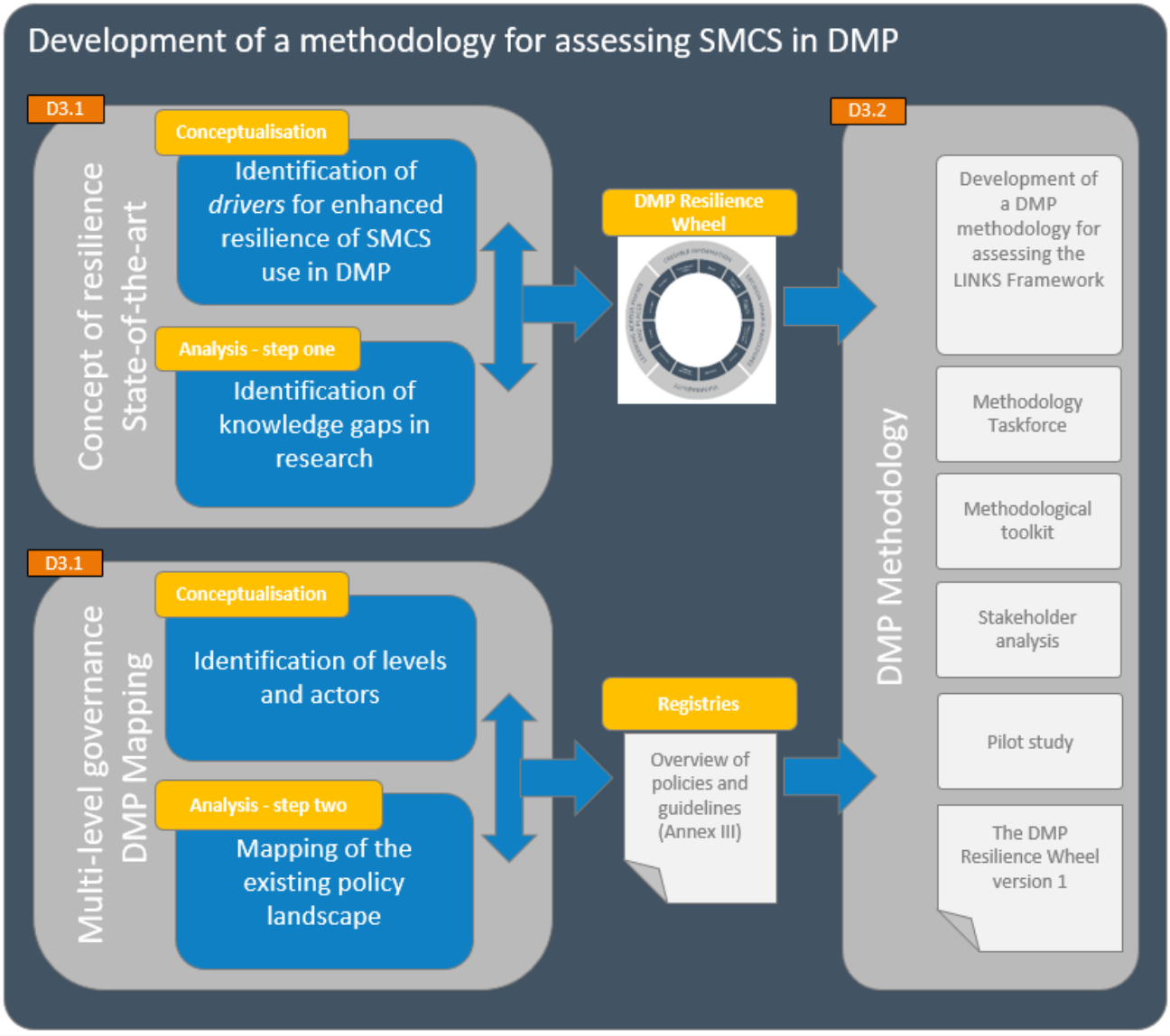
Figure 12: D3.1 and the DMP Methodology



Source: Authors' contribution

For the DMP Methodology, a designated taskforce will be established to ensure a broad consultation process across LINKS consortium partners. This taskforce will select and develop a methodological toolkit for the first round of case assessment building on a pilot study and the knowledge provided by this knowledge base.

In a practical sense, the DMP Resilience Wheel supports the methodology and identification of the case-specific potentials for improving SMCS use in DMP in the context of each case scenario. It links existing research on the topic with practice across the five case scenarios and provides a tool for further narrowing down the needs and questions to be addressed within the DMP knowledge domain. Simultaneously, we aim at developing and adapting the DMP Resilience Wheel into a supporting tool for assessing and addressing the potential and risk associated with SMCS use in

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DMP. Moreover, all the collected policies and guidelines are brought into further discussions with practitioners in the LINKS Consortium. Consequently, the results and insights from both analyses presented within this deliverable will be scrutinised in the methodology and assessment phases before they are tested, adapted or adopted and translated into the LINKS Framework.

Ultimately the knowledge gathered within this KB must be translated into the LINKS Framework through various learning materials and for different sets of stakeholders within the LINKS Community. The knowledge must also be accessible to those users through the LINKS Community Center (WP7). This requires ongoing work across all WP in the coming project phases to understand the learning needs and to enable learning potentials for different stakeholders through the refinements of the Framework and LCC. For a detailed overview of the next processes for the Framework, cases, and LCC development, please see D5.1, D6.1 and D7.1.

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7. NOTE TO ANNEXES

The following four annexes (Annex I-IV) contain a list of systematically collected knowledge on the use of SMCS in DMP. These are independent contributions to D3.1 and provide valuable overviews of the research, policies, guidelines, reports and frameworks that currently are important for assessing the use of SMCS in DMP. The annexes comprise the following registries:

1. Academic research: As of 2020, the list is a bibliography that contains all the research material collected to analyse and discuss the use of SMCS in DMP. This registry could be a useful basis for future literature reviews and conceptual discussions and it is thought of mainly as a output for academic workers.

2. Research projects: The annex provides an overview of other European projects that work(ed) on DMP and new technologies in disasters. This is important for ensuring integration between EU funded research as well as to avoid re-inventing the wheel in terms of research questions, designs, frameworks and products. This list could be a useful basis for future works and EU projects that has a similar focus.

3. Policies and guidelines: This registry comprises guidelines and policies that address SMCS use in DMP. These tables are useful instruments for assessing the current policy landscape and for policymakers and emergency managers to familiarise themselves with current regulatory frameworks and what is considered best-practice. Thus, this resource is mainly thought of as a output for policy-makers and practitioners that need an understanding of how these technology platforms could be integrated into their services and what formal institutional arrangements they need to have in mind. This registry is moreover important to the LINKS project as the WP3 team will continue to develop, adapt and transform the information provided in this literature into something more operational for the LINKS Framework.

4. Country profile survey: This last annex contains the survey that WP2-4 circulated to local partners to obtain knowledge of local policy and practice of SMCS use across LINKS case countries. This was made for internal use and is included in the annex for the sake of transparency. Besides, it may serve as inspiration for other research or analytical purposes that want to investigate the use of SMCS in DMP.

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9. ANNEXES

9.1 Annex I: List of Academic Research

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9.2 Annex II: European Projects (Horizon 2020 and Fp7)

Title	Project start	Project end	Project summary	Relevance to D.3.1	URL
EmerGent	2014	2017	EmerGent regarded the positive and negative impacts and potentials of social media in emergencies for citizens and Emergency Management Services and how social media can be used during emergencies. Guidelines and tools were developed to achieve these goals.	D.3.1 refers to the results, tools and guidelines produced in EmerGent. The results gathered in EmerGent regarding the use and potentials of SMCS in emergencies provide a useful basis for the identification of the knowledge bases in both DCT, DMP, DRPV.	http://www.fp7-emergent.eu/
SORTIA	2014	2017	SOTERIA aimed to research how social media communication may have a positive effect on disaster management	The findings of SOTERIA informed the understanding of the impact of social media on DMP	http://soteria.i112.eu/
ANYWHERE	2016	2019	Objective of ANYWHERE is to enable practitioners and citizens to enhance their awareness and pro-active capacity of response to face extreme and high-impact weather and climate events. A Pan-European multi-hazard platform will be developed	Results of ANYWHERE enable LINKS to better define and focus on the described LINKS cases and to analyse the DMP and DRPV domain.	http://anywhere-h2020.eu/
IN-PREP	2017	2020	IN-PREP creates a Mixed Reality Preparedness Platform to facilitate interoperability, a 'at-a-glance' visualisation and integrate situational awareness with real time information. IN-PREP	LINKS will build in the DCT analysis on the findings concerning the usage of new technology of the IN-PREP project. The operation standardization supports	https://www.in-prep.eu/

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			will provide training to standardise operations in transboundary situations	the DMP analysis and the methods and tools in the LINKS framework	
DRIVER+	2014	2020	DRIVER+ (Driving Innovation in Crisis Management for European Resilience) is a project funded under the 7th Framework Programme of the European Commission, whose main aim is to cope with current and future challenges due to increasingly severe consequences of natural disasters and terrorist threats, by the development and uptake of innovative solutions that are addressing the operational needs of practitioners dealing with Crisis Management	Driver+ has listed gaps in crisis management as well as developed a portfolio for disaster crisis management solutions, which are relevant for the DMP knowledge domain	https://www.driver-project.eu/
ESPREssO	2015	2018	The ESPREssO project addresses the topic DRS-10-2015: Disaster Resilience and Climate Changetopic 2: Natural Hazards: Towards risk reduction science and innovation plans at national and European level. ESPREssO aims at contributing to a new strategic vision to approach natural risk reduction and climate change adaptation,	The ESPREssO project's work on mapping out DMP across Europe informs the departure point for the DMP knowledge domain. Particularly the insights from the case countries are informing D.3.1	http://www.espressoproject.eu/

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			thereby opening new frontiers for research and policy making.		
TransCrisis	2015	2018	The overall aim of the TransCrisis project is to gain a deeper understanding of the factors that make transboundary crisis (TBC) management in the European Union (EU) effective and legitimate. It seeks to understand the challenges posed by TBCs, identify requirements for the management of TBCs, outline the role of EU institutions in fulfilling those requirements, and identify the critical factors that determine whether a joint response is effective and legitimate. We are particularly focused on the role of political leadership and how it can facilitate effective and legitimate crisis management in a multilevel system. In addition, the TransCrisis project aims to explain the effects of TBC management on the legitimacy of EU institutions, leaders and policies.	TransCrisis provides a relevant and useful background for understanding key issues in crisis management across EU and thus provides a helpful base for the DMP knowledge domain.	https://www.transcrisis.eu/
ResiStand	2016	2018	The goal of the project was to improve the disaster management capabilities of the European Union and individual Member States with means of standards.	Provided an overview of standards relevant for understanding the use of SMCS in DMP.	http://www.resistand.eu/

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SmartResilience	2016	2019	The society needs a system of resilience management going beyond conventional risk management, in order to address the complexities of large integrated systems and the uncertainty of future threats. In modern society the systems that determine resilience of the society are the critical infrastructures (energy grids, transportation, government, water, etc.) SmartResilience aims to provide an innovative "holistic" methodology for assessing resilience that is based on resilience indicators.	SmartResilience is relevant for LINKS's development of the resilience concept. The task of understanding resilience in an institutional perspective is approached within DMP.	The project | SmartResilience (eu-vri.eu)

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9.3 Annex III: Guidelines and Policies

9.3.1 Guidelines

Name	Publishing organisation / Author	Year	Target Group	Description	Source
EmerGent - Guidelines to increase the benefit of social media in emergencies	EmerGent	2017	Emergency services & public authorities	A set of guidelines for emergency services & public authorities how to communicate in social media and help to decrease the uncertainty with this new, changing and maybe unfamiliar medium.	Deliverable 7.3: http://www.fp7-emergent.eu/wp-content/uploads/2017/09/20170529_D7.3_Guidelines_to_increase_the_benefit_of_social_media_EmerGent.pdf
Operationalizing crowdsourcing through mobile applications for disaster management in India	R. Shaw; V. Sukhwani; Graduate School of Media and Governance, Keio University	2019	App developers, humanitarian agencies, academic experts	Analysis of 33 freely available disaster-related, crowdsourced-based mobile apps in India from the perspective of the users. As a result the paper includes specific suggestions for enhancing community outreach, ensuring user-friendly interface and promoting Global Positioning System 'GPS' based apps.	https://www.sciencedirect.com/science/article/pii/S2590061719300523

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Crisis Mapping and Crowdsourcing in Flood Management	Associated Programme on Flood Management (APFM)	2017	Practitioners, flood managers	Guidance material for practitioners on how to use crowdsourcing-applications for the preparation of an incoming flood, during a flood and facing the aftermath. It also includes the presentation of already established crowdsourcing apps.	https://www.floodmanagement.info/publications/guidance%20-%20selecting%20measures%20and%20designing%20strategies_e_web.pdf
Guidelines for the use of new media in crisis situations	Project COSMIC	2015	Citizens and public authorities	The guideline offers a holistic overview of the use of social media before, during and after a crisis or disaster and offers useful examples both from the point of view of ES as well as from the point of view of citizens. The focus of this guide includes the active structuring of information flows and trust building.	https://zenodo.org/record/16235
Warning and informing Scotland using social media in emergencies	Scottish Government	2012	Emergency services & public authorities	This guidance provides responders with information on the tools and techniques that are available along with advice on how these can be deployed to optimise communications and engagement activities.	https://www2.gov.scot/Resource/0041/00411704.pdf

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Social media for emergency management—a good practice guide	Wellington Region Emergency Management Office	2014	Emergency services & public authorities	The WREMO guideline provides relevant information on the development of a social media strategy and points out that the employees involved in a social media team must be appropriately trained in order to be able to react appropriately during emergency situations. In addition, it is made clear how resource-intensive the maintenance of a social media presence is and how this effort can be met technically and through good preparation.	https://wremo.nz/assets/Publications/Social-Media-for-Emergency-Management.pdf
Crisis communications and social media: A best practice guide to communicating in an emergency	International Air Transport Association (IATA)	2014	Emergency managers of airlines, airports and their manufacturers	The guideline focuses on measures and communication through social media during a situation in which a flood of images from the scene of the accident appears on social networks a short time later. It presents a holistic concept with a clear focus on practical application, so that the IATA "Lessons Learned" can offer considerable added value for the transfer into the emergency context.	http://ilxcloud.s3.amazonaws.com/peer_resources/IATA%20Crisis%20Communications%20and%20Social%20Media%20A%20Best%20Practice%20Guide%20to%20Communicating%20In%20An%20Emergency.pdf?AWSAccessKeyId=AKIAISAJ7VK6UYRCQEUQ&Expires=1602214087&Signature=

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					vktKfk0ryyBWbIRviRrCKWjuJvs%3D
Social Media in an emergency: Developing a Best Practice Guide Literature Review	Opus International Consultants Ltd.	2012	Emergency services & public authorities	This guide is based on the experience from CDEM-Groups (Civil Defence Emergency Management Groups) in New Zealand which are already using social media in crisis management. The focus of the guide is to provide practical advice for using social media before, during and after an emergency. It includes a lot of additional sources and practical checklists.	https://idisaster.files.wordpress.com/2012/07/social-media-in-an-emergency-a-best-practice-guide-2012.pdf

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Using Social Media in Emergencies: Smart Practies	Defense Science and Technology Laboratory (DSTL), UK	2012	Core responders (authorities, fire services, police, ambulance...)	This guide is a short compilation of practical tips on how to use social media using examples of the core social media tools Facebook, Twitter, Youtube and Flickr. It also describes the activities before, during and after a crisis.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85946/Using-social-media-in-emergencies-smart-tips.pdf
Social media use in emergency management	Wukich, Clayton; Cleveland State University	2015	Emergency managers	For this article, over 200 sources were analysed with regard to social media strategies used by civil authorities in crisis situations and the knowledge was summarized at a strategy level.	https://www.researchgate.net/publication/281484759_Social_media_use_in_emergency_management/link/5a0dea7ca6fdcc2b5b5deada/download
Using social media for emergency notifications—7 questions for emergency managers to consider	Twenty First Century Communications, Inc., US	2010	Emergency managers	The basic principles of social media in crisis situations are explained with 7 questions, followed by help on the use of Twitter and Facebook as an emergency organisation.	https://idisaster.files.wordpress.com/2010/06/socialmediaforemergencymanagers.pdf

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Social Media in Emergencies—UNICEF Guidelines for Communication and Public Advocacy	United Nations Children's Fund (UNICEF)	2012	Communications officers at headquarters, in regional and UNICEF country offices and in national committees	The guidelines concentrate on the use of social media to communicate with the general public and the media. They do not cover use of social media for gathering data on evolving crises, 'crisis mapping' or needs assessment.	http://www.unicefinemergencies.com/downloads/eresource/docs/3.1%20Media%20and%20Communications/socialmediainemergencies-communicationsguidelines-120518144234-phpapp02.pdf
Next Steps: Social Media for Emergency Response	Homeland Security, US	2012	All public safety disciplines	This guidance provides best practices and policy examples to better understand and utilize social media for inclusion in agency strategies.	https://www.ghinternational.com/docs/DHS_VSMWG_Next_Steps_Social_Media_Strategy_Formatted_May_2013_FINAL.pdf
Social Media Guidelines and Best Practices	Centers for Disease Control and Prevention (CDC)	2012/ 2018	Citizens and social media teams	A set of 6 documents results in a comprehensive guideline for the use of social media in emergencies. Using best practice examples (Facebook and Twitter), the difference between good and bad publications in social media is shown	https://www.cdc.gov/socialmedia/tools/guidelines/index.html

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Lessons for Crisis Communication on Social Media: A Systematic Review of What Research Tells the Practice	M. Eriksson	2018	Emergency managers and researchers	This study examined the content of 104 scientific papers based on advices made by researchers to emergency organizations how to use social media in crisis situations. As a result 5 lessons learned were identified, discussed and presented.	https://www.tandfonline.com/doi/pdf/10.1080/1553118X.2018.1510405?needAccess=true
Innovative Uses of Social Media in Emergency Management	Homeland Security, US	2013	Emergency responders	Not a guideline as such but an assessment and validation report on the innovative use of social media in emergency management. Contains a list of best-practices for implementation of SM in emergency management as well as a short literature review, list of different social media 'types' and six case studies of innovative use of social media.	https://www.dhs.gov/sites/default/files/publications/Social-Media-EM_0913-508_0.pdf
Social media and disasters	US Department of Health and Human Services	2020	Citizens and social media teams	Online information page from the US Department of Health and Human Services containing information and guidelines about the role of social media in disasters.	https://www.samhsa.gov/find-help/disaster-distress-helpline/social-media

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ITU Guidelines for national emergency telecommunication plan	International Telecommunication Union (ITU)	2020	National governments	Guidelines/report with the purpose of assisting national authorities and policymakers to develop a framework that guides countries on how to develop a strategic plan to support and enable the continued use of telecommunication and information and communication technology (ICT) networks and services in all four disaster management phases.	https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Documents/2020/NETP-guidelines.pdf
How to use social media to better engage people affected by crisis	ICRC , IFRC and OCHA	2017	Social media teams	The guide provides practical tips and advice on how to use social media effectively to engage with, and be accountable to, affected people.	https://media.ifrc.org/ifrc/document/use-social-media-better-engage-people-affected-crises/
Social media in emergencies in UNHCR's Emergency Handbook. Version 3.5.	UNHCR	2020	Emergency managers/staff and social media teams	The guidelines guide the use of social media to communicate with the general public. Primarily seems to be directed towards UN staff working in crisis situations. Contains a brief overview of key considerations, best-practices and so on.	https://emergency.unhcr.org/entry/29319/social-media-in-emergencies

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Social Media and Disasters: Current Uses, Future Options, and Policy Consideration	B. Lindsay - Congressional Research Service	2011	Members of Congress. But also relevant for emergency services & public authorities	This report summarizes how social media have been used by US emergency management officials and agencies. It also examines the potential benefits, as well as the implications, of using social media in the context of emergencies and disasters	https://fas.org/sgp/crs/homesec/R41987.pdf
Words into action guidelines: Citizens' Participation and Crowdsourcing	UNISDR	2017	National authorities/governments	Additional information on crowdsourcing to support the guidelines on national disaster risk assessment (NDRA) initiative. Aim of the guidelines is to support national implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. Brief and generic introduction to the potential of crowdsourcing.	https://www.undrr.org/publication/citizens-participation-and-crowdsourcing
Guidelines for the Regulation of Computerized Personal Data Files Resolution 45/95	UN	1990	General Assembly	Guidelines prescribe a duty to assess security measures with regard to data processing and to take the required security precautions.	https://www.refworld.org/pdfid/3ddcafaac.pdf

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Verification Handbook: An Ultimate Guideline on Digital Age Sourcing for Emergency Coverage	The European Journalism Centre	2013	Media, social media teams, emergency managers	Extremely detailed step-by-step guide on how to verify information. The Handbook prescribes best practice advice on how to verify and use this information provided by the crowd, as well as actionable advice to facilitate disaster preparedness in newsrooms.	http://verificationhandbook.com/
How to Use Social Media for Crisis Communications and Emergency Management	Paige Cooper, Hootsuite	2020	Emergency managers/staff and social media teams		https://blog.hootsuite.com/social-media-crisis-communication/
ISO 22329 - Guidelines for using social media in emergencies	ISO			ISO/TC 292 is currently working on a standard called ISO 22329 Security and resilience - Emergency management - Guidelines for the use of social media in an emergency which will provide guidance on how social media can be integrated into and improve all communications during an emergency or disaster.	https://www.iso.org/standard/50066.html

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9.3.2 Policies

Framework	Origin	Publishing organisation / Author	Year	Description
Sendai Framework for Disaster Risk Reduction	International	UN	2015	The Sendai Framework for Disaster Risk Reduction 2015-2030 outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.
Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations	International	UN and member of the International Telecommunication Union	1998	The Tampere Convention calls on States to facilitate the provision of prompt telecommunication assistance to mitigate the impact of a disaster, and covers both the installation and operation of reliable, flexible telecommunication services. Regulatory barriers that impede the use of telecommunication resources for disasters are waived. These barriers include the licensing requirements to use allocated frequencies, restrictions on the import of telecommunication equipment, as well as limitations on the movement of humanitarian teams.
International Standard on the Protection of Personal Data and Privacy	International	National data protection authorities coordinated by the Spanish protection Agency	2009	Resolution to support the International Standards on the Protection of Personal Data and Privacy adopted in Madrid on November 5, 2009, at the 31st International Conference of Data Protection and Privacy Commissioners.

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SWD(2016)	EU	Commission	2016	The 'Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030 A disaster risk-informed approach for all EU policies' maps EU policies, tools and initiatives in accordance with the four Sendai Framework priortities.
(EU) 2016/679	EU	European Parliament and the Council	2016	The General Data Protection Regulation (GDPR) is a regulation in EU law on data protection and privacy in the European Union (EU) and the European Economic Area (EEA). It also addresses the transfer of personal data outside the EU and EEA areas. The GDPR's primary aim is to give control to individuals over their personal data and to simplify the regulatory environment for international business by unifying the regulation within the EU.[1] Superseding the Data Protection Directive 95/46/EC, the regulation contains provisions and requirements related to the processing of personal data of individuals (formally called data subjects in the GDPR) who are located in the EEA, and applies to any enterprise—regardless of its location and the data subjects' citizenship or residence—that is processing the personal information of individuals inside the EEA.
Directive 95/46/EC	EU	European Parliament and the Council	1995	On the protection of individuals with regard to the processing of personal data and on the free movement of such data, is a European Union directive adopted in 1995 which regulates the processing of personal data within the European Union (EU). It is an important component of EU privacy and human rights law.

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(EU) 2019/881	EU	European Parliament and the Council	2019	The ultimate goal of the Regulation is to strengthen the Union's cybersecurity structures. The aim is to offer a comprehensive set of measures to develop Member States' capabilities for responding to cyber threats (including cross-border incidents), and to foster operational cooperation between them. The Cybersecurity Act has two focal areas: The first being to strengthen the powers of ENISA by making it a permanent agency of the EU. The second is to establish a European cybersecurity certification framework to ensure the application of a common certification for information and communications technology ("ICT") goods
Directive 2000/31/EC	EU	European Parliament and the Council	2000	Article 15 of the EU's e-commerce directive does not prevent EU member states from ordering injunctions against platforms, for example to take down offending material. The court held that these injunctions can cover a wide variety of material, as well as reposts and "equivalent" posts, not just on Facebook, and can be applied worldwide, subject to the appropriate treaties and international agreement.

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Decision No 1313/2013/EU	EU	Council	2001	The overall objective of the EU Civil Protection Mechanism is to strengthen cooperation between the EU Member States, 6 Participating States and the UK during the transition period, in the field of civil protection, with a view to improve prevention, preparedness and response to disasters. When the scale of an emergency overwhelms the response capabilities of a country, it can request assistance via the Mechanism. Through the Mechanism, the European Commission plays a key role in coordinating the response to disasters in Europe and beyond and contributes to at least 75% of the transport and/or operational costs of deployments.
Decision No 2019/420/EU	EU	Commission	2019	In 2019, the EU reinforced and strengthened components of its disaster risk management by upgrading the EU Civil Protection Mechanism. The latest element introduced - rescEU - has the objective of enhancing both the protection of citizens from disasters and the management of emerging risks. In addition, rescEU establishes a new European reserve of resources (the 'rescEU reserve') which includes a fleet of firefighting planes and helicopters, medical evacuation planes, as well as a stockpile of medical equipment and field hospitals that can respond to health emergencies, and chemical, biological, radiological, and nuclear incidents.

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Directive 2002/21/EC	EU	European Parliament and the Council	2002	Regulatory framework for electronic communications networks and services (Framework Directive) establishes the general framework for the harmonisation of e-communication networks and services regulation. It consists of general rules regarding scope, definitions, the national regulatory authorities and granting access to essential resources such as radio frequencies.
Directive 2002/20/EC	EU	European Parliament and the Council	2002	The authorisation of electronic communications networks and services (Authorisation Directive) applies to all electronic communications and network services, whether or not they are provided to the public, and also to rights of use of radio frequencies. Under Article 3, Member States are required to ensure freedom to provide e-communications networks and services subject to conditions set forth in the Directive. Article 6 states that the authorisation may be subject to conditions listed in the Annex. Part A paragraph 12 of the Annex states as one of the conditions which may be attached to a general authorisation: "Terms of use during major disaster to ensure communications between emergency services and authorities and broadcasts to the general public." It is unclear on the face of the Directive who may have access to communications facilities under these conditions. However, it is likely that the individual Member State authorities would determine the exact parameters of the conditions attached to access.

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Code of Conduct on Countering Illegal Hate Speech Online	EU	Commission and various companies	2016	To prevent and counter the spread of illegal hate speech online, in May 2016, the Commission agreed with Facebook, Microsoft, Twitter and YouTube a "Code of conduct on countering illegal hate speech online". In the course of 2018, Instagram, Snapchat and Dailymotion joined the Code of Conduct. Jeuxvideo.com joined in January 2019, and TikTok announced their participation to the Code in September 2020.
Directive (EU) 2018/1972	EU	European Parliament and the Council	2018	Directive establishes a harmonised framework for the regulation of electronic communications networks, electronic communications services, associated facilities and associated services, and certain aspects of terminal equipment. It lays down tasks of national regulatory authorities and, where applicable, of other competent authorities, and establishes a set of procedures to ensure the harmonised application of the regulatory framework throughout the Union. Repeals Directive 2002/21/EC (Framework Directive)
EU Data Protection Code of Conduct for Cloud Service Providers	EU	Commission and various companies	2020	The EU Data Protection Code of Conduct for Cloud Service Providers plays an important role. Known by its abbreviated name EU Cloud Code of Conduct, it sets out clear requirements and recommends procedures to raise the level of data protection in cloud services, based on GDPR.

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(EU) 910/2014	EU	European Parliament and the Council	2014	The eIDAS Regulation ensures that people and businesses can use their own national electronic identification schemes (eIDs) to access public services in other EU countries where eIDs are available and creates an European internal market for electronic trust services – namely electronic signatures, electronic seals, time stamp, electronic delivery service and website authentication – by ensuring that they will work across borders and have the same legal status as traditional paper based processes

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(EU) 2018/1971	EU	European Parliament and the Council	2018	The Electronic Communication Framework aims to create an internal market for electronic communications within the Union while ensuring a high level of investment, innovation and consumer protection through enhanced competition. That Directive also establishes a significant number of new tasks for the Body of European Regulators for Electronic Communications ('BEREC') such as issuing guidelines on several topics, reporting on technical matters, keeping registers, lists or databases and delivering opinions on internal market procedures for draft national measures on market regulation. BEREC and the Office were established by Regulation (EC) No 1211/2009 of the European Parliament and of the Council (3). BEREC replaced the ERG and was intended to contribute, on one hand, to the development and, on the other, to the better functioning, of the internal market for electronic communications networks and services by aiming to ensure the consistent implementation of the regulatory framework for electronic communications. BEREC acts as a forum for cooperation among NRAs and between NRAs and the Commission in the exercise of the full range of their responsibilities under the Union regulatory framework. BEREC was established to provide expertise and to act independently and transparently.

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EU Host Nation Support Guidelines	EU	EU Civil Protection Committee	2012	These EU Host Nation Support Guidelines (EU HNSG) aim at assisting the affected Participating States to receive international assistance in the most effective and efficient manner. The level of HNS may vary according to the severity of the situation and will be subject to a prior agreement between the requesting and offering Participating States. These guidelines are of a non binding nature which aim to provide guidance and support. Although they are non-binding, states participating in the EU's Civil Protection Mechanism are encouraged to apply these Guidelines in the course of operations within the EU and in cases of bilateral assistance (see https://www.ifrc.org/en/what-we-do/idrl/latest-news/disaster-law-newsletter-february-2012/host-nation-support-guidelines-approved-by-eu/)
EU Integrated Political Crisis Response arrangements	EU	The Council	2013	The EU Integrated Political Crisis Response arrangements (IPCR) reinforce the European Union's ability to take rapid decisions when facing major emergencies requiring a response at EU political level. They were approved on 25 June 2013 by the Council, thus finalising the review of the EU Emergency and Crisis Coordination Arrangements (CCA).
Code of Practice on Disinformation	EU	Commission and various companies	2018	The Code includes an annex identifying best practices that signatories will apply to implement the Code's commitments. The Commission has also published the opinion of the Sounding board of the Multi-stakeholder forum on the Code of Practice.

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The Digital Service Act	EU	European commission is leading the public hearing - but the act in itself is by the Council and Parliament	2020?	The general objective is to provide for a modern legal framework for digital services, strengthening the Digital Single Market and ensuring that digital service providers present in the Union act responsibly to mitigate risks emanating from the use of their service, respecting Union rights and values, and protecting fundamental rights. This initiative aims at establishing a balanced and effective governance online and at clarifying roles, procedures and responsibilities. The current liability framework for online intermediaries (i.e. online service providers such as social media platforms like YouTube or Facebook, but also smaller marketplaces or internet service providers) is governed by the e-commerce directive, which dates back to the year 2000. In this legal framework, internet service providers and intermediaries are not liable for illegal and/or harmful content, goods, or services which may be distributed via their channels if they fulfil certain conditions: Intermediaries are not liable if they remove illegal content or disable access to it as fast as possible once they are aware of its illegal nature or if they play a neutral, merely technical and passive role towards the hosted content.

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9.4 Annex IV: Qualitative Survey for LINKS Consortium Partners

These overarching questions were sent to the LINKS consortium partners to layout an overview of the SMCS landscape in their respective countries:

Country profile for:

Author:

Please answer the following questions by providing a qualitative description of the processes.

Questions	Answers
Briefly describe the institutional landscape of disaster risk reduction frameworks and guidelines in your country (beyond those that deal with SMSC). - What are the main global/national/subnational frameworks/guidelines governing DRR in your country? - What are the main authorities responsible for DRR and what level of government do they represent? - Do you know of specific disaster guidelines/frameworks/other documents/tools adopted, which consider vulnerable people*? - Do you know of specific disaster guidelines/frameworks/other documents/tools adopted which consider gender perspectives?	

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How are disaster frameworks/guidelines/other documents/tools generally communicated by governments/subnational governments? Are vulnerable groups considered?	
Describe the overall role of SMCS in guiding disaster management processes in your country.	
Do you know frameworks/ guidelines/ other documents/tools, which specifically aim to promote/support/facilitate the use of SMCS? Maybe do they consider the most vulnerable groups, in your country?	
Are you aware of any needs or challenges concerning the use of SMCS tools/technologies? (open question)	
Are you aware of methodologies to handle/identify/manage trustworthiness of data coming from SMCS?	
Other comments/reflections/remarks	

*The list of most vulnerable people includes vulnerable social groups like elderly people, minors, women, homeless, migrants/refugees, indigenous communities, low-income people, chronically ill people, people with disabilities, but also temporary vulnerable people like tourists, volunteers and first responders/practitioners.