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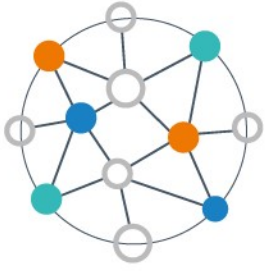
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LINKS

Strengthening links between technologies and society
for European disaster resilience

D5.5 FINAL VERSION OF THE LINKS FRAMEWORK

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

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

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

About this deliverable

This deliverable (5.5) describes the third and final version of the LINKS Framework. The Framework guides and orientates different types of stakeholders (e.g. disaster management organisations, educational institutions, non-governmental organisations) within and across two main thematic areas (**improving communication** and **engaging with citizens**) to facilitate access to the vast amount of knowledge developed in LINKS. This document outlines both the design of the third iteration of development and describes through a user-story approach how the Framework can support users in finding relevant resources on applying social media and crowdsourcing (SMCS), made available in

the LINKS products. Moreover, it provides an overview of the maturity levels of the LINKS products and explains the Framework's new user guidance approach implemented in the LINKS Community Center (LCC). D5.5 explains also the vision behind the sustainability of the LINKS Framework and how future validation and promotion through the LCC can foster sustainable advanced knowledge, namely a maintainable and evolving collection of knowledge produced for and by relevant stakeholders.

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LIST OF ACRONYMS

Acronym /Abbreviation	Description
CAT	Case Assessment Team
DCT	Disaster Community Technologies
DMO	Disaster Management Organisation(s)
DMP	Disaster Management Processes
DRM	Disaster Risk Management
DRMKC	Disaster Risk Management Knowledge Centre
DRR	Disaster Risk Reduction
DRPV	Disaster Risk Perception and Vulnerability
HRB	Horizon Booster
LCC	LINKS Community Center
SMCS	Social Media and Crowdsourcing
TRL	Technology Readiness Level
WP	Work Package

DEFINITION OF KEY TERMS¹

Term	Definition
Case	Context-based study, realised through fieldwork, to assess the LINKS Framework. A case implies an empirical inquiry that investigates a real-life hazard scenario.
Case assessments	The cross-based assessments (or case assessments) are joint efforts between WP2-4 and investigate the specific knowledge domains across different contexts while exploring interacting themes. The cross-based assessments are thus both an attempt to explore domain-specific questions through a comparative lens and an attempt to explore the interdependent questions cutting across knowledge domains.
Crowdsourcing	Describes a distributed problem-solving model where the task of solving a challenge or developing an idea get "outsourced" to a crowd. It implies tapping into "the wisdom of the crowd" (definition builds on Howe, 2006; see also LINKS Glossary).
LINKS Community Center (LCC)	The LCC brings together different stakeholders (LINKS Community) in one user-friendly and flexible web-platform and enables them to exchange knowledge and experiences and to access, discuss and assess learning materials on the usages of SMCS in disaster.
LINKS Framework	The LINKS Framework consolidates knowledge and experiences on the uses of social media and crowdsourcing in disasters, into products for relevant stakeholders. The Framework is accessible online through the LCC, and can be used by stakeholders to openly explore knowledge, or as a strategic planning tool for guiding disaster management organisations in their planning for using social media and crowdsourcing in disasters.
LINKS Knowledge Bases	The outputs and knowledge obtained from the assessment of three knowledge domains. This knowledge is used to develop the LINKS Framework.
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 Risk Management Processes (DMP) for analysis and how SMCS changes the procedures and processes within the crisis disaster management; Disaster Community Technologies (DCT), for assessing SMCS related technologies used by practitioners (and citizens) in disasters.
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 the interdependent 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 (UGC). Forms of media that allow people to communicate and

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

share information using the internet or mobile phones (definition builds on Kaplan & Haenlein, 2010; see also LINKS Glossary).

1. INTRODUCTION

The LINKS Framework consolidates knowledge on how the use of social media and crowdsourcing (SMCS) can be strengthened across different social (disaster risk perception and vulnerabilities, DRPV), institutional (disaster management processes, DMP) and technical (disaster community technologies, DCT) landscapes (see, *inter alia*: D2.1: Bonati S., 2020; D2.2: Pazzi V. et. al, 2020; D2.5: Froio C. et. al, 2023; D3.1: Nielsen, A., & Raju, E., 2020; D3.4 Nielsen, A., et. al. 2023; D4.1: Habig T. et. al, 2020; D4.4: Lüke R., & Habig, T., 2023).

During the lifetime of the project, the consolidation of this knowledge has been done in different stages:

- Identifying the inputs for the Framework from the three LINKS knowledge bases (DRPV, DMP and DCT) and structuring them into themes and sub-themes (D5.3: Fonio et. al. 2022);
- Identifying the needs in five European cases to ensure the usability of the Framework (see, *inter alia* D6.2: Fonio, C., & Clark, N. 2021);
- Identifying the core components of the Framework, namely the LINKS products (D2.7: Lueke at. al, 2022; D5.3);
- Co-designing user stories with the stakeholders involved in the case assessments teams (CATs) (D5.4 Fonio, C., & Tzavella, K., 2022);
- Defining easy access to the products through specific learning paths or user guidance (D5.4) implemented in the LINKS Community Center (LCC).

The LINKS Framework, which is now presented in its third and final version, aims to guide different types of stakeholders in their access to the vast amount of knowledge developed and collected in the LINKS project. The access to this knowledge is orientated through two main thematic areas: **improving communication** and **engaging with citizens**.

The uses of the Framework and its products have been evaluated in the case assessments (D6.4 Clark et. al, 2022; D6.5 Larruina at. al. 2023) and a stakeholder's perspective on the added value of the core components have been described through a user stories (D5.4).

The five cases in LINKS revolve around the following hazard scenario and had the purpose of assessing the usability of the Framework in different contexts:

- Earthquake in Italy;
- Industrial hazards in the Netherlands;
- Drought in Germany;
- Flooding in Denmark;
- Terrorism in Germany.

Local stakeholders at case level have been involved in co-designing user stories which shed light on how the Framework can be used within their organisations.

The stakeholders who can benefit from the knowledge available in the Framework are diverse and range from disaster management organisations to other actors (e.g. researchers) engaging with topics in disaster risk management (DRM) and disaster risk reduction (DRR). Depending on the type and the objectives of the stakeholder, the Framework offers insights into what is important to consider when applying SMCS to:

- Targeting communication, ensuring credible information, making information accessible (**Improving communication**);
- Collecting and analysing information, mobilising citizens, mobilising volunteers (**Engaging with citizens**).

The effort of structuring knowledge for different purposes and around specific themes and topics is at the heart of many European knowledge centres (e.g. Disaster Risk Management Knowledge Centre, DRMKC) and knowledge for policies initiatives². In this regard, the LINKS Framework has the ambition of contributing to these efforts by addressing social, technical and institutional aspects (D5.3) around the uses of social media and crowdsourcing (SMCS). Specifically, it speaks directly to a question that emerged, *inter alia*, during the 6th DRMKC Annual Seminar (November 2022): “**how to make scientific knowledge easily accessible for different actors?**”³.

In its current version, the Framework indeed addresses the question above by making accessible six unique and actionable products – **three libraries on Technologies, Guidelines and Use Cases; the Including Citizens Handbook, an educational platform called Feel Safe, and the Resilience Wheel** – through a **user guidance Q&A approach** (initially introduced as learning paths).

This document concerns the final version of the LINKS Framework, the third iteration of development and design, and describes what users can expect from its application through a user guidance approach that has been refined together with the product owners and the practitioners involved in the project.

It is structured as follows:

- Section 2 outlines the most significant steps that led to final version of the LINKS Framework and shows how the Framework can be beneficial to different stakeholders through three user stories:
 - a. How a representative from the Province of Terni (Italy), located in an earthquake prone area, can enhance digital education to improve the mobilisation of citizens;
 - b. How the social media team from a Fire Department from the city region of Aachen (Germany) explores ways to improve the collection and analysis of social media data to

² See: https://knowledge4policy.ec.europa.eu/home_en

³ See: <https://drmkc.jrc.ec.europa.eu/events-news/drmkc-annual-seminars/6th-drmkc-annual-seminar>

enhance the preparedness and response measures to droughts and their consequences in water supply;

- c. How the head of the department of DHPol's (the German Police University) Communication Scene who is in charge of educating police leadership on best practices on the use of SMCS, can use some of products of the LINKS Framework in the context of training.
- Section 3 focuses on the final design of the LINKS Framework and revolves around the activities carried out to refine the user guidance approach and the products. Moreover, it provides an overview of the maturity levels for each of the products and describes the new in-depth mapping and matching with the improved products that led to the final design. Practically, this entailed refining the Q&A approach described in D5.4;
 - Section 4 outlines the path towards the sustainability of the LINKS Framework.
 - Section 5 provides some conclusive remarks.

1.1 Reading Guide

This deliverable is the last of series of research reports revolving around the LINKS Framework. The previous documents (D5.3 and D5.4) provide in-depth background information on the Framework which is only partially referred to here. For a more comprehensive overview of the design and rationale behind the Framework, we would recommend readers to explore the reports mentioned above.

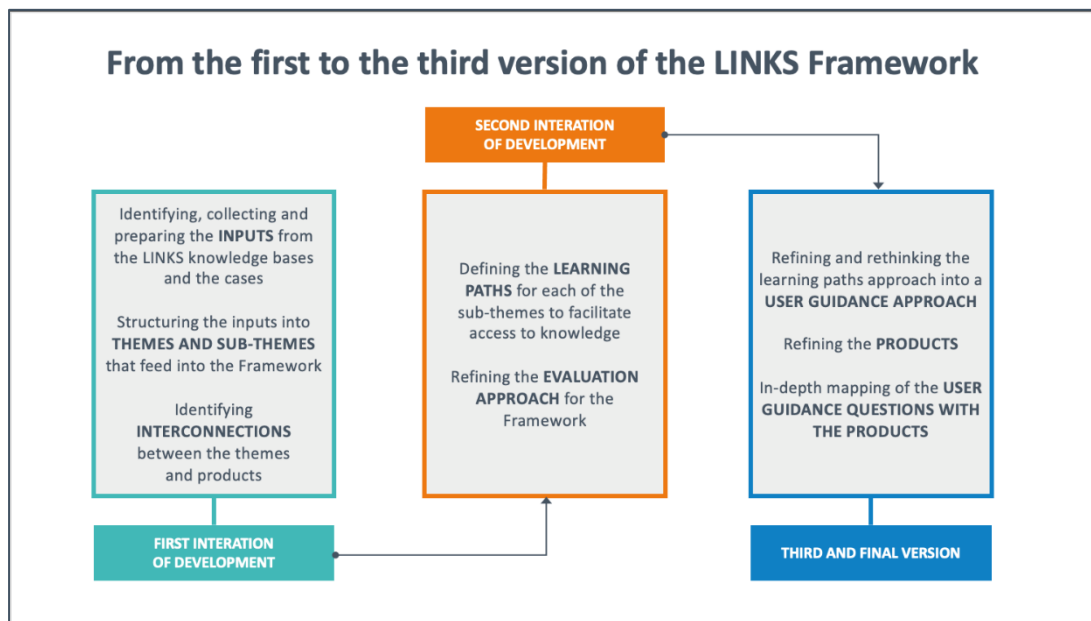
Those mainly interested in the final output, will find in this document explanations on how the third and final version of the Framework was conceived as well as three user stories that offer a practical glimpse into the uses of the output by some of the stakeholders involved in the LINKS project.

2. THE FINAL VERSION OF THE LINKS FRAMEWORK

The final version of the LINKS Framework is the result of three years of work to turn knowledge from three different domains (disaster risk perception of vulnerability, disaster management processes and disaster community technologies) into an integrated set of useful resources under two thematic areas (engaging with citizens and improving communication).

The journey that led from “theory” to “practice” has been described in D5.3 and in D5.4 and it is captured in the visual below (Fig. 1).

Figure 1: From the first to the third version of the LINKS Framework

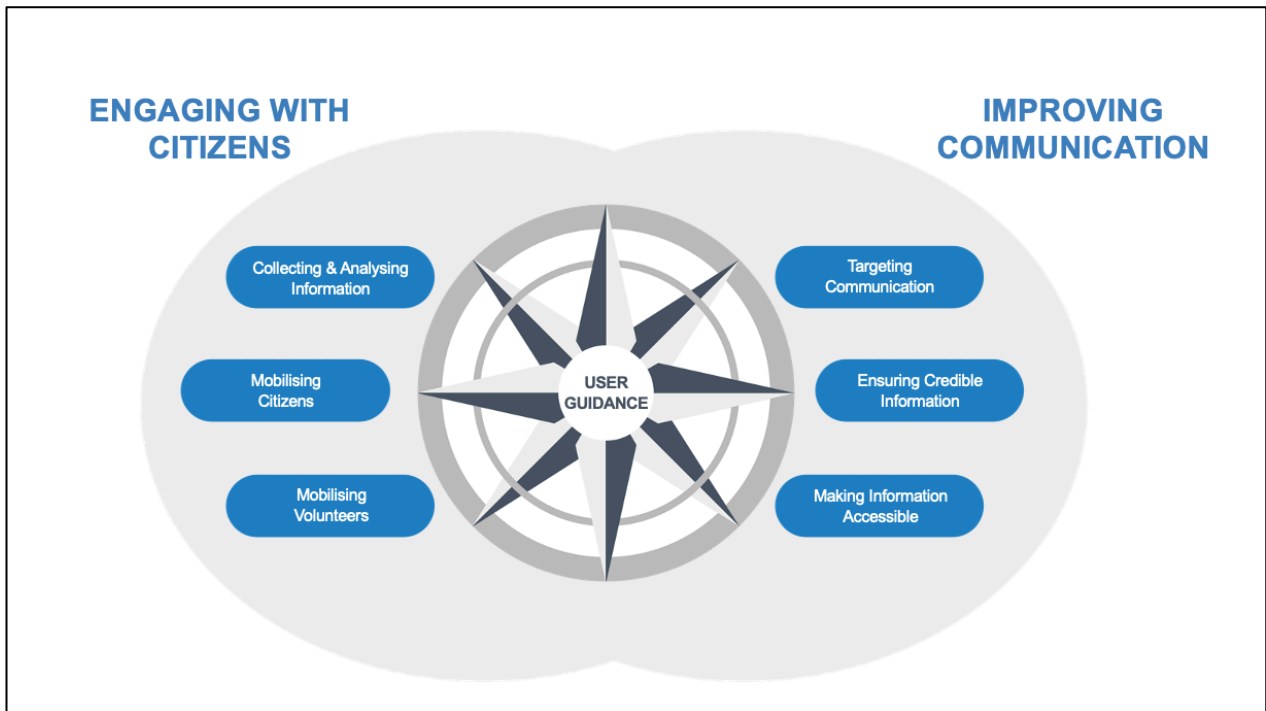


Source: WP5-WP9

The journey from the inputs of the knowledge bases to the user guidance approach implemented in the last version entailed both internal (LINKS cases, brainstorming sessions) and external (workshops, LINKS Advisory Committee meetings) rounds of assessment to ensure that the Framework is an actionable outcome and serves the main purpose of guiding relevant stakeholders to focus on what is important when using SMCS, and specifically in relation to improving communication and engagement with citizens in all phases of disasters.

This is done by orienting users under six sub-thematic areas (Fig. 2)

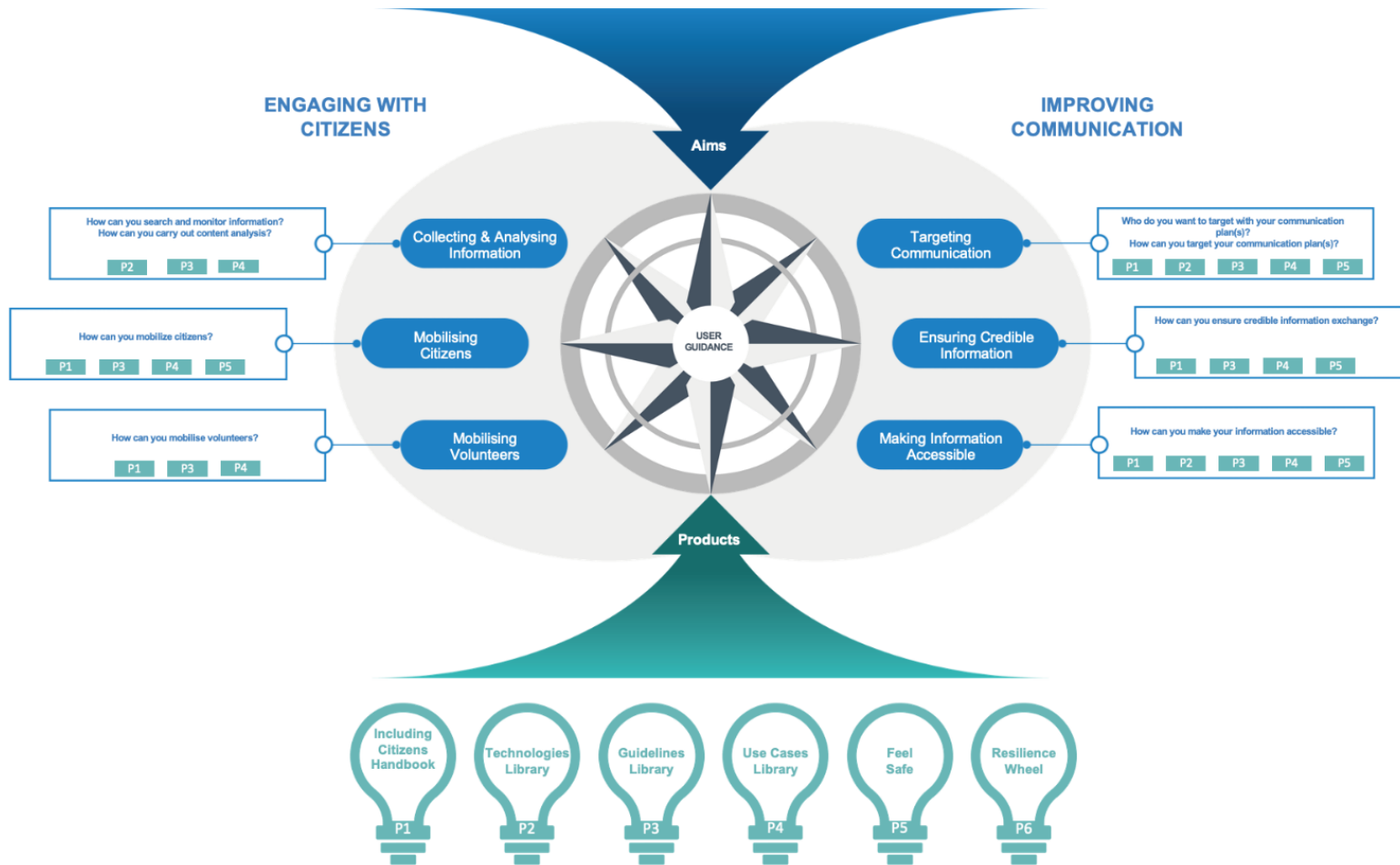
Figure 2: The LINKS Framework – main themes and sub-themes



Source: WP5-WP9

The term “orientation” evokes a compass that aims to support navigation within and across themes and sub-themes. The overall goal is to facilitate access to the LINKS knowledge which is made available in the core components of the Framework, namely the products (Fig. 3), and through the LINKS Community Center (LCC).

Figure 3: The LINKS Framework and its products



Source: WP5-WP9

The second version of the LINKS Framework, as described in D5.4, led to a comprehensive mapping of pre-defined learning paths and matching with the LINKS products. However, at the time of writing D5.4, the mapping and matching was still on-going due to the improvements of the products and of the Framework as a whole.

In the second version of the Framework, access to knowledge was facilitated through socio-technical learning paths (D5.3)⁴. In validation processes with the case assessment teams (CATs) as well as in bi-lateral meetings, the learning paths were simplified and refined. Specifically, as we outline in Section 3, to deliver the final version of the LINKS Framework, the learning paths were refined into a “**user guidance**” approach and implemented in the LINKS Community Center (LCC) in the form of simplified questions (see also Section 3.1) matched with the products.

The update of the products has been monitored regularly through different means, including the participation in the product’s task forces.

The Framework updates from version 2 to version 3 entailed:

- The user guidance approach with the redefined thematic questions;
- Refinement of the products (WP2-4);
- In-depth mapping and matching with the improved products that led to the final design.

A detailed description of the design process for the third version of the LINKS Framework is provided in Section 3 of this document.

In the following sub-sections, we show what type of guidance and knowledge users can explore and use in the LINKS Framework through three user stories (Sections 2.2.1; 2.2.2 and 2.2.3) co-designed with stakeholders involved in the projects.

2.1 Guiding users through the LINKS Framework

The following sub-sections should be considered as a follow-up of the user stories described in D5.4 and applied to two LINKS cases: the Danish Flooding case and the Dutch Industrial Hazards case (D5.4: Sections 2.1.1 and 2.1.2). **The user stories show how the LINKS Framework can guide and support users in achieving specific goals.**

The same co-design principle used in the frame of D5.4 has been adopted here, involving the following stakeholders:

- User story 1: University of Florence (UNIFI), Save the Children (SCIT) and Terni Province (PDT);
- User story 2: Safety Innovation Center (SIC) and the Federal European Fire Officers (FEU);

⁴ The learning paths are questions that connect themes and sub-themes to the products, namely the answers that LINKS provides.

- User story 3: German Police University (DhPol).

The three user stories revolve around respectively:

1. How to enhance digital education and to improve the mobilisation of citizens within a context often hit by major earthquakes;
2. How to collect and analyse information from SMCS with the aim of dealing with the disruptive impacts of droughts;
3. How to ensure credible information retrieved from social media in a fast and reliable manner in case of manmade disasters (e.g., terrorist attacks).

An overview of the maturity levels of the products mentioned in the user stories is provided in Section 3.2.

2.1.1 User story 1: Digital education and the mobilising of citizens

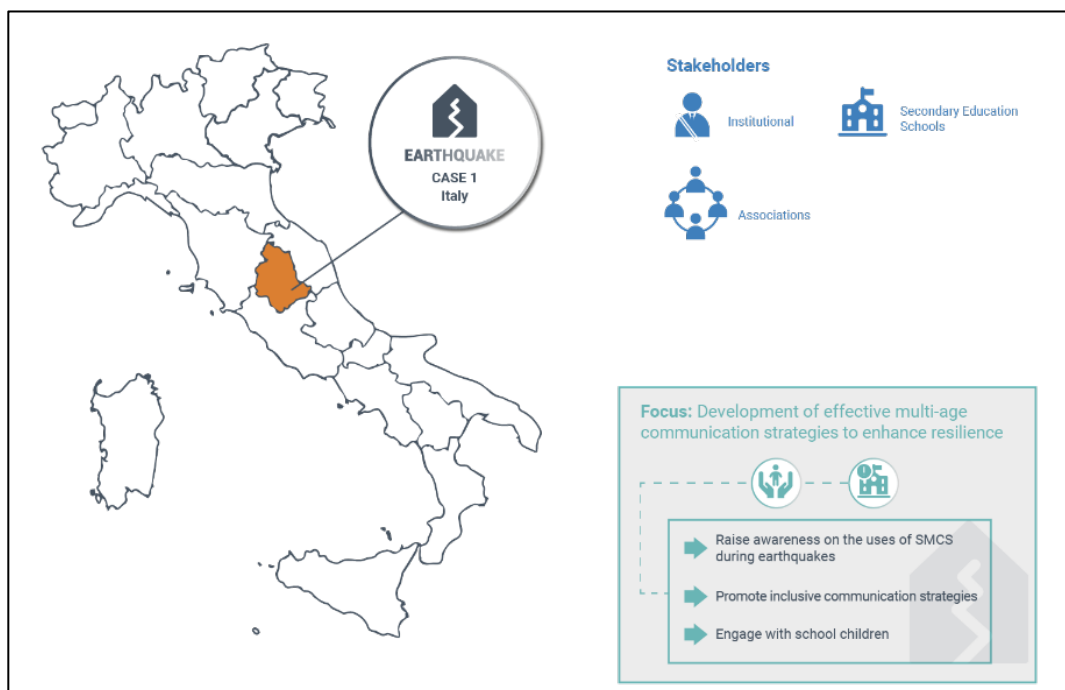


Figure 4: the Italian case

The earthquakes that occurred in the area in 2016-2017 showed that a better understanding on how to use more effectively SMCS to mobilise citizens could have been extremely beneficial. Local authorities, civil society organisations and public administrations usually lack training and overall guidance on how to communicate with the local community before, during and after a crisis. The stakeholders mentioned above need practical guidance on how to ensure accessibility to information to different target groups, especially vulnerable people (e.g. linguistic minorities,

children). In this frame, SMCS have potentials and benefits that are often disregarded. In terms of accessibility to information and mobilisation of citizens, the employment of SMCS could be useful to limit marginalisation and social exclusion; additionally digital tools could make a difference in the perception of risk by increasing the level of awareness and knowledge.

Moreover, in this context, digital education could be significantly improved both to enhance community engagement and participation in disaster prevention and to strengthen children's digital skills.

One of the most relevant stakeholders who expressed interest in innovative solutions that can, on the one hand, help guiding local authorities in using SMCS, on the other improving digital education is the Province of Terni (PDT) together with the Regional Civil Protection (Umbria Region).

PDT is, responsible, *inter alia*, for the overall planning activities in case of disasters and supports the regional governor. Additionally, PDT is involved in educational activities with the aim of sharing lessons learned and good practices in schools. The main areas of interest are:

1. Integrating preparedness in education by focussing on children's risk awareness;
2. Working directly with teachers who are the main points of contact for children when an earthquake strikes;
3. Promoting more inclusive communication strategies through a multi-age approach and with a focus on the benefits of SMCS.

These three points are part of a more general effort to mobilise citizens in more efficient ways.

The LINKS Framework and its products are of great relevance here, especially Feel Safe and the Including Citizens Handbook. This is also the reason why both some schools in the area and the Regional Civil Protection played a role in developing these products through a wide set of activities (workshops, products evaluation etc.).

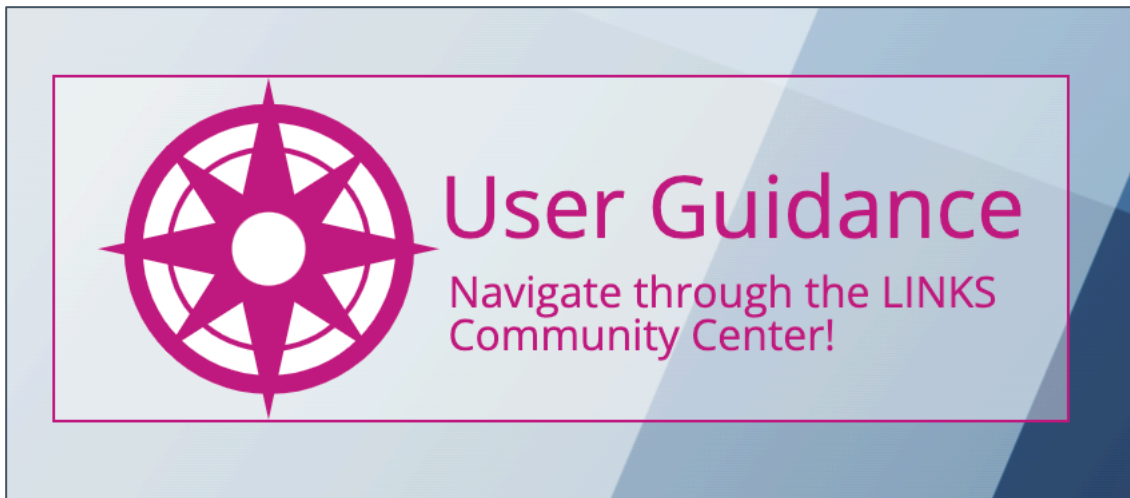
In the following pages, a step-by-step approach is used to outline how the LINKS Framework can guide and support PDT in achieving its goals.

PDT, being one of the stakeholders involved in the Italian CAT, is already familiar with the LCC and with the LINKS Framework. The PDT employee knows that he can look for guidance on:

- How to set up an educational campaign in schools revolving around key civil protection issues, such as risk awareness and communication;
- Communicating with citizens in case of emergencies (e.g. to inform and alert the local communities);

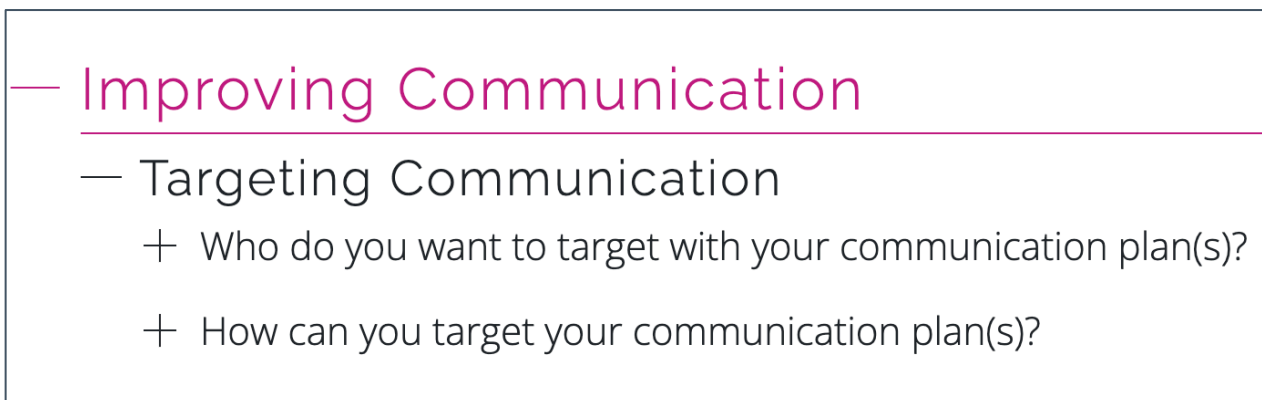
He goes to the landing page of the LCC where there is a specific user guidance (Fig. 5):

Figure 5: Entry point to the LINKS Framework in the LCC



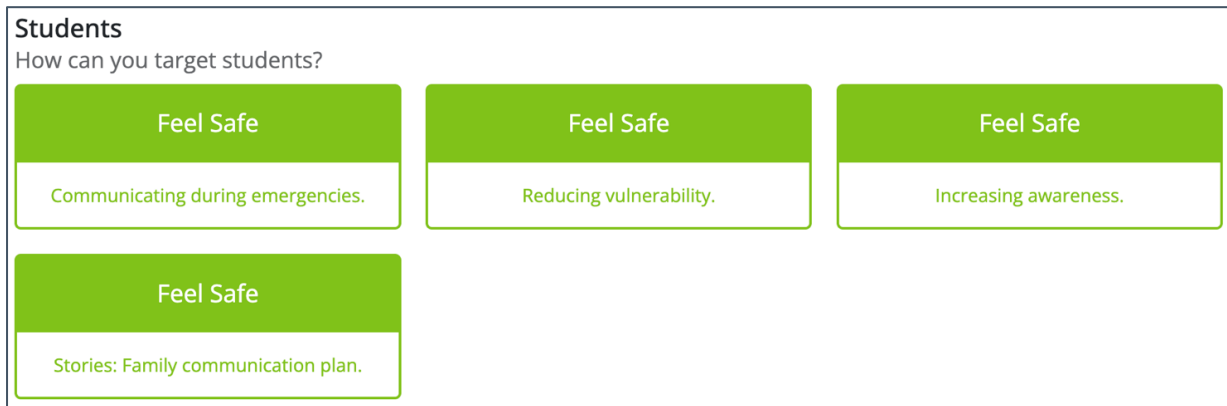
He notices the theme “Improving communication” and selects the sub-theme “Targeting communication” (Fig 6):

Figure 6: Targeting Communication



This is exactly what is he is looking for and starts exploring the resources available on this topic under the “students” section:

Figure 7: How can you target students?



The educational platform Feel Safe is of great interest to the PDT representative. He remembers when the platform was designed and presented in the frame of LINKS but did not have enough time to explore in-depth the resources available in Feel Safe.

The PDT employer gets access to four pre-selected resources captured above (Fig 7). He is mainly interested in “Increasing awareness” which seems to speak directly to one of his areas of interest (Integrating preparedness in education by focussing on children’s risk awareness). He may also find guidance on setting up an educational campaign in schools revolving around risk awareness and communication.

Overall, it seems that Feel Safe could be extremely helpful to set up an educational campaign.

He clicks on "Increasing awareness" which takes him to a small intermediate page on the LCC explaining what Feel Safe is and what it can offer. After this brief introduction, the PDT employee proceeds to Feel Safe’s own website where he finds “Experience” section under “Increasing awareness” destination⁵ (Fig. 8).

Figure 8: Increasing awareness – Experience

⁵ At the time of writing this document (June 2023), this intermediate “bridging page” contains only basic introductory information on Feel Safe. However, in the course of upcoming work on the LCC, these pages will be expanded to also include an outline of the respective product’s content, so that the user can navigate them quickly and according to their needs.



Preparedness in education could be significantly enhanced through the resources available. For instance, there are exercises on the types of risks that teachers can easily use in their classrooms (Fig. 9):

Figure 9: Example of an exercise

STEP BY STEP

STEP BY STEP

Start from the word risk, taking up the definition in the Child Friendly Glossary.

At this point, the teacher asks the class: *how many risks do you know about?*

Divided into pairs, the students have 5 minutes to write down all the risks that they know.

Once written down, the teacher writes on the blackboard **anthropic risks** and **natural risks** specifying that anthropic risks are those deriving from the action of human beings, while natural ones derive from natural factors (earthquake, floods, tsunami, etc.) and asks students to list the risks that they wrote down under each category.

Next, reflect on the second question:

What do we know about these risks?


The causes and effects. The following natural risks are then examined:

Earthquake/ Tsunami/ Flood/ Volcanoes

Referring to [this](#) website, read together the information regarding the different risks.

Moreover, specific exercises revolving around the risks in the area (Risks around us) can be really helpful both in understanding children's risk perceptions and for improving their awareness (Fig. 10):

Figure 10: Improving kids' risk awareness



INCREASING AWARENESS

MATERIA

GEOGRAPHY **SCIENCE & TECHNOLOGY**

DURATION

MORE THAN 2 HOURS

RESOURCE TYPE

ACTIVITIES

DOWNLOAD AS PDF

STEP BY STEP

Where we are and where we would like to be. The teacher proposes a small introductory game. The desks are moved to the sides of the classroom. In the centre of the space, the name of the city is written on a piece of paper and then students are asked to start from that point to reach the place where one would like to be. Each place will be told verbally students will need to stand close to or further away from their companions, depending on the place.

Once everyone is arranged, each person says one thing they like about their own city and one thing which makes them want to leave and choose another place.

After the introductory game, the real activity begins.

Inspired by Feel Safe, the PDT representative is willing to commit to a more structured disaster risk reduction education to build more resilient communities.

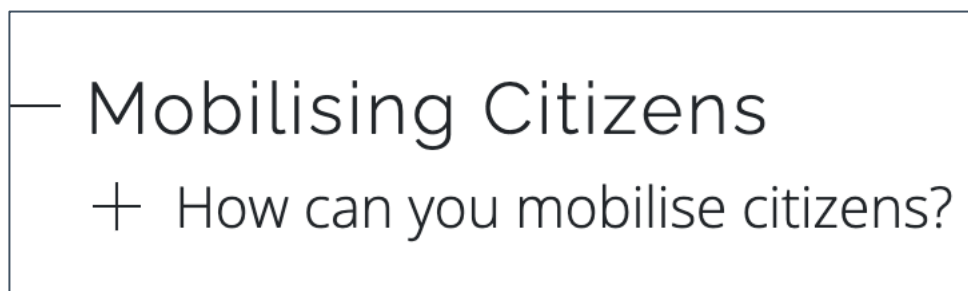
He gets back to the user guidance with the aim of looking also for more general resources that can help both PDT and the local Civil Protection to inform and alert citizens. As mentioned, the earthquakes that occurred in the area 2016-2017 clearly showed the need for better understanding on how to use more effectively SMCS to communicate with citizens. He clicks on “Engaging with citizens” (Fig 11):

Figure 11: Engaging with citizens



Citizens' mobilisation catches his attention (Fig 12):

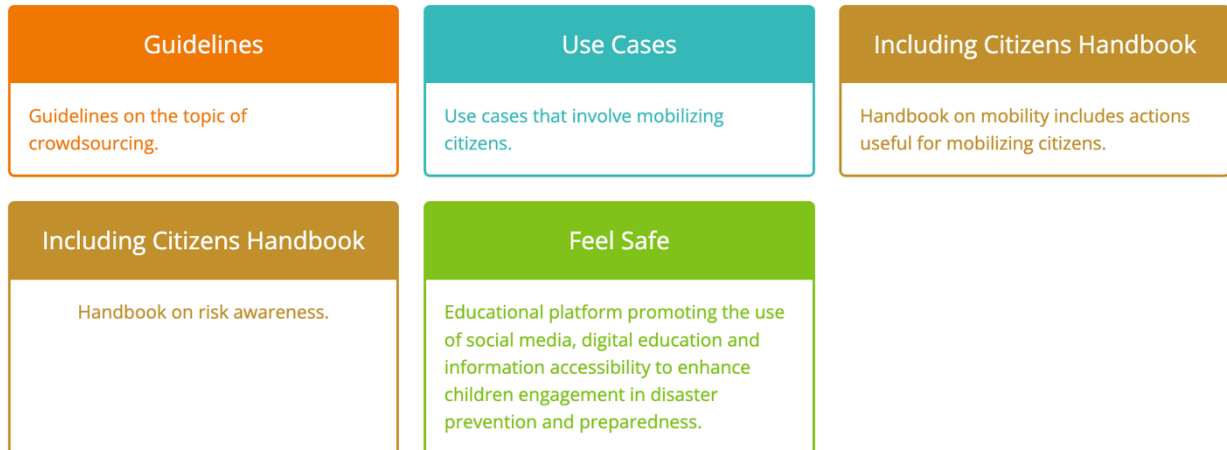
Figure 12: How can you mobilise citizens?



He is impressed by the number of resources available ranging from Guidelines to Use Cases from a Handbook and again Feel Safe (Fig. 13).

Figure 13: LINKS products for mobilising citizens

— How can you mobilise citizens?



He decides to explore the Handbook which revolves around mobility actions.


After clicking on the button, he is presented with the “bridging page” just like with Feel Safe where he can quickly familiarise himself with the idea behind the Handbook and what it offers. Afterwards, he goes to the Handbook’s own website and explores content concerning mobility (Fig. 14).

Figure 14: The Handbook on Including Citizens – Mobility

How social media and crowdsourcing could help in disaster mobility?

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

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



Physical mobility	MORE INFO HERE
Immobility	MORE INFO HERE
Cultural mobility	MORE INFO HERE
Temporal mobility	MORE INFO HERE

ACTIONS:


Preparedness activities	GO TO ACTION 1
How to mobilize after a disaster	GO TO ACTION 2
Coordinating spontaneous aids	GO TO ACTION 3

The PDT employer is looking for practical guidance and goes to the “Actions” and finds some helpful action steps (Fig. 15):

Figure 15: Actions, dos and don'ts

Action 3

Coordinating spontaneous aids from citizens who would like to help



Through social media communication, it is possible to raise awareness and provide information on how to give effective and targeted support. Sometimes people would like to help without knowing exactly how, hence they might spontaneously send items or even physically reach the stricken areas, with the risk of hampering first responders' intervention. Here you may find a to-do/avoid list to share with citizens in order to target in a more efficient way the mobilization of aids.

AVOID

- Provide unnecessary types of clothes (fancy dresses, hills, and so on)
- Broken or even slightly ruined or dirty clothes
- Make spontaneous donation without having done a proper research on what people in need may actually already have
- Physically reach the area where the disaster occurred (you would obstruct first responders in their activities)
- Search for information on unofficial sources or through random research
- Go to emergency area and directly ask instruction on how to enroll as a volunteer
- Share or disseminate second-hand and unverified information or news


TO DO

- Provide brand new clothes, better if still packed
- If you would like to send second-hand clothes, make sure they are clean and intact
- Be sure the items you would like to give are both useful and not damaged
- Ask information to first responders on the items they would actually need according to their inventories
- If you would like to donate items, ask about the specific needs of vulnerable groups (e.g., elderly people, infants, people with physical impediments)
- If you would like to become a volunteer, address to official and authorized groups
- Every time first responders/volunteers indicate the item they might need through social media, always check the day and the hour the post was published. Maybe they have already received what they needed.

During the latest earthquakes that hit the area, the mobilisation of citizens in the aftermath proven to be challenging due to the mountainous environment. Information exchange was difficult as well coordinating the spontaneous aids from citizens who lived nearby and were willing to help. The Handbook offers “dos” and “don'ts” that can be useful for first responders and citizens alike.

The PDT employer is also interested in finding guidelines on citizens' participation and crowdsourcing to better understand how to citizens can be proactively involved in the preparedness phase. He gets back to the resources available under “How can you mobilise citizens?” and clicks on the Guidelines (Fig. 16):

Figure 16: the Guidelines library



Guidelines

Social Media and Crowdsourcing Library

The guidelines library gathers and structures existing guiding documents (guidelines, legal documents, Standard Operation Procedures) that support the implementation and use of social media and crowdsourcing in disaster management organisations.

- Building a communication strategy for social media and consideration of the main elements (e.g. needed roles for the team)
- Set up and evaluate social media activities
- Recommended actions on social media before, during and after a crisis
- Tips and behavioural advice for citizens on social media in crisis situations
- Consideration of legal requirements when using social media
- Verification of information from social media;
- Use of technologies to support work with social media
- Support of vulnerable people with specific needs

Clicking on the Guidelines Library, 9 pre-selected results are available:

Figure 17: Relevant results in the Guidelines library

Selected Filters

Covers Thematic Crowdsourcing

Results: 9

Title	
Citizens' participation and crowdsourcing	
Target Audience	Policy Makers, Researchers, Civil Society, Media
Year	2017
Language	English
Audience Experience Level	Advanced
Covers Thematic	Crowdsourcing
Target Audience	Policy Makers, Researchers, Civil Society, Media
Disaster Management Phase	Before
Mentions Technologies	—
Mentions Platforms	👤

The PDT representative decides to spend some time exploring the documents, focusing on those dealing with innovative uses of social media in emergency management.

The PDT representative was looking for guidance on:

- How to set up an educational campaign in schools revolving around key civil protection issues, such as risk awareness and communication;
- Communicating with citizens in case of emergencies (e.g. to inform and alert the local communities through SMCS);

Using the guidance in the LCC, he discovered that there are resources with a specific focus on students and teachers that be helpful to set up an educational campaign, e.g:

- **Exercises** that teachers can use in classes on how to understanding children's risk perceptions and for improving their awareness

If he can deal now with communicating properly with kids and better understanding their risk perceptions, more general resources on communicating with citizens would be extremely helpful. He discovered the Handbook on Including Citizens which revolves around:

- How he can better use **SMCS to mobilise local communities** (dos and don'ts)

Overall, the user guidance directed the employer towards relevant resources which can be used in combination with already existing lessons learned and good practices at local level. The pre-selected filter in the Guidelines library was also key to find additional information on innovative uses of social media in emergency management.

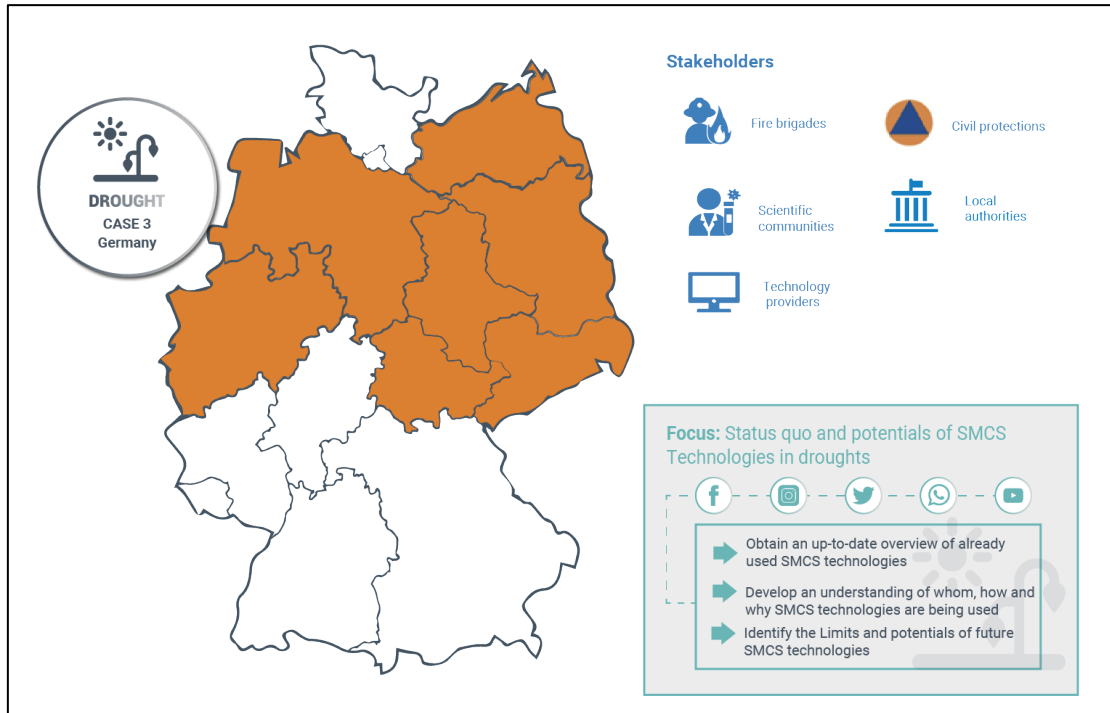
The next steps for him will be to reach out to:

- Local and regional schools in order to work on preparedness;
- Other relevant stakeholders (e.g. the Civil Protection) to double check if and how the actions mentioned in the Handbook and the guidelines on crowdsourcing can be adopted and/or adapted to the context.

The LINKS Framework met his needs and he is planning on organising meetings with his colleagues to explain the benefits and the potential for learning around more strategic and comprehensive uses of SMCS.

2.1.2 User story 2: Collecting and analysing information

Figure 18: The German Case (Drought)



Overall, droughts in Germany were severe. According to the European State of the Climate Summary 2022, the years 2018 to 2022 were marked by extreme in heat and temperatures. The associated heat waves and water shortages had a serious impact on the entire environment: forests, agriculture and plants struggled immensely, farmers suffered large crop losses, and wildfires became both more frequent and more severe. In June 2023, experts already talked about drought and the risk of water shortages in Germany which call for an active water-management plan (FOCUS Online 2023).

Across Europe a severe drought is developing since late spring 2023 which is already causing worse conditions for water supply, energy resources, and farming than the extreme drought in 2022 (EU Science Hub 2023). In this context, the most relevant stakeholders dealing with droughts are local authorities and fire brigades. Following the research described in D6.5 on the current state and capabilities of SMCS technologies in drought crises, the fire department can benefit from SMCS by improving collaboration and communication between responders and local communities to better manage drought impacts.

A medium-scale fire department in the city region of Aachen operates in the city Aachen and the neighboring areas of Belgium and the Netherlands. The social media team of the respective fire department working in the emergency response unit is interested in exploring ways to improve the

collection and analysis of social media data to enhance the preparedness measures as well as reaction to droughts and fostered wildfires.

The moor Hohes Venn located in the borderland of Aachen and Belgium was on fire for three days during spring 2023 (WDR 2023). The fire was most likely caused by hikers who grilled despite the obvious dryness of the moor. At this time of year, the fresh moor grass has not yet sprouted, and the old, dry grass is highly inflammable which led to the quick spread of the fire and constituted difficulties in extinguishing it. Fortunately, the ground underneath the moor grass was still wet which prevented the fire of turning into an ecological crisis for the nature reserve. As the weather in Europe is highly prone to drought, this is probably not the case for the hot summer, which increases the damage caused by wildfires. The team is examining possibilities from social media to foresee fire outbreaks, inform hikers more efficiently and battle acute wildfire outbreaks more quickly and effectively. Connecting to the issue of the increasing numbers of wildfire, the team is also interested in discovering new ways to combat the impacts of the drought around Aachen.

Specifically, they are interested in:

1. **Monitoring** social media data continuously (Facebook, Twitter, etc.) to identify trends concerning droughts and fostered wildfires in Aachen and surrounding areas;
2. **Analysing** the set of data collected and
3. Understanding how to **enhance the communication** between the **citizens** and the fire department to achieve a real-time information exchange concerning the drought on both sides.

Enriching the current communication plan and reforming the social media data analysis would benefit the fire department and other local practitioners in the area. The LINKS Community Center (LCC) offers support in the social media data analysis department of the fire brigade and the surrounding stakeholders with use cases on related issues that propose various solutions. The LCC suggests beneficial technologies and guidelines to assist stakeholders in dealing with specific identification of trends in various disasters.

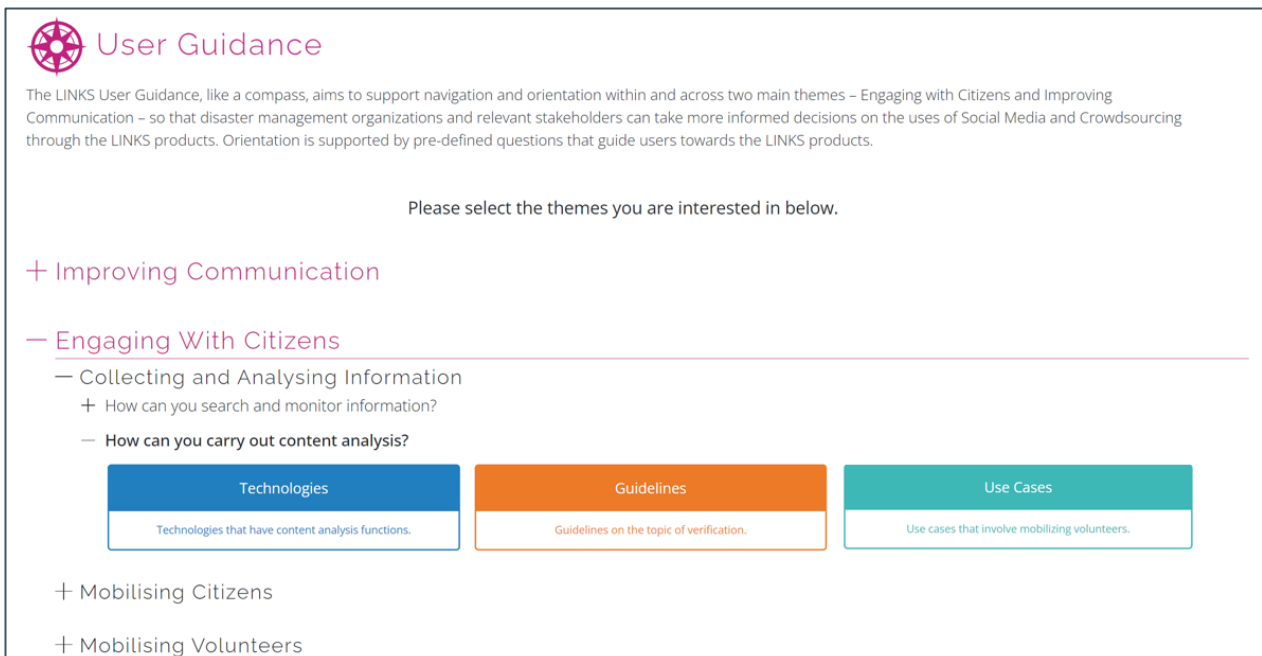
To navigate through the LCC the social media team clicks on the “User Guidance” provided on the Homepage (Fig. 19).

Figure 19: The LCC Homepage



By opening the User Guidance, the team chooses the theme “Engaging with citizens” which opens the connected subthemes to receive potentially suiting results. As the team aims at analysing a set of social media data to receive sooner warnings of disasters and accelerate disaster responses to droughts and related issues like wildfires, they decide on the filter option “Collecting and analysing information” which offers two further options to narrow down the team’s interest. By clicking on “How can you carry out content analysis?”, the three libraries are suggested as results appear (Figure 20).

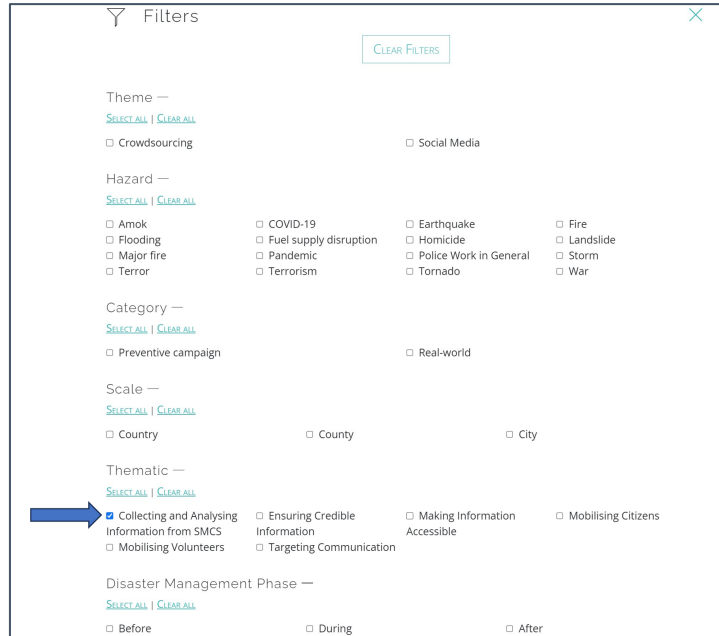
Figure 20: User Guidance



As the team is interested in exemplary cases, they choose the “SMCS Use Cases Library”. Due to the already identified needs of the team, the filter for “Collecting and analysing information” is pre-selected (Figure 21). The filters allow to customise the results according to various aspects in order

to provide users with relevant information. As a filter was pre-selected due to the use of the User Guidance, the subthemes of the filtering options and subthemes are already expanded.

Figure 21: Pre-selected Filter Options



The social media team is looking for use cases that apply to droughts and useful processing of social media data to react to acute wildfires and other pressing issues resulting from droughts, e.g. water shortages. As there appear many use cases on the page, the team needs to narrow down the results to receive use cases that resemble the aim to analyse social media data for accelerating disaster responses. To get the proper information, the team applies four more filter options (Figure 22).

Figure 21: Applied Filters

Filters
✕

Theme —

[SELECT ALL](#) | [CLEAR ALL](#)

Crowdsourcing Social Media

Hazard —

[SELECT ALL](#) | [CLEAR ALL](#)

<input type="checkbox"/> Amok	<input type="checkbox"/> COVID-19	<input type="checkbox"/> Earthquake	<input type="checkbox"/> Fire
<input type="checkbox"/> Flooding	<input type="checkbox"/> Fuel supply disruption	<input type="checkbox"/> Homicide	<input type="checkbox"/> Landslide
<input type="checkbox"/> Major fire	<input type="checkbox"/> Pandemic	<input type="checkbox"/> Police Work in General	<input type="checkbox"/> Storm
<input type="checkbox"/> Terror	<input type="checkbox"/> Terrorism	<input type="checkbox"/> Tornado	<input type="checkbox"/> War

Category —

[SELECT ALL](#) | [CLEAR ALL](#)

Preventive campaign Real-world

Scale —

[SELECT ALL](#) | [CLEAR ALL](#)

Country County City

Thematic —

[SELECT ALL](#) | [CLEAR ALL](#)

<input checked="" type="checkbox"/> Collecting and Analysing Information from SMCS	<input type="checkbox"/> Ensuring Credible Information	<input type="checkbox"/> Making Information Accessible	<input type="checkbox"/> Mobilising Citizens
<input type="checkbox"/> Mobilising Volunteers	<input type="checkbox"/> Targeting Communication		

Disaster Management Phase —

[SELECT ALL](#) | [CLEAR ALL](#)

Before During After

There are three results in the Use Cases Library that can be of relevance for them (Figure 23).

Figure 23: Results

Use Cases

Social Media and Crowdsourcing Library

The overall goal of the Social Media and Crowdsourcing (SMCS) Use Cases Library is to collect experiences and use cases of how SMCS have been used or can be used in real world. This enables the opportunity to give disaster management organisations a concrete indication of how they can use SMCS in practice.

Selected Filters

- Theme: **Social Media**
- Category: **Real-world**
- Scale: **City**
- Thematics: **Collecting and Analysing Information from SMCS**
- Phases: **none**

[OPEN FILTERS](#)

Results: 3 [ADD NEW USE CASE](#)

Title	Year	Theme	Hazard	Category	Scale
<p>Attack at the OEZ in Munich 2016</p> <p><small>Thematic: Collecting and Analysing Information from SMCS Mobilising Volunteers Making Information Accessible Ensuring Credible Information</small></p> <p><small>Disaster Management Phase: After, During</small></p>	2016	Crowdsourcing, Social Media	Terror, Amok	Real-world	City
<p>Attack in Vienna 2020</p> <p><small>Thematic: Collecting and Analysing Information from SMCS Mobilising Citizens Making Information Accessible Targeting Communication Ensuring Credible Information</small></p> <p><small>Disaster Management Phase: After, During</small></p>	2020	Crowdsourcing, Social Media	Terror, Amok	Real-world	City
<p>Tornado in Paderborn</p> <p><small>Thematic: Collecting and Analysing Information from SMCS</small></p> <p><small>Disaster Management Phase: After, During</small></p>	2022	Social Media	Storm, Tornado	Real-world	City

The social media team chooses the use case “Tornado in Paderborn” to look for significant information as this disaster event shows related challenges: gathering crucial information and establishing a real-time disaster communication to help people in acute danger during an extreme weather event. By clicking on the use case, detailed information in different categories appears (Figure 23). All the information provided in the use case is of great benefit for the entire fire department since the Tornado in Paderborn is a relevant example for the possibilities of applying social media data analysis in disaster management and preparedness.

As they explore the use case, the team discovers an interesting SMCS technology as well as a useful guideline (Figure 24).

Figure 24: Use Case Tornado in Paderborn – Technology and Guideline

What was the overall goal of the Use Case?
Gather and filter an overwhelming amount of information when a disaster or crisis-related emergency occurs.

➔ Which social media and crowdsourcing technologies were used?

- **Ubermetrics**
- **INSPIRE**

➔ Which guidelines were used?

- **EmerGent - Guidelines to increase the benefit of social media in emergencies**

Which social media platforms were used?

- **Instagram**
- **Twitter**

Which hashtags or keywords were used?
#tornado, #storm, #heavy rain, #destruction

By clicking on the technology “Ubermetrics”, valuable information about the technology opens on a new profile page. This information is of great interest to them as they can explore the possibilities of the technology and identify required functions to manage and analyse social media data within a drought (Figure 25).

Figure 25: Ubermetrics

Ubermetrics Website ↗

Ubermetrics's monitoring technology integrates information analysis across sources and media channels to identify emerging risks, potentials, and trends to help companies optimize their business responses. The amount of new information created daily is truly immense. Every minute, hundreds of thousands of documents, tweets, blogs, and news are published – public information that is often ignored by companies as they are simply overwhelmed by this flood of input and thusly fail to systematically evaluate these amounts of equally valuable information from external sources. As a result, they fail to react to powerful information about their customers, their products, their competition, and suppliers.

Note: This description is based on content provided by the technology's website.

Functions

<p>Search & Monitor</p> <ul style="list-style-type: none"> ✓ Advanced search features ? ✓ Event monitoring ? ✓ Event notification ? ✓ Hashtag monitoring ? ✓ Hashtag search ? ✓ Keyword monitoring ? ✓ Keyword search ? 	<p>Post & Schedule</p> <ul style="list-style-type: none"> X Content library ? X Post time optimization ? X Posting content ? X Scheduling content ? 	<p>Analysis</p> <ul style="list-style-type: none"> X Image analysis ? ✓ Sentiment analysis ? ✓ Text analysis ? ✓ Topic analysis ? X Trend analysis ? X Video analysis ?
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Provider
Ubermetrics Technologies
 Germany

Pricing
Paid

User Interface Languages
English, French, German, Spanish, Russian

Supported Platforms

Crisis Communication Matrix
Citizens to Authorities

Disaster Management Phase
During

Clicking on the guideline used for that use case opens a new page with beneficial information on how to use social media in emergencies in an efficient way (Figure 26). Furthermore, the guideline

provides suggestions on how to enhance the communication between citizens and public authorities, including the fire brigade, using a social media strategy:

Figure 26: EmerGent – Guidelines to increase the Benefit of Social Media in Emergencies



EmerGent - Guidelines to increase the benefit of social media in emergencies Source ↗

Quick Facts
Publishing Organisation: EmerGent FP7 Project Year: 2017 Languages: English Status: Published

Synopsis
Guidelines for emergency services & public authorities

Prepare to start using social media

- Consider the legal implications
- Consider the needs in human and financial resources
- Prepare a social media strategy
- Clearly communicate the social media strategy and provide staff training
- Explore what Information Communication Technology (ICT) tools are available for social media monitoring and analysis
- Use of apps for direct communication (Authorities-to-Citizens and Citizens-to-Authorities)
- Plan the next steps to start using social media

Before an emergency

- Provide information about your organization, its operations and emergency prevention and preparation
- Raise awareness on the use of social media
- Use of ICT tools for social media monitoring and analysis
- Team up with other groups and organizations
- Publish alerts for the risk of an upcoming emergency

Covers Thematic

- Content creation
- Legal/Standards
- Social Media Strategy

Target audience

- Civil Society
- Practitioners
- Researchers

Audience experience level

- Starter
- Intermediate

Disaster Management Phase

- Before
- During
- After

Mentions platforms

Facebook Twitter YouTube

The social media team considers the development of a social media strategy as helpful to deal with the dangers of the drought. While reading the guidelines, the team comes across important aspects that they decide to include in their social media strategy (Figure 27):

- Promoting the already existing Facebook account of the fire department;
- Implementation of other social media accounts and regular maintenance of the Facebook account;
- Providing a guideline for citizens for posts concerning the drought on the fire department's social media accounts: e.g. posts should include a location and
- Establishing a hashtag for citizens to post concerning the drought in Aachen and surrounding areas to collect relevant data more efficiently.

Figure 27: Excerpt of the EmerGent Guidelines for Citizens

Before an emergency

- Be prepared:
- ➔ Know the social media accounts of your local and national ES and follow them. This will help find real-time information during an emergency.
- Read what to expect from Emergency Services in social media.
- Follow the information from Emergency Services on how to prevent and stay safe during emergencies

During an emergency

- ➔ Stay up-to-date and follow official accounts and local organizations to get information updates
- Social media does not replace 112. If in danger, always call 112 first.
- Be responsible and avoid spreading rumors!

When you post information about an emergency in social media:

- ➔ Always mention the Emergency Services account or include any already used hashtags. When possible, report a location and use photos
- Tell only facts and don't send information you are not certain about
- Share only official and reliable information and avoid spreading rumors!
- If you spot or shared false information, please correct it
- Forward received official messages to your contacts or share them

Reviewing the functions of Ubermetrics, the team can directly monitor specific hashtags that are part of their social media strategy (Figure 28).

Figure 28: Ubermetrics – Hashtag Monitoring

Ubermetrics

Ubermetrics's monitoring technology integrates information analysis across sources and media channels to identify emerging risks, potentials, and trends to help companies optimize their business responses. The amount of new information created daily is truly immense. Every minute, hundreds of thousands of documents, tweets, blogs, and news are published – public information that is often ignored by companies as they are simply overwhelmed by this flood of input and thusly fail to systematically evaluate these amounts of equally valuable information from external sources. As a result, they fail to react to powerful information about their customers, their products, their competition, and suppliers.

Note: This description is based on content provided by the technology's website.

Functions

<p>Search & Monitor</p> <ul style="list-style-type: none"> ✓ Advanced search features ✓ Event monitoring ➔ Hashtag monitoring ➔ Hashtag search ✓ Keyword monitoring ✓ Keyword search 	<p>Post & Schedule</p> <ul style="list-style-type: none"> X Content library X Post time optimization X Posting content X Scheduling content 	<p>Analysis</p> <ul style="list-style-type: none"> X Image analysis ✓ Sentiment analysis ✓ Text analysis ✓ Topic analysis ✓ Trend analysis X Video analysis 	<p>Metrics</p> <ul style="list-style-type: none"> ✓ Audience metrics X Competitor metrics ✓ Follower metrics ✓ Network metrics ✓ Post metrics ✓ Profile or Site metrics 	<p>Report</p> <ul style="list-style-type: none"> ✓ Clustering/Aggregation ✓ Customizable reports ✓ Filtering, sorting & searching ✓ PDF export ✓ Predefined reports ✓ Visualization options 	<p>Collaboration</p> <ul style="list-style-type: none"> X Approval workflows X Inbox workflow ✓ Multiuser ✓ Permission management 	<p>Interoperability</p> <ul style="list-style-type: none"> ✓ API support ✓ Data export X Third party tool integration 	<p>Meta</p> <ul style="list-style-type: none"> ✓ GDPR compliant ✓ Historical data access X Multiple accounts per platform ✓ White Label
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To ensure that the use of hashtags is viable during a disaster event, the team looks for use cases that apply a similar social media strategy by adjusting the appropriate filter under the field of “Thematic”: “Making information accessible” (Figure 29). Other filters stay the same as above.

Figure 29: Applied Filters on the Use Cases Library - Making Information accessible

Selected Filters

Theme: Social Media
Category: Real-world
Scale: City
Thematics: Making Information Accessible
Phases: none

Results: 4

Title	Year
Attack at the OEZ in Munich 2016	2016
<p>Collecting and Analysing Information from SMCS Thematic: Mobilising Volunteers Making Information Accessible Ensuring Credible Information</p> <p>Disaster Management Phase: After, During</p>	
Attack in Vienna 2020	2020
<p>Collecting and Analysing Information from SMCS Thematic: Mobilising Citizens Making Information Accessible Targeting Communication Ensuring Credible Information</p> <p>Disaster Management Phase: After, During</p>	
Crowd-Engagement during the Stockholm Vehi-cle-Ramming	2017
<p>Mobilising Citizens Thematic: Mobilising Volunteers Making Information Accessible</p> <p>Disaster Management Phase: After, During</p>	
The 2016 Rampage in Nice	2016
<p>Mobilising Volunteers Thematic: Making Information Accessible Ensuring Credible Information</p> <p>Disaster Management Phase: After, During</p>	

Filters ✕

[CLEAR FILTERS](#)

Theme —
[SELECT ALL](#) | [CLEAR ALL](#)

Crowdsourcing Social Media

Hazard —
[SELECT ALL](#) | [CLEAR ALL](#)

Amok COVID-19 Earthquake Fire
 Flooding Fuel supply disruption Homicide Landslide
 Major fire Pandemic Police Work in General Storm
 Terror Terrorism Tornado War

Category —
[SELECT ALL](#) | [CLEAR ALL](#)

Preventive campaign Real-world

Scale —
[SELECT ALL](#) | [CLEAR ALL](#)

Country County City

Thematic —
[SELECT ALL](#) | [CLEAR ALL](#)

Collecting and Analysing Information from SMCS Ensuring Credible Information Making Information Accessible Mobilising Citizens
 Mobilising Volunteers Targeting Communication

Disaster Management Phase —
[SELECT ALL](#) | [CLEAR ALL](#)

Before During After

To investigate crowd-engagement in context with disasters, they choose the third use case resulting from their search: “Crowd-Engagement during the Stockholm Vehicle-Ramming”. The use case displays a successful application of a hashtag that was created by the crowd and supported the disaster response from the crowd (Figure 30). To amplify the positive effects of a hashtag for a drought, the team considers promoting the hashtag on the Fire Department’s official account to support responsible and reputable use of the hashtag.

Figure 30: Use Case Crowd-Engagement during the Stockholm Vehicle-Ramming

Crowd-Engagement during the Stockholm Vehi-cle-Ramming

Tweets containing the #openstockholm hashtag facilitated the creation of a massive support network by spontaneous volunteers, yet the authorities did not engage much with this network.

Hazard: Terror, Amok — Year: 2017 — Location: Stockholm, Sweden — Scale: City

The social media team had three initial objectives:

- **Monitoring** of social media data and identification of trends to receive early warnings of risks associated with drought;
- **Analysis** of the collected data and
- **Enhancement of the communication** between citizens and the local fire department.

Applying the filter options on the Use Cases Library, the team discovered relevant use cases to consult for proposed solutions. They focused on the Paderborn tornado use case to investigate

further potential of social media data analysis in disaster response and preparedness. Additionally, the Stockholm Use Case inspired the use of hashtags during disasters which plays a major role in early hazard detection. The added value for this stakeholder is in the resources provided that directly address their needs:

- A detailed description of the hazard and its consequences that help put the use case into context and allow further application on other scenarios;
- A link to the technology used that enabled beneficial social media data analysis;
- A link to guidelines for usage of social media data analysis and communication that is of great interest for the fire department since the guidelines inspired the development of a social media strategy and the use of hashtags.

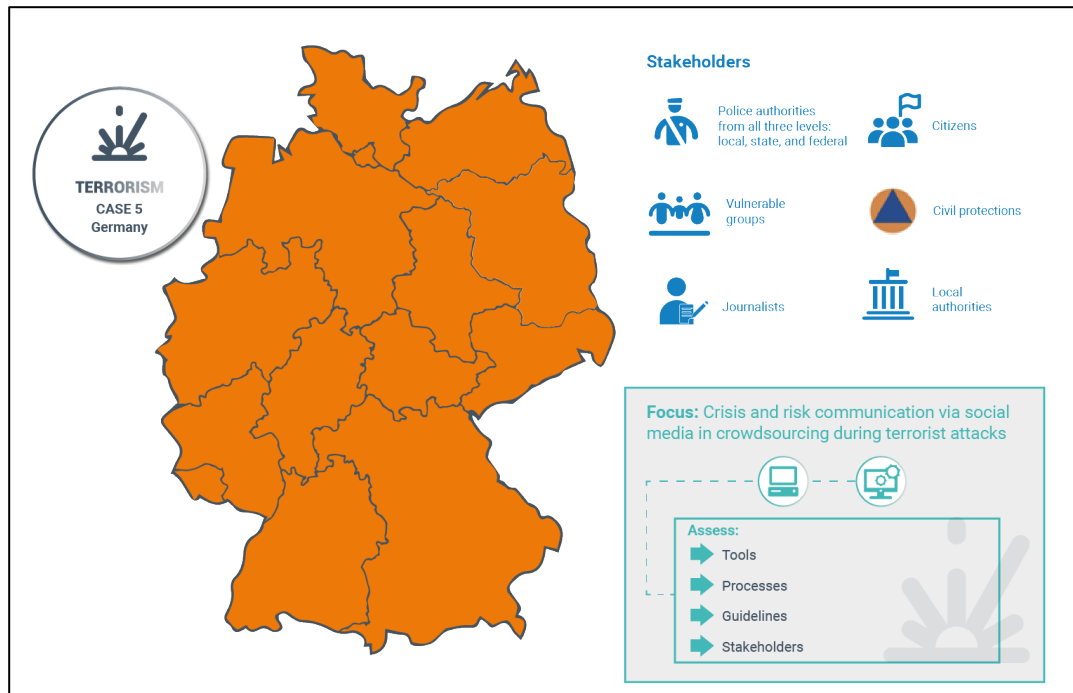
The following steps for them and the involved local authorities in Aachen entail:

- Presenting technology and the guidelines to the fire department and deciding on the use of it in the context of drought;
- Adjusting already existing social media data analysis according to the guidelines;
- Development of a social media strategy;
- Introducing the use of hashtags for specific disaster situations;
- Implementing social media data analysis technology in the communication department of the fire brigade;
- Carrying out a workshop to make employees accustomed to social media analysis technology;
- Creating a use case for the drought around Aachen to provide information of great interest to other stakeholders.

Some time later, after successfully battling the drought and fostered wildfires around Aachen and its associated consequences for water supply, the social media team decides to add a use case to the LCC to provide beneficial information for other stakeholders. One member of the team needs to register for a free account in the LCC to share their experiences and insights with the drought around Aachen by creating a new use case for SMCS usage in disasters since other organisations have a great benefit in learning from other's experiences.

2.1.3 User story 3: Ensuring credible information

Figure 31: The German case (terrorism)



German law enforcement authorities, as outlined in D6.3, continually seek to develop strategies to be prepared as good as possible to deal with a threat that remains high across Europe, with Germany being a potential target for future plots. Several attacks occurred in recent years, especially from 2016 to 2020, that pointed towards the need of focusing on information and how to spread it, also using social media, during terrorist attacks. Relevant information for the public's safety can in fact be shared easily and quickly but, with the same token, rumours and false information can reach a wide audience.

In this context, the main themes and sub-themes of the LINKS Framework are all of relevance but the necessity of ensuring credible information seems one of the most important to the law enforcements and to those responsible for their training.

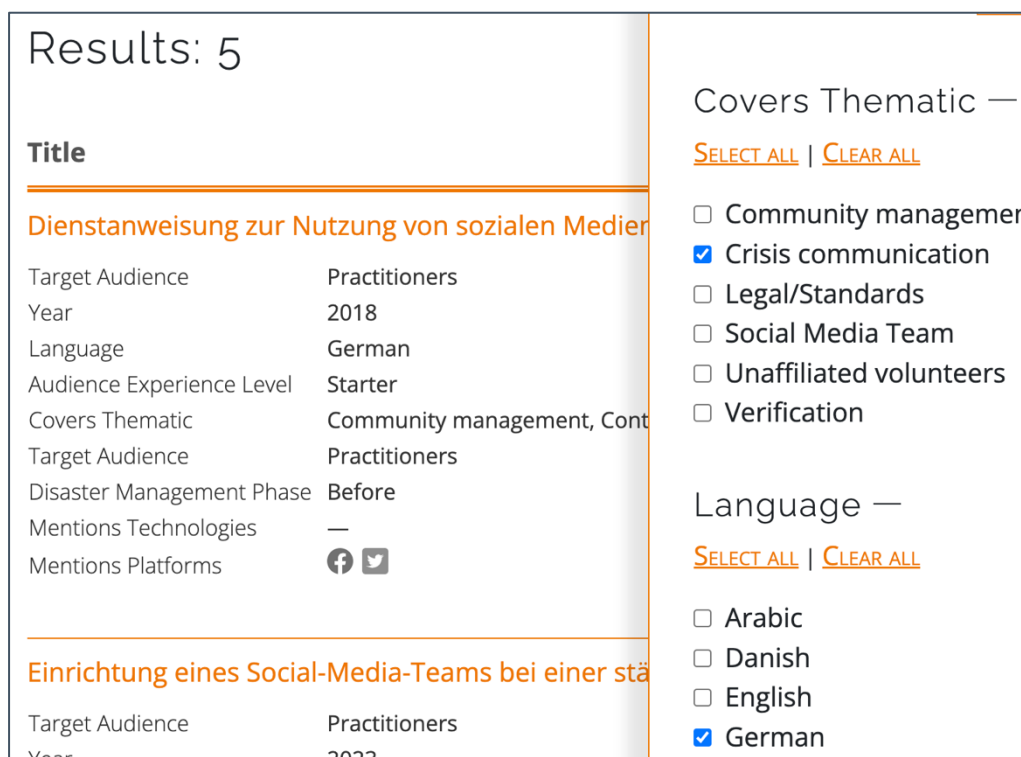
Law enforcement education touching upon this matter happens at different levels and thus a plethora of stakeholders are important here. One such stakeholder that is particularly important because of its mediating role at the German national level and cross-European level, is DHPol itself, particularly its head of the department of Communication Scene. He is in charge of educating police leadership on best practices on the use of SMCS, regularly involved in practical staff training sessions on that topic and e.g., in contact with CEPOL (the European Union Agency for Law Enforcement Training).

In this frame, the department head is mostly interested in resources that help determine the credibility of information retrieved from social media in a fast and reliable manner. Those resources

may either come in the form of guidelines specifying workarounds to handle massive amounts of potentially unreliable information under time pressure or as DCTs that help to automatise risk and crisis communication, also via different social media channels. Thus, the Framework theme which is most relevant to the Communication Science head and fellow police crisis communication instructors is Ensuring credible information. Specifically, two products: the Guidelines Library and the Technologies Library.

Using the filters “German” and “Crisis communication”, he found five results in the Guidelines library (Fig. 32):



Figure 32: Applied filters in the Guidelines Library



The screenshot shows a search results page with 5 results. The filters applied are:

- Covers Thematic:**
 - Community management
 - Crisis communication
 - Legal/Standards
 - Social Media Team
 - Unaffiliated volunteers
 - Verification
- Language:**
 - Arabic
 - Danish
 - English
 - German

The results list includes:

- Dienstanweisung zur Nutzung von sozialen Medien**
 - Target Audience: Practitioners
 - Year: 2018
 - Language: German
 - Audience Experience Level: Starter
 - Covers Thematic: Community management, Cont
 - Target Audience: Practitioners
 - Disaster Management Phase: Before
 - Mentions Technologies: —
 - Mentions Platforms:  
- Einrichtung eines Social-Media-Teams bei einer stä**
 - Target Audience: Practitioners
 - Year: 2022

Having resources in German is extremely helpful since there are more opportunities to use the materials in the training courses in which the participants are be more comfortable using their own language. Specifically, two guidelines caught his attention (Fig. 33):

1. The first⁶ one revolves around when and how one can use social media for civil protection, which serves as inspiration for the use of SM for the police in the area of risk and crisis

⁶

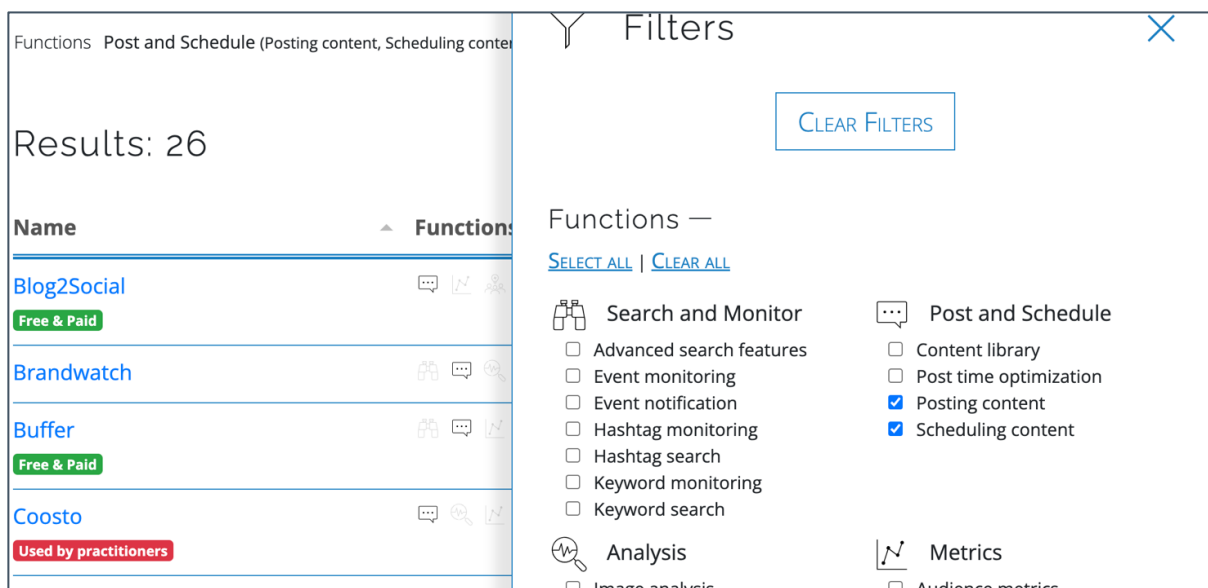
https://links.communitycenter.eu/index.php/Rahmenempfehlungen_f%C3%BCr_den_Einsatz_von_Social_Media_im_Bev%C3%B6lkerungsschutz

communication. Moreover, it explains how to monitor the communication via social media and how to deal with volunteers;

2. The second guideline⁷ provides useful tips (including dos and don'ts) on how to use SM in the preparation phase (e.g. risk communication, developing media channels). It can be useful to be better prepared with regards to risk communication.

Having a list of technologies that are helpful in organising communication and posts via social media is also important to communicate faster and better. Applying the filters “posting” and “scheduling” to the Technologies library leads to a wide set of results (Fig. 33) from which the Communication Science head can select (e.g. Socialhub and Facliftcloud have content libraries through which one can quickly create information posts, as there can be templates saved, which one can prepare and then use during an emergency. This saves time, as the outlines of a post with different information is already prepared and one only has to add specific details).

Figure 33: Pre-selected filters in the SMCS Library



Both libraries can thus be fruitfully incorporated into future law enforcement training sessions organised (jointly) by the Communication Science Department of DHPol – particularly discussion- and/or scenario-based trainings (like the LÜKEX and the BABZ trainings regularly held in Germany for police staff leaders). There, participants can use the libraries and its various filters to discuss features of DCTs that serve their very particular needs during a severe incident and derive workarounds particularly tailored towards terrorist attacks.

⁷ https://links.communitycenter.eu/index.php/Social_Media (Leitfaden zum Umgang mit Social Media im DRK)

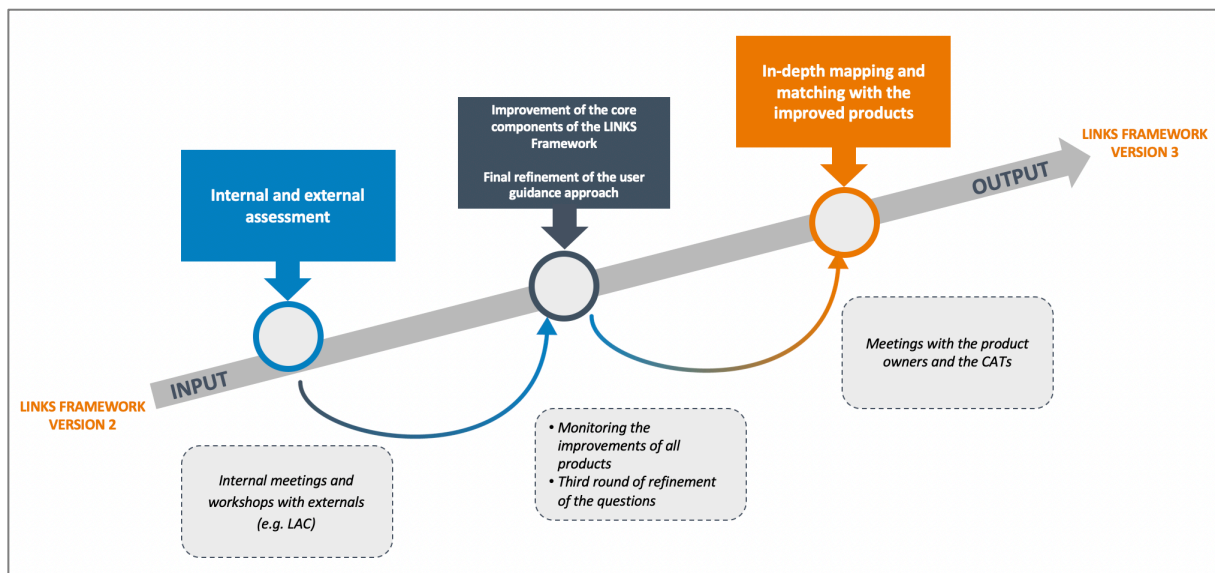
3. THE FINAL DESIGN OF THE LINKS FRAMEWORK

As specified in Section 2, the final design of the LINKS Framework entailed the following processes:

1. The internal and external assessment of the LINKS Framework (3.1);
2. A set of activities carried out by the product owners to improve the core components of the LINKS Framework (3.2);
3. A third round of refinement of the questions (3.3);
4. A new in-depth mapping and matching with the improved products that led to the final design (3.4);

A high-level overview of these processes is captured in the Figure 34 below:

Figure 34: The third iteration of development



Source: WP5-WP9

In the sub-sections below, the outcomes of these processes are outlined.

It is worth mentioning that an important set of complementary activities entailed also the close cooperation with WP7 to implement significant changes in the LCC based on the outcomes from 1. and 4.

3.1 Internal and external assessment

The internal assessment of the LINKS Framework was carried out both in the activities at case level, and during meetings and workshops in which the design was discussed (e.g. bilateral meetings with product owners and practitioners alike). As explained in D6.5, for the activities at case level, the Framework was deemed useful and the main sub-themes of relevance in connection to the needs of case teams were identified:

- Mobilising citizens and connecting and analysing information for the theme engaging with citizens;
- Targeting communication for the theme improving communication

For the sub-theme targeting communication, we decided to provide more precise answers in relation to the target group of interest, as outlined in Section 3.3, based on the importance of this sub-theme stressed by the CATs. Overall, the internal assessment of the Framework was key to evaluate the guidance approach behind it. The feedback from the CATs had a significant impact on the previously adopted “learning path” approach and led to important updates described in 3.3. The Internal assessments with CATs also feed into improvements of the products as outlined in Section 3.2. The inputs for the products that the activities at case level contributed to, also had an impact on the Framework as a whole: the new mapping and matching between the questions and the products is based on the improved products thanks to, *inter alia*, recommendations from the CATs (see Section 3.4).

In parallel an external assessment was carried out in a number of activities and across three different layers, as specified in D6.5 and as explained in Section 4. The results from the broader (external) evaluation of the Framework are provided in D6.5 (Section 4). While the evaluation was mainly concerned with the use and validation of the products than with the Framework, the conceptual design was discussed in several meetings (LACs, presentations at conferences and workshops). The feedback on the usability and helpfulness of Framework was always positive but it should be noted the broader evaluation is still being carried out in the final period of the project to ensure that the final version is validated and shared with a wider user base. Furthermore, as specified in D6.5, the overall external evaluation is largely linked to the dissemination and community building activities in WP8 and WP9.

3.2 Product maturity levels

Based also on the feedback and activities in the internal and external assessments, the products were refined and improved in this period.

In D5.4, in order to provide a detailed analysis of the Technology Readiness Level (TRL), we adopted the TRL scale used in the projects’ work on exploitation under the Horizon Booster (HRB) Module A programme.

This approach allowed us to create a heatmap (Fig. 35) based on the different colours associated with each scale level (See also Figure 31 in D5.4)

Figure 35: Technology Readiness Levels (TRL)



Table 1 below provides an updated overview of the TRL per product as well as descriptions of the main activities and changes that led to main improvements in all products. Additionally, information on the final format and on the users is outlined. It is worth mentioning that the table captures the work of the product owners until April 2023.

The improvements of all products were monitored through reporting protocols for the CATs and product owners. Participation in the different product task force meetings was also key to gain an understanding of the status update per product and to gain insights into key decisions and actions which led to finalisation of the key components of the LINKS Framework.

The product maturity levels overview shows that all core components have been improved and further refined through e.g. testing, internal and external evaluations, task force meetings etc. The majority of the products have reached a TRL 7, meaning that they have been validated and can operate at pre-commercial scale. The products will maintain TRL 7, but will continue to be discussed, used, and minor refinement made in upcoming project workshops and meetings (e.g. the LAC Meeting in Rotterdam in June 2023; the LINKS Annual Meeting in July 2023). The anticipated users of the products consist of several stakeholders who go beyond disaster management organisations and comprise also researchers, local communities and educational institutions. This aspect should

not be overlooked as it points towards both exploitation and sustainability of either the Framework or its core components (forthcoming D9.6; see also Section 4 in this deliverable).

Table 1: Technology Readiness Levels (TRL) heatmap according to product maturity levels.

LINKS Products	Year	TRL	Product updates	Year	TRL	Final Format and Users
Technologies Library	2022	6	From October 2022 to March 2023 the Technologies Library has been tested and updated regularly thanks to a wide set of activities which were key to ensure further refinements and developments. Specifically, both the site-visit from the Danish and the Dutch CATs, the presentation and discussions at the BKK (Federal Office of Civil Protection and Disaster Assistance) expert congress “Research for Civil Protection” (January 2023), the third LINKS Advisory Committee (LAC) Meeting (February 2023), the EENA conference (April 2023) and the Annual Symposium of the Association for the Promotion of German Fire Protection (vfdb) (May 2023) were crucial to, <i>inter alia</i> , improve the usability and understandability of the library as well as to change the filter logic, improve the quality of entries on the profile page of technologies and improve navigation. Additionally, categories were refined, as needed, after testing and application of technologies and expert interviews with technology providers, networks of civil society and practitioner organisations were carried to get insights into the uses of specific technologies.	2023	7	<p>The final format of the Technologies Library is a structured, wiki-based collection of information, accessible via a filter system, integrated into the LINKS Community Center (LCC).</p> <p>Main users: Social Media teams and leadership positions of DMOs who want to get an overview of the market, compare and select suitable technologies; researchers who are working in the field of SMCS technologies in disasters; technology providers who want to get an overview of the market and their competitors as well as to present their own product within the LCC.</p> <p>Translation: a partial translation via a built-in translation feature in browsers (e.g. Google chrome) will be added.</p>
Guidelines Library	2022	5	The Guidelines Library has been tested, assessed and thoroughly discussed both internally (e.g. in the Guidelines Task Force Meetings) and externally (e.g. in the LAC meetings). Internally, besides the Guidelines Task Force Meetings, a task-oriented survey on the use of the library was addressed to all consortium partners and was followed by a workshop (January 2022). The feedback gathered led to improvements on the filter selection process, on the overall product layout and to other adjustments. Externally, the inputs from the LAC members were taken into account and discussed in internal meetings. Overall, all feedback and inputs are currently being implemented and/or discussed and refer to e.g. making the filter descriptions more visible and clarifying technical	2023	7	<p>The final format of the Guidelines Library is a structured, wiki-based collection of information, accessible via a filter system, integrated into the LINKS Community Center (LCC).</p> <p>Main users: Social Media teams and leadership positions of DMOs who want practical guidance on how to implement the use of SMCS in their disaster management activities; researchers who are working in the field of SMCS in disasters and seek grey literature on the topic. Overall, civil society (including VOST and unaffiliated volunteers) interested in becoming involved and seek guidance on how take an active role in disaster management.</p>

			terms, adding more guidelines where a knowledge gap has been identified, highlighting a built-in translation feature for translation needs e.g. Google Chrome reduce length of the synopses.			The guidelines available are already provided in different languages (e.g. German, Italian).
Use Cases Library	2022	3	The Use Case Library has significantly improved and enriched with regards to content. Providing a pilot case (Tornado in Paderborn) was key to make both the concept and the potential added value of this product clear. This was a necessary step to collect more use cases from the consortium (through a contribution form which also allows and facilitate the participation in the overall LINKS Community). This process has increased the number of use cases from 8 to 24. Additionally, internal workshops and meetings led to changes and adjustments of the categories and of the wording. The feedback from the LAC members (February 2023) and the EENA conference (April 2023) led to further improvements but they were also important to collect ideas for future considerations (e.g. pointing out advice on learnings and limitations).	2023	7	<p>The final format of the Use Cases Library is a structured, wiki-based collection of information, accessible via a filter system, integrated into the LINKS Community Center (LCC).</p> <p>Main users: Social Media teams and leadership positions of DMOs who want to learn about the application, benefits and experiences of SMCS in disasters; researchers who are working in the field of SMCS in disasters; Technology providers who want to get inspired by the application of SMCS in disasters and who want to showcase their own product in practice.</p> <p>Translation: A built-in translation feature in browsers (e.g. Google chrome) will be added for translation needs.</p>
Including Citizens Handbook	2022	4	The Including Citizens' Handbook has gone through changes (format and content-wise) and adjustments that contributed to turn this product into an ambitious educational project (see final format). The rationale, aim and the format of the Handbook were discussed in regular Task Force meetings that led to a major change, namely to the digitalisation – currently still on-going – of the Handbook. This entails video making for four thematic areas (accessibility, mobility, risk awareness and volunteers) as well as the development of additional resources and educational materials. Additionally, the accessibility part of the Handbook has been validated internally through a survey. The outcomes contributed to a more user-friendly version of the Handbook (e.g. language and more precise indications of the target groups).	2023	6	<p>An open-source educational platform designed by UNIFI, UCC and UCPH. The platform will consist of four thematic areas (Accessibility, Mobility, Awareness and Volunteers): each one will consist of a theoretical introduction followed by guidelines, explanation videos and actions according to specific hazards/emergency situations. The latest digitalisation of the Handbook will entail the integration of the product in the LCC. It will involve the improvement of the user's access to the product, as well as the optimisation of the interconnections with the rest of the products within the LINKS Framework.</p> <p>Main users: DMOs, first responders, and practitioners interested in how to include citizens in the disaster management processes. In addition, local communities and vulnerable groups are expected to be indirect beneficiaries of the product. Additional materials, e.g. publications and links to other websites, will be available as well.</p> <p>Translation: It will be translated into the five project languages.</p>

<p>Feel Safe</p>	<p>2022</p>	<p>4</p>	<p>The Feel Safe product has made considerable progress in reaching the final TRL 7 through a combination of actions, means, and engagement with target groups. All actions have been guided by a co-design approach. The progress began with a series of consultations with stakeholders and workshops involving children from secondary schools in Italy which led to the development of the product concept. Other activities (e.g. with the Italian Association of Geography Teachers) were instrumental in further refining the product. Graphic design updates were made in consultation with a graphic designer, and content updates included the development of activities, uploading of stories, and other relevant materials. The Feel Safe product was also launched through a public webinar, inviting all SCIT partner schools to participate and learn how to use the tool effectively. Finally, social media sponsorship was utilised to raise awareness among the general public interested in emergency management.</p>	<p>2023</p>	<p>7</p>	<p>Open-source website managed by Save the Children Italia. The website will consist of a library section (with useful stories and resources) and thematic sections revolving around a wide set of exercises.</p> <p>Feel Safe will be accessible from the LCC. Infographics and links will direct the users to the Feel Safe website.</p> <p>Main users: The website's users are primary and secondary schools as well as practitioners interested in child-led DRR.</p> <p>Translation: A built-in translation feature in browsers (e.g. Google chrome) will be added for translation needs. If the automatic translation will be deemed not appropriate, opportunities for translating the resources in the project languages will be explored. Some resources will be translated in Japanese in the light of the cooperation between SCIT and the Center for Resilient Design, Japan (CResD). The Japanese partners are developing activities on: early warnings, checklists, safety confirmations via SM.</p>
<p>Resilience Wheel</p>	<p>2022</p>	<p>6</p>	<p>The Resilience Wheel has gone through implementation into the local cases as well as testing and validation mainly carried out with the Danish, Dutch and German CATs. These activities led to identify some needs e.g. the need for translation and contextualisation of the wheel within organisations which are willing to use it; the need for facilitation and specific resources to use the off-line version of the wheel in workshops and the willingness to use SMCS strategically.</p>	<p>2023</p>	<p>6</p>	<p>The final offline version of the Resilience Wheel is an offline tool for conducting workshops in an organisation that wants to discuss and/or assess their use of social media and crowdsourcing in a holistic manner. The workshop template will be developed over the summer/early fall of 2023 when all the test workshops are completed.</p> <p>Main users: disaster management organisations (DMOs).</p> <p>Translation: It will be translated into: Danish, Dutch and German.</p>

3.3 User Guidance approach

In addition to the improvements carried out at products' level, the feedback on the learning paths received from the CATs played a significant role in refining the approach behind the LINKS Framework. The socio and socio-technical dimensions (see D5.4) were deemed too complex, especially for practitioners who expressed the need for a more user-friendly language before and during the second case-based assessments.

The final refinement (the third round mentioned below), was carried out during the second case-based assessments with the involvement of the product owners. This process entailed a third⁸ round of refinement of the questions. The latter have been significantly simplified. The main goal was not only to provide a simplified yet accurate version of the questions, but also to formulate questions that can easily guide users towards all relevant knowledge available in the LINKS Framework. The questions have been validated both with the products owners and with the practitioners involved in the CATs. Emphasis was put both on the language and on the purpose of each question, namely facilitating access to the knowledge available in the products. In this frame, facilitation entailed also a new in-depth mapping and matching with the improved products, as explained in Section 3.3.

The adjusted questions⁹ are captured in the tables below:

Table 2: Themes, Sub-Themes and Questions for Improving Communication

Theme	Sub-themes	User Guidance
Improving Communication	Targeting Communication	Who do you want to target with your communication with your communication plan(s) How can you target your communication plan(s)?
	Ensuring credible information	How can you ensure credible information exchange?
	Making information accessible	How can you make your information accessible?

Table 3: Themes, Sub-Themes and Questions for Engaging with citizens

Theme	Sub-themes	User Guidance
		How can you search and monitor information?

⁸ For the first and second round of refinement, see D5.4 (p.14).

⁹ In-depth explanations of the "old" questions and learning paths are provided in D5.4.

Engaging with citizens	Collecting and analysing information	How can you carry out content analysis?
	Mobilising citizens	How can you mobilise citizens?
	Mobilising volunteers	How can you mobilise volunteers?

It should be noted that the first question of the sub-theme “targeting communication” differs from the others since (Fig. 35):

- Who do you want to target with your communication plan(s) highlights the target audience and specific products that can support users based on the selection of the audience (made explicit in the LCC): citizens (main category); vulnerable groups; students (sub-categories).

Figure 36: Example of the sub-theme “Targeting communication”

Citizens

How can you target citizens?



Vulnerable Groups

How can you target vulnerable groups?



Considering that in the LINKS Framework there is *ad hoc* knowledge which can be helpful to support specific target groups (e.g. teachers and students), the question on the audience and, more importantly, the respective answers from the LINKS products, serve the purpose of filtering only relevant knowledge in relation to the target group of interest. This approach cannot be applied to all sub-themes. We applied it only to “targeting communication” since this sub-theme was identified by the case teams (CATs) as of most relevance for the theme improving communication (see: Section 3.3).

In addition to these questions, which are conceived for a broad target audience, one additional question addressing disaster management organisations has been added:

- **Do you want further guidance on how you can create a complete overview of strategic and inclusive SMCS activities in your organisation, in the context of disasters?**

It should be noted that, in the context of the user guidance, this question points towards a product (the Resilience Wheel) which can be used by DMOs as a stand-alone tool to assess their capacities. Overall, the LINKS Framework draws on the Resilience Wheel conceptually and practically. This is apparent, for instance, in its guidance and orientation purposes as well as in the themes and sub-themes prioritised. In this frame, the wheel is an important additional resource for DMOs interested in doing more strategic planning with regards to uses of SMCS. The question directs users to the on-line version of the Resilience Wheel¹⁰. It does not refer to the off-line tool for conducting workshops in an organisation that wants to discuss and/or assess their use of social media and crowdsourcing in a holistic manner (see table 4).

The user guidance questions lead to the LINKS products as “answers” that relevant stakeholders can use to address their gaps or needs. An overview of the status (mainly the Technology Readiness Level) for each of the products is provided in Section 3.2.

3.4 The final design of the LINKS Framework

As previously mentioned, the main activity that led to the final design of the LINKS Framework entailed a new in-depth mapping and matching between the updated questions of the user guidance approach and the improved products. This work has been carried out in close cooperation with:

- The product owners who validated both the questions (user guidance) and the answers. The latter are as precise as possible, meaning that pre-selected filters (for the libraries) and/or sections of the products (e.g. Handbook or Feel Safe) are conceived to orient users providing pre-identified knowledge (e.g. only a certain number of guidelines) around specific issues (e.g. ensuring credible information). In doing so, users can decide to be guided through the Framework only to most relevant knowledge focussing on one or more than topic. Access to the entire LINKS products (without using pre-selected filters) is made available in the LCC through other entry points (D7.4, Kiehl et. al. 2022).¹¹
- The practitioners who validated the questions and provided feedback on their understandability after the feedback collected in the second case assessments.;
- WP7 in relation to the implementation in the LCC.

¹⁰ https://links.communitycenter.eu/index.php/Resilience_Wheel

¹¹ The Dutch CAT was also involved in this validation process.

The outcomes of these processes led to final design of an integrated Framework which orients users towards the LINKS products based on the aims and needs (framed as questions) that different types of stakeholders would like to address.

4. SUSTAINABILITY OF THE FRAMEWORK

To ensure the sustainability and the transferability of the LINKS Framework (forthcoming in the overall sustainability strategy for the Framework in D9.6 in November of 2023), the output will be further validated and promoted via LCC as well as other networks (D7.7 Nuessler, 2022; D7.8, forthcoming) and platforms.

The vision behind validation and promotion is to foster **sustainable advanced learning**, namely a maintainable and evolving collection of knowledge produced for and by relevant stakeholders (e.g. disaster management organisations, researchers etc.) who can contribute to the knowledge through the LCC.

To achieve this objective, two parallel activities are carried out:

1. **Improving, as needed, the LINKS Framework.** This is done through external assessment and entails, *inter alia*, contributing to the products so that the knowledge in the Framework is even richer than the currently available resources (e.g. more guidelines on specific topics of interest, more use cases etc.). The external evaluation of the Framework includes the use and validation of the products within the Framework in the LINKS Community Center, through different activities and by different stakeholders (D6.5). It is important to note that some activities run throughout the project, such as meetings with associated partners and the LINKS Advisory Committee (LAC) meetings. Yet, most are carried out within the final year of the project (2023) (D6.5). The external evaluation is carried across three different layers, as outlined below. Recent activities include:
 - *LINKS Advisory Committee (LAC) and Associate Partners;* the Disaster Prevention and Preparedness Initiative of Southern Europe (DPPI-SEE) and the Center for Resilient Design (CResD). In June 2023, there is a combined activity (explained in the next layer), and a final meeting planned for November 2023 (the last month of the project);
 - *Through European Networks and Mechanisms,* in June 2023, LINKS organises a joint activity with the sister project from the SRC (Societal resilience cluster) ENGAGE, bringing the advisory boards of both projects in a two-day meeting;
 - *As part of the broader LINKS Community.* For example, LINKS will organise a workshop at NEEDS 2023 (Northern European Conference on Emergency and Disaster Studies).

In the upcoming events, the participants will get actively engaged with the products to a) assess if they are useful b) assess if there are potential gaps that can be addressed through, as mentioned above, targeted contribution to the knowledge.

2. Developing the **LINKS Community of practice** revolving around the uses of SMCS during the external assessment activities (see: D8.2, Bianchi & Giacinti, 2022; D8.3 – forthcoming). The LINKS community of practice is being developed during these activities within the LCC to ensure that the Framework brings real added value to the users, based on their level of engagement and interest:
- *Access to the knowledge*: browse through the LINKS Framework and its products to get a better understanding of what it is available;
 - *Learn from the knowledge*: browse and use the LINKS Framework, for instance by applying a guideline or a technology that is of significance to address a challenge within an organisation;
 - *Contribute to the knowledge*: help to enrich the content of the products, along the lines mentioned in 1.

The community will facilitate both the update of the Framework and the discussion among several stakeholders on SMCS-relevant thematic by e.g. organising webinars, panels or workshops at conferences (e.g. NEEDS, Northern European Emergency and Disaster Studies Conference 2023).

LINKS will continue engaging with specific existing communities (CERIS - Community for European Research and Innovation for Security; CMINE - Crisis Management Innovation Network Europe; EENA, European Emergency Number Association; FEU - Federation of European Fire Officers, VOST Europe) and networks (e.g. SMDRM - Social Media-Driven Disaster Risk Management of the Joint Research Centre) to join efforts and develop its own community of practice with the aim of avoiding duplications. Moreover, LINKS will continue to merge networks with EU-funded projects in the SRC cluster and beyond which can engage with the Framework, some of which have been already identified to use the LINKS outputs in the future (e.g. SYNERGIES).

In addition to the points above, dissemination and communication activities will also contribute – more indirectly, to the sustainability of the LINKS Framework. Strategically, this can be done by promoting it, after the project concludes, through collaborative knowledge sharing platforms (e.g., PreventionWeb)¹². Until November 2023, potential agreements will be explored to assess their feasibility. Moreover, communication messages on social media will continue up to six months after the project finished to help the LINKS community of practice growing and evolving.

¹² <https://www.preventionweb.net>

5. CONCLUSIONS

After three years of close collaboration with the project's partners, the final version of the LINKS Framework can now be delivered. Overall, the Framework provides guidance and offers insights into what is important to consider when applying SMCS to:

- Collect and analyse information, mobilise citizens, mobilise volunteers (**Engaging with citizens**);
- Target communication, ensure credible information, make information accessible (**Improving communication**).

Through a user guidance approach, the Framework makes accessible via the LCC six actionable products:

- three libraries on Technologies¹³, Guidelines¹⁴ and Use Cases¹⁵;
- the Including Citizens Handbook¹⁶;
- Feel Safe¹⁷;
- The Resilience Wheel¹⁸.

It is conceived as a living resource for different types of stakeholders, including disaster management organisations and other actors engaging with topics in disaster risk management (DRM) and disaster risk reduction (DRR).

The external assessment activities and the LINKS Community of practice will facilitate the uptake of one of the main outputs of the project and will further enrich the content of the products through those who will contribute actively by adding relevant (namely, more specific and varied, for instance adding resources in different languages) resources.

Ultimately, the LINKS Framework improves the understanding of the uses of SMCS in the frame of disasters. Thus, it has the potential of strengthening disaster resilience by fostering sustainable advanced learning through a maintainable and evolving collection of knowledge produced for and by relevant actors. Indeed we invite all interested stakeholders to access, use, and contribute to the Framework and to our LINKS Community of practice by registering on our LINKS Community Center at the following address: links.communitycenter.eu

¹³ https://links.communitycenter.eu/index.php/List_of_Disaster_Community_Technologies

¹⁴ https://links.communitycenter.eu/index.php/List_of_Guidelines

¹⁵ https://links.communitycenter.eu/index.php/List_of_Use_Cases

¹⁶ https://links.communitycenter.eu/index.php/Including_Citizens_Handbook_-_Accessibility

¹⁷ https://links.communitycenter.eu/index.php/Feel_Safe

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