

LINKS

Strengthening links between technologies and society
for European disaster resilience

D5.4 SECOND VERSION OF THE LINKS FRAMEWORK

Research Report

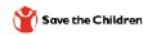
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EXECUTIVE SUMMARY

About the project

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

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

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 TO 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 (5.4) describes the second version of the LINKS Framework. The Framework provides products for critical stakeholders by combining knowledge and experiences about how social media and crowdsourcing (SMCS) are used in disaster risk management (DRM). It focuses on how the second version can support and guide practitioners in their planning for the uses of SMCS through learning paths. The learning paths revolve around two main themes (*engaging with citizens* and *improving communication*) and aim at pointing users towards relevant knowledge delivered from the LINKS products. Additionally, this deliverable outlines the design and rationale behind the second version and the next steps for developing the final version of the LINKS Framework.

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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
DRR	Disaster Risk Reduction
DRPV	Disaster Risk Perception and Vulnerability
GQ	Guiding Question
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 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)

¹ Definitions are retrieved from the LINKS Glossary at <http://links-project.eu/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 share information using the internet or mobile phones (definition builds on Kaplan & Haenlein, 2010; see also LINKS Glossary).
Sustainable advanced learning	A maintainable and evolving collection of knowledge and best practices produced for and by relevant stakeholders. Sustainable advanced learning entails a cognitive dimension (the capability to gain in-depth knowledge of crises and crisis response), a social dimension (the ability to implement that knowledge into new practices), and a transformative dimension whereby reflections are made on how knowledge was learned, what has changed in the process, and how and in what ways new knowledge might continue to evolve.

1. INTRODUCTION

The LINKS project's primary goal is to improve European disaster resilience by pooling knowledge and experiences on the uses of learning using social media and crowdsourcing (SMCS) in disasters. This is accomplished by developing the LINKS Framework in three iterations during the project, combining theoretical and practical knowledge from various scientific fields, cases and scenarios. As outlined in D5.3 (Fonio et al., 2022), the Framework consolidates expertise and experiences on social media and crowdsourcing (SMCS) into products for relevant stakeholders. Overall, it fosters strategic planning and is mainly developed for disaster management organisations (DMOs) and other relevant stakeholders working with disaster risk management. The Framework supports strategic planning around two main themes and six sub-themes:

1. **Engaging with citizens:** collecting and analysing information, mobilising citizens, mobilising volunteers;
2. **Improving communication:** targeting communication, ensuring the quality of information, making information accessible.

This is done through six main products that feed into the Framework and have been described in D5.3 (Fonio et al., 2022) and D2.7 (Lüke et al., 2022). The products include:

- Three libraries revolving respectively around a) technologies, b) guidelines, and c) use cases (previously called examples);
- A Handbook on involving citizens promotes more inclusive approaches in disaster risk management;
- Feel Safe (previously called educational toolkit) to empower minors through SMCS;
- The Resilience Wheel facilitates initial discussions and assessments on how SMCS may support and challenge disaster management processes within and across organisations.

Strategic planning is further supported by the "Compass" in the LCC. As described in D5.3, there are three main entry points to the Framework in the LINKS Community Center: "plan strategically", which revolves around the themes' specific resources and the sub-themes structured around learning paths. This entry point is visualised as a "compass" in the LCC² (Figure 1). The "search" entry point allows for a text search of the content, and "explore" provides access directly to the products.

² <https://links.communitycenter.eu/index.php/Welcome!>

Figure 1: LINKS Framework compass in the LCC



This document concerns the second version of the LINKS Framework, the second iteration of its development, the design and what users can expect from **its application through the compass**. Additionally, it outlines the context, the stakeholders and the learning experience that can be facilitated through the second version of the Framework and its products. It provides an overview of how the Framework has evolved from the first to the second version focusing on the learning paths³ discussed and developed in cooperation with the stakeholders involved in the project.

If compared to the first version in which the themes, sub-themes and products were identified, the second version of the Framework is:

- implemented in the LCC through the visualised compass (see: D5.3);
 - Enriched by the guided approach exemplified in the learning paths;
 - Conceived having in mind the practical uses of the LINKS products and through the activities taking place in the LINKS cases (D6.3);
- Embedded in an evaluation process that will facilitate the development of the final version of the Framework;

1.1 Reading guide

This document is structured as follows:

- Section 2 describes the second version of the LINKS Framework and presents the second iteration of development. In this Section, the actual use of the Framework and its products are explained through two user stories which respectively focus on the main themes of the Framework: "Improving communication" and "Engaging with citizens". This is the **core part of the document**, which is of relevance to different target audiences, specifically to

³ The learning paths are pre-defined questions for each sub-theme that guide users towards relevant resources made available and distilled through the products.

practitioners working with disaster risk management and SMCS, to understand how the Framework can support them;

- Section 3 explains the changes from the first to the second version of the Framework by focusing on the pre-defined questions (the "learning paths") for each sub-themes and how they match the products. It also describes the current maturity levels of the LINKS products and the planned trajectories. This Section may also be interesting for researchers as it allows for the conceptual basis on which the second version of the Framework has been developed;
- Section 4 outlines the following steps to develop the third and final version of the LINKS Framework. This is of interest to all stakeholders and the overall LINKS consortium.

2. THE SECOND VERSION OF THE LINKS FRAMEWORK

As outlined in D5.3, the LINKS Framework can be used as a tool for strategic planning, mainly by DMOs and other relevant stakeholders working with disaster risk management, on how they can use and apply SMCS in different phases of disasters. It encompasses valuable resources about two main thematic areas (*engaging with citizens* and *improving communication*). The themes, as described in D.5.3, are the results of the identification, collection and preparation of the inputs from the LINKS knowledge bases (desk studies, research gaps and knowledge-related landscape), the LINKS cases (meetings, workshops and exercises) as well as of brainstorming sessions with WP2-4.

For each of the main themes, three sub-themes have been identified:

Relevant stakeholders working with disaster management can explore the resources under the theme "Engaging with citizens" if they are interested in:

- *Collecting and analysing information from SMCS*. This refers to a comprehensive set of technical-oriented actions which mainly consists of searching, monitoring and analysing for different purposes (e.g. from text to sentiment analysis);
- *Mobilising citizens* deals with citizens-mobility, meaning the challenges that arise in different phases of disasters, for instance, during the response phase, e.g. citizens' evacuation or displacement. This refers to a set of guidelines that will be included in the Handbook on Including Citizens;
- *Mobilising volunteers*. This concerns mobilising spontaneous and affiliated volunteers through SMCS before, during and after a crisis using different through different tools made available in different formats.

Additional resources are available under the theme "Improving communication":

- *Targeting communication* concerns the target audience that relevant stakeholders have in mind for risk and crisis communication and the ambition to be as inclusive as possible. Practically, this translates into good practices, checklists, and examples of how to improve communication via SMCS with different target groups, including the most vulnerable;
- *Ensuring credible information*. This refers to ensuring credible information exchange from authorities to citizens and from citizens to authorities. It should be noted that, in the First Version of the LINKS Framework (D5.3), this sub-theme was framed as "ensuring the quality of information". Credibility is a broader notion which covers, *inter alia*, the quality of information (D3.1: Nielsen and Raju., 2020);
- *Making information accessible*. This refers to improving access to information in different phases of disasters, for instance, by identifying 1. target groups and 2. potential accessibility problems and solutions (e.g. platforms with accessibility issues for the visually impaired, as well as examples/checklists on how to be accessible to all target groups).

The following sub-sections outline the second iteration of development (2.1) and then turn to show what users can learn from the Framework (2.2) through two user stories respectively revolving around engaging with citizens (2.2.1) and improving communication (2.2.2).

2.1 The second iteration of the development

The first iteration of the LINKS Framework, as described in D5.3, was concerned with the following:

- the inputs from the knowledge bases and the cases;
- the structuring of the inputs into themes that feed into the Framework, and
- the interconnections between the themes and the products.

The second iteration, which led to the second version of the Framework, revolves around ***defining and refining the learning paths to facilitate access to knowledge*** (the LINKS products). This entailed: :

1. Refining the learning paths for each of the sub-themes considering socio and socio-technical aspects and mapping/ matching the products with each of the sub-themes as well as extracting relevant knowledge from the products;
2. Refining the evaluation approach for the Framework in D2.7 and in D6.3.

The main idea behind the learning paths is to provide stakeholders with a guide that enables the Framework's application within their respective organisations. The learning paths are used as entry points to assist them with the Framework application according to their needs and aims (SMCS-related objectives) and guide them around the LINKS product's solutions.

While examples of learning paths have been provided in D5.3, the set of guiding questions (pre-defined learning paths) for each sub-theme was not yet comprehensively designed. The second version of the Framework provides a comprehensive mapping of the pre-defined learning paths as well as matching with the LINKS products. It should be noted that the mapping and matching is still on-going. The following process has been followed and it is planned:

- The first round of refinement of the questions has been carried out with the product owners' participation in bi-lateral meetings in September and October 2022. The outcomes of this process are described in Section 3;
- The second round of refinement will be carried out during the second case-based assessment with the involvement of the case assessment teams (CATs). The learning paths were presented at Case Coordinators' Meetings (04.10.2022 and 31.10.2022) but they have not been discussed bilaterally, as originally planned (D6.3);
- The elaboration of the answers to the proposed questions (meaning matching the products with each of the sub-theme) has been carried out in close cooperation with the product owners as a follow-up of the bi-lateral meetings mentioned above.

As specified in Section 3, the questions cover social and socio-technical aspects.

It should be noted that the refinement of the learning paths will continue until the final version of the LINKS Framework (D5.5).

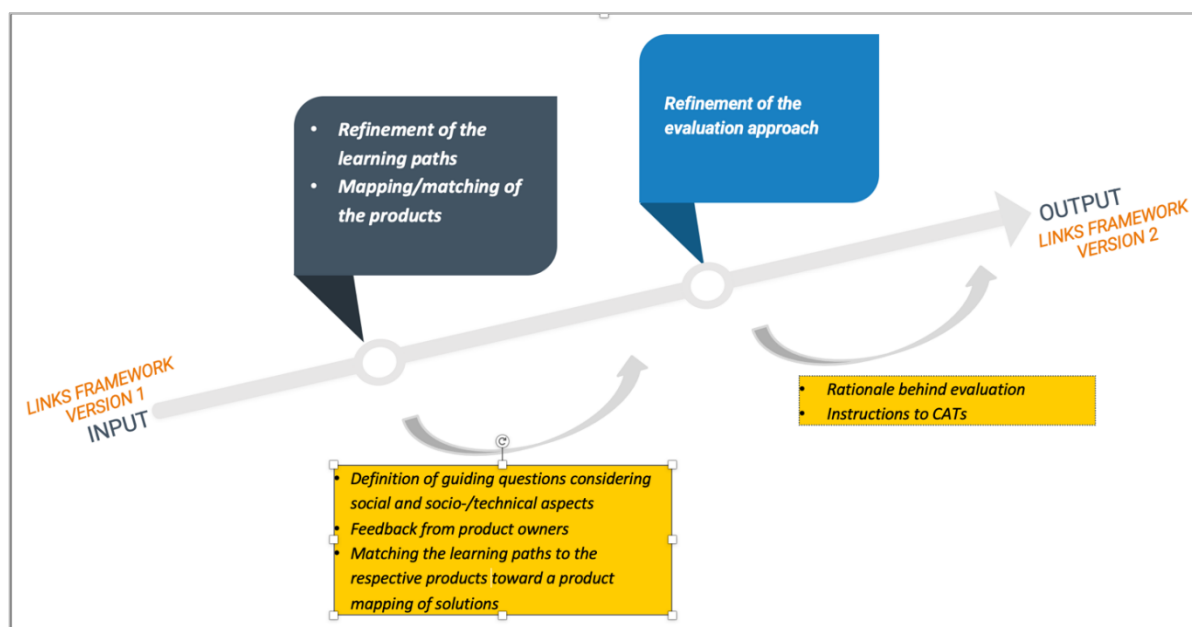
At the same time, the methodological approach to assess the Framework (D2.7: Section 4) led to a more specific evaluation approach to assess the second version of the Framework. This was included in D6.3 (See: Section 3). The rationale behind the evaluation of the Framework is part of the design since it has, at its core, the application of one or more learning paths, the assessment of the usefulness of the LINKS Framework, and the implementation and update of its products that address SMCS use-related needs and challenges.

The evaluation of the LINKS Framework consists of methodological approaches that assist with its implementation through guided applications of learning paths on various geographical scales so to:

- Assist the DMOs with the Framework application based on their needs and aims (SMCS-related objectives) and guide them on using and further developing the LINKS products in their work;
- Provide the basis for impact evaluations of the Framework integration within the work of the organisations through instructions provided in D6.3.

Figure 2 captures the steps that led to the second version.

Figure 2: Development of the LINKS Framework Version 2



Source: WP3's and WP5's contribution

A detailed description of the design process for the second version of the LINKS Framework is provided in Section 3 of this document. In the following subsections, we explain how stakeholders

can use the second version of the Framework based on specific needs and objectives (2.2) using a user-story approach (2.1.1. and 2.2.2).

2.2 Plan strategically through the LINKS Framework

The following sub-sections show how stakeholders can plan strategically through the LINKS Framework.

Through the second case-based assessment, based on the feedback from the CATs and the update of the products, some functions and design elements will be updated and expanded (conceptually and in the LCC). The learning paths will be validated and extended. For instance, planning strategically at this stage means primarily focusing on “how” stakeholders can, e.g. analyse and collect information. In a subsequent phase “from whom” they would need this information will be elaborated.

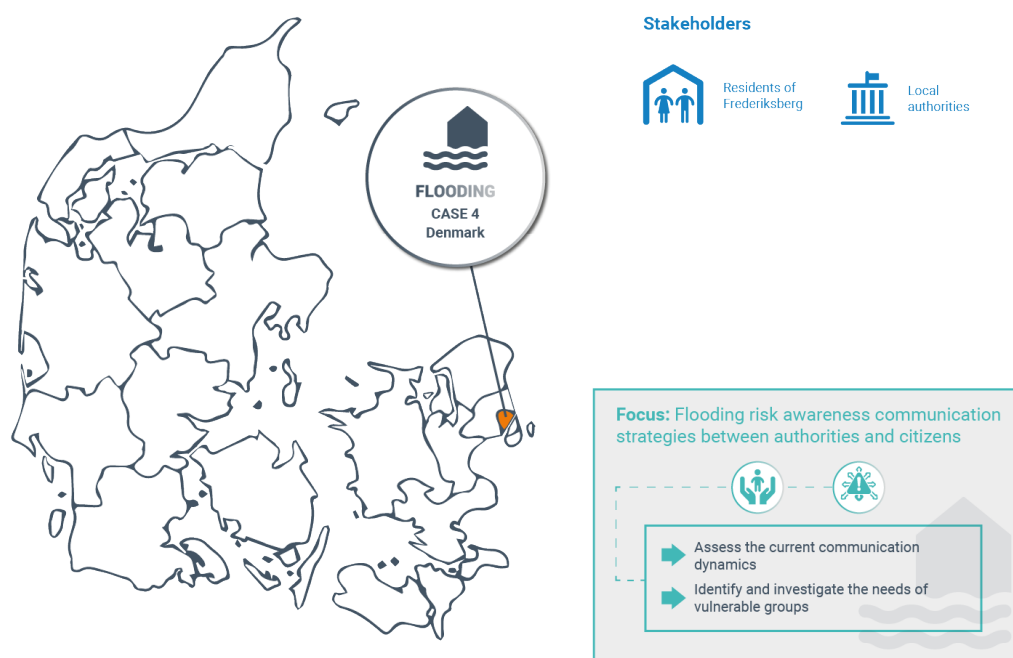
Yet, adopting a "user story" approach is essential to provide the stakeholders' perspective and assess if the LINKS products can meet their needs and objectives. With this purpose, we co-designed the stories outlined below with two stakeholders involved in the project (FRB: Frederiksberg Commune and VRZL: Safety Region of South Limburg). The Danish and Dutch LINKS cases define the contexts in both stories.

It is worth considering that:

- The user stories have been designed together with the stakeholders that will apply the Framework within their organisations (D2.7 and D6.3);
- The user stories are contextualised within the cases, as mentioned above, and
- They follow the two main themes of the Framework: engaging with citizens and improving communication concerning the themes;
- The maturity levels of the products mentioned in the stories differ, product developments are ongoing based on the activities and product updates will be carried out from November 2022 to February 2023 (see also: Section 3 in this document).

2.2.1 User Story 1: Engaging with Citizens

Figure 3: Danish case, hazard scenario and benefited stakeholders



Source: WP6's contribution

As specified in D6.3, the focus of the LINKS Danish case is to "is to investigate the potential for strengthening the communication between professional actors, NGOs and citizens concerning both matters related to preparedness activities before crises occur and in the response phase during actual incidents" (p. 48). Overall, risk awareness on flooding and communication processes and practices are at the case's core. The results from the first case assessment, the outcomes of the social media analysis, emphasise the importance of open Facebook groups administered by citizens in which many communication activities are carried out (especially in the preparedness phase). In this frame, the municipality of Frederiksberg (FRB) involved in the case is interested in **implementing a social listening technology at FRB municipality to monitor social sentiments on Facebook, potentially also in open, local Facebook groups, to investigate the potential for further engagement.**

FRB is an independent municipality (approx. 105.000 citizens) in the middle of Copenhagen. It has a strategy for cloudburst management, and it is one of the leading municipalities in the field of climate adaption in urban areas. Frederiksberg has several areas at risk of flooding and needs to retain a lot of rainwater locally. To achieve the objectives of the strategy, the municipality has a climate adaptation group consisting of 9 employees working on planning, developing and documenting climate adaption solutions.

Communication and citizens' engagement are key to FRB. Understanding social media sentiments would be beneficial not only to FRB but also to other municipalities within the Copenhagen area (and in Denmark). The results could lead both to better communication strategies tailored to specific information needs, which may emerge in online discussions and strengthen the involvement of citizens both in prevention and during crises.

The LINKS Framework can support FRB's communication department and the climate adaptation group in collecting and analysing information from citizens.

The LINKS Framework is available on the landing page of the LINKS Community Center⁴ (Figure 4).

Figure 4: LINKS Framework compass in the LCC

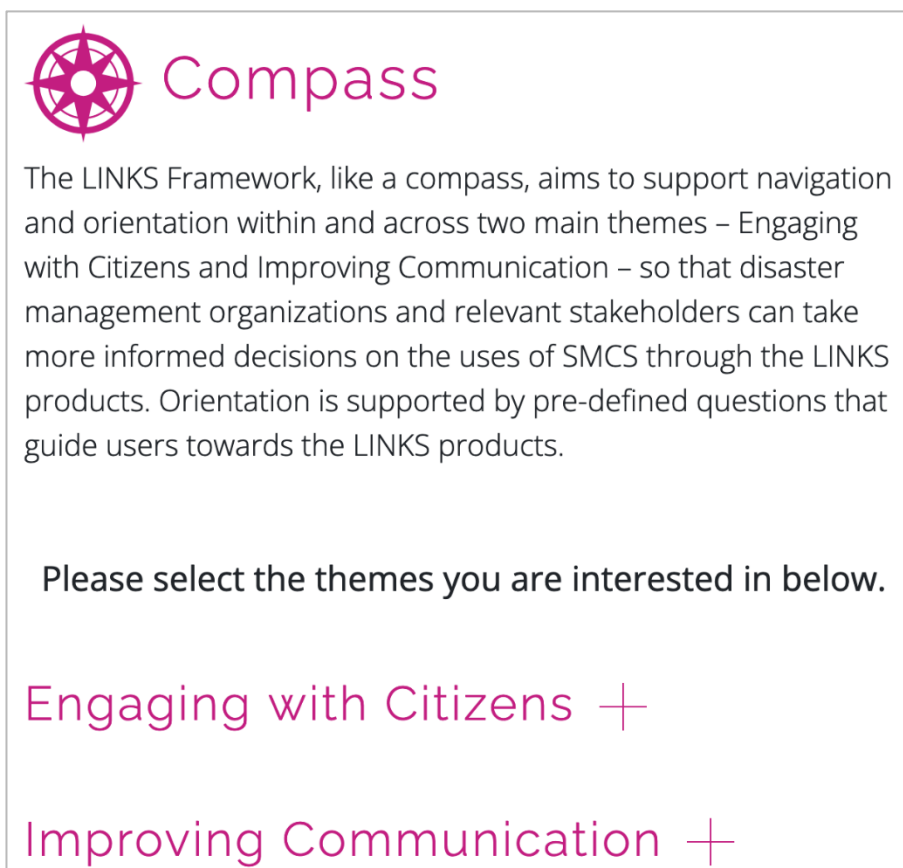


By clicking on the Compass, more information is provided⁵ (Figure 5).

⁴ <https://links.communitycenter.eu/index.php/Welcome!>

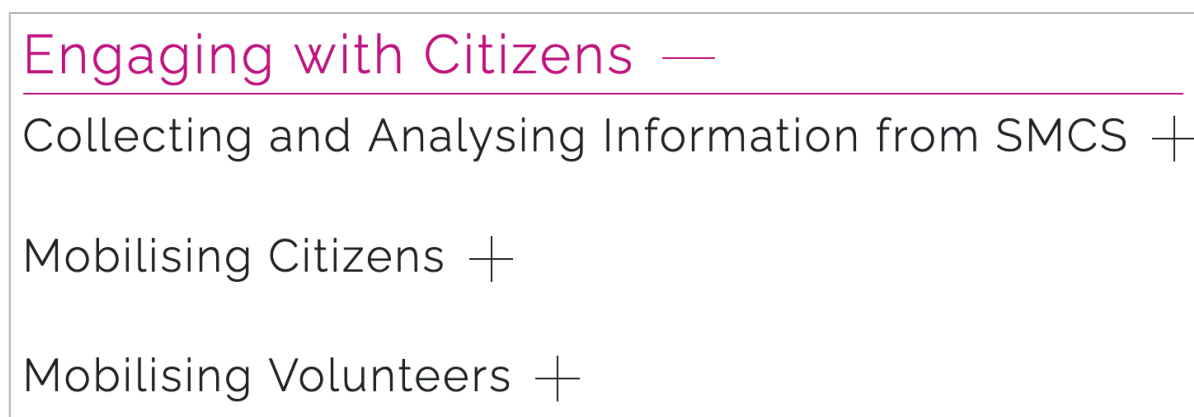
⁵ <https://links.communitycenter.eu/index.php/Compass>

Figure 5: LINKS Framework



By clicking on the main theme that is of relevance to FRB, three main sub-themes (or focus areas) will be displayed (Figure 6).

Figure 6: The theme Engaging Citizens with its sub-themes in LCC



By expanding the sub-themes, learning paths related to Engaging citizens are displayed, consisting of two pre-defined guiding questions (Figure 7).

Figure 7: The sub-theme Collecting and Analysing information from SMCS and its guiding questions in LCC

Engaging with Citizens —

Collecting and Analysing Information from SMCS —

- Whom do you want to include in your collection and analysis of information, and from whom do you want to collect and analyse information?
- How can you collect and analyse information?

Having already defined the target of the analysis (Facebook groups), the "how" is of most of interest to FRB. By clicking on the "How can you collect and analyse information", three products (the three libraries) are displayed, as shown in Figure 8.

Figure 8: The chosen guiding question and the product answers/solutions in the LCC

- How can you collect and analyse information?

Technologies

It allows filtering for software that covers the functions Search & Monitor and Analysis of information from social media.

Guidelines

Several thematic search filters integrated within the Guidelines Library will help stakeholders retrieve relevant SMCS guidelines to better mobilise and engage citizens, for instance, the "crowdsourcing" search filter.

Use Cases

It provides helpful information from social media and crowdsourcing examples around the theme "Collecting and Analysing Information from SMCS". Also the question, which specific functionality SMCS has been used for and how (e.g. gathering of information) is answered.

Three products are available pooled out from the three main LINKS libraries: technologies, a set of guidelines use case examples. After selecting a product ("Technologies"), the FRB employee gets the direct link with pre-defined filters ("Search and Monitor" and "Analysis") to the Technologies Library⁶ (Figure 9).

⁶ <https://tinyurl.com/4ue3237t>

Figure 9: Overview page of the Technologies Library with pre-defined filters

Results: 52

Name	Functions
Agorapulse <small>Free edition</small>	
ArcGIS <small>Used by practitioners</small>	
Artificial Intelligence for Disaster Response <small>Freeware</small>	
Awario	
Brandwatch	
Buffer <small>Free edition</small>	
Coosto <small>Used by practitioners</small>	
Echosec Systems	
Emergency Situation Awareness <small>Used by practitioners</small>	
Emplifi	
Facelift Cloud	

[CLEAR FILTERS](#)

Functions

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

☒ **Search and Monitor**

- ☒ Keyword search
- ☒ Event monitoring
- ☒ Hashtag monitoring
- ☒ Advanced search features
- ☒ Hashtag search
- ☒ Event notification
- ☒ Keyword monitoring

☐ **Post and Schedule**

- ☐ Posting content
- ☐ Post time optimization
- ☐ Content library
- ☐ Supported content types
- ☐ Scheduling content

☒ **Analysis**

- ☒ Text analysis
- ☒ Sentiment analysis
- ☒ Video analysis
- ☒ Topic analysis
- ☒ Image analysis
- ☒ Trend analysis
- ☒ Content processing languages

☐ **Metrics**

















- ☐ Competitor metrics
- ☐ Audience metrics
- ☐ Network metrics
- ☐ Profile or Site metrics
- ☐ Follower metrics
- ☐ Post metrics

☐ **Report**
☐ **Interoperability**
☐ **Collaboration**
☐ **Meta**

Supported Platforms

Based on the need of FRB, the "Sentiment analysis" is the requested sub-function under the Analysis function category, and "Facebook" is selected as the requested supported platform (Figure 10).

Figure 10: Selection of further filters

<p>Facelift Cloud <small>Used by practitioners</small></p> <p>Fanpage Karma <small>Free edition Used by practitioners</small></p> <p>GRYTICS</p> <p>Hootsuite <small>Used by practitioners</small></p> <p>Meltwater</p> <p>Obi4wan <small>Used by practitioners</small></p> <p>Orlo</p> <p>PublicSonar <small>Used by practitioners</small></p> <p>Retriever <small>Used by practitioners</small></p> <p>Simplify360</p> <p>SocialHub</p> <p>Sprout Social <small>Used by practitioners</small></p> <p>Ubermetrics</p> <p>SUGGEST A NEW TECHNOLOGY</p>	<p><input type="checkbox"/> Advanced search features</p> <p><input type="checkbox"/> Hashtag search</p> <p><input type="checkbox"/> Event notification</p> <p><input type="checkbox"/> Keyword monitoring</p> <p><input checked="" type="checkbox"/>  Analysis</p> <p><input type="checkbox"/> Text analysis</p> <p><input checked="" type="checkbox"/> Sentiment analysis</p> <p><input type="checkbox"/> Video analysis</p> <p><input type="checkbox"/> Topic analysis</p> <p><input type="checkbox"/> Image analysis</p> <p><input type="checkbox"/> Trend analysis</p> <p><input type="checkbox"/> Content processing languages</p> <p><input type="checkbox"/>  Report</p> <p><input type="checkbox"/>  Interoperability</p> <p><input type="checkbox"/>  Metrics</p> <p><input type="checkbox"/> Competitor metrics</p> <p><input type="checkbox"/> Audience metrics</p> <p><input type="checkbox"/> Network metrics</p> <p><input type="checkbox"/> Profile or Site metrics</p> <p><input type="checkbox"/> Follower metrics</p> <p><input type="checkbox"/> Post metrics</p> <p><input type="checkbox"/>  Collaboration</p> <p><input type="checkbox"/>  Meta</p> <p>Supported Platforms</p> <p>SELECT ALL CLEAR ALL</p> <p>General</p> <p><input type="checkbox"/>  Crowd</p> <p>Platforms</p> <p><input checked="" type="checkbox"/>  Facebook</p> <p><input type="checkbox"/>  Instagram</p> <p>More platforms</p> <p><input type="checkbox"/>  Disqus</p> <p><input type="checkbox"/>  Gab</p> <p><input type="checkbox"/>  Web</p> <p><input type="checkbox"/>  Twitter</p> <p><input type="checkbox"/>  YouTube</p> <p><input type="checkbox"/>  Flickr</p> <p><input type="checkbox"/>  Google My Business</p>
---	---

In doing so, FRB can get a list of selected technologies that can address their needs (Figure 11).

Figure 11: List of selected technologies which fulfil the requirements

Functions: Analysis (Sentiment analysis)
Platforms: Facebook

Results: 16




























































































































































































































































































































































































































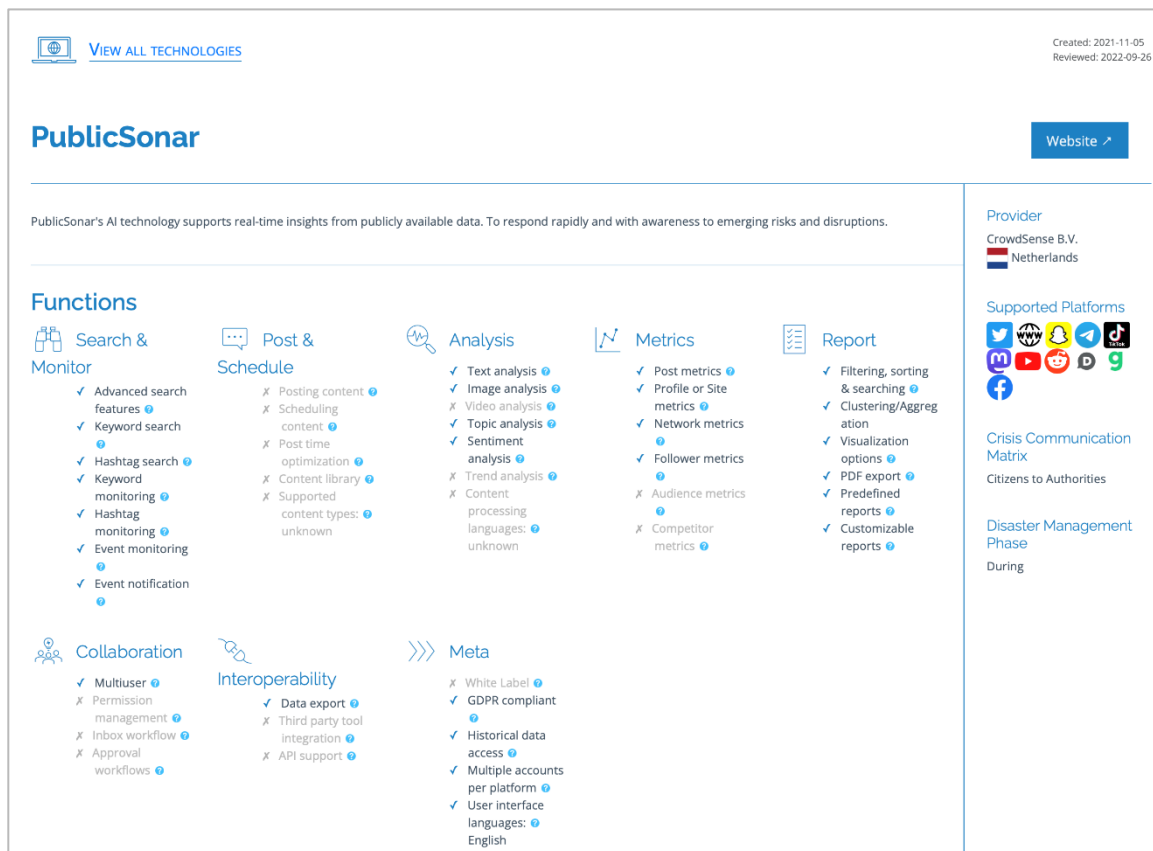
Name	Functions	Supported Platforms
Awario	                       	                
Brandwatch	                       	                
Emplifi	                       	                
Facelift Cloud <small>Used by practitioners</small>	                       	                
Fanpage Karma <small>Free edition Used by practitioners</small>	                       	                
GRYTICS	                       	
Hootsuite <small>Used by practitioners</small>	                       	                
Meltwater	                       	                
Obi4wan <small>Used by practitioners</small>	                       	                
Orlo	                       	                
PublicSonar <small>Used by practitioners</small>	                	

Figure 12: Profile page of a selected SMCS technology



[VIEW ALL TECHNOLOGIES](#)

Created: 2021-11-05
Reviewed: 2022-09-26

PublicSonar [Website](#)

PublicSonar's AI technology supports real-time insights from publicly available data. To respond rapidly and with awareness to emerging risks and disruptions.

Functions

- Monitor**
 - ✓ Advanced search features
 - ✓ Keyword search
 - ✓ Hashtag search
 - ✓ Keyword monitoring
 - ✓ Hashtag monitoring
 - ✓ Event monitoring
 - ✓ Event notification
- Post & Schedule**
 - ✗ Posting content
 - ✗ Scheduling content
 - ✗ Post time optimization
 - ✗ Content library
 - ✗ Supported content types: unknown
- Analysis**
 - ✓ Text analysis
 - ✓ Image analysis
 - ✗ Video analysis
 - ✓ Topic analysis
 - ✓ Sentiment analysis
 - ✗ Trend analysis
 - ✗ Content processing languages: unknown
- Metrics**
 - ✓ Post metrics
 - ✓ Profile or Site metrics
 - ✓ Network metrics
 - ✓ Follower metrics
 - ✗ Audience metrics
 - ✗ Competitor metrics
- Report**
 - ✓ Filtering, sorting & searching
 - ✓ Clustering/Aggregation
 - ✓ Visualization options
 - ✓ PDF export
 - ✓ Predefined reports
 - ✓ Customizable reports
- Collaboration**
 - ✓ Multiuser
 - ✗ Permission management
 - ✗ Inbox workflow
 - ✗ Approval workflows
- Interoperability**
 - ✓ Data export
 - ✗ Third party tool integration
 - ✗ API support
- Meta**
 - ✗ White Label
 - ✓ GDPR compliant
 - ✓ Historical data access
 - ✓ Multiple accounts per platform
 - ✓ User interface languages: English

Provider
CrowdSense B.V.
Netherlands

Supported Platforms
Twitter, Facebook, YouTube, Instagram, LinkedIn, etc.

Crisis Communication Matrix
Citizens to Authorities

Disaster Management Phase
During

The learning path of analysing and collecting information led FRB to find a technology which may be suitable. However, additional resources can also be relevant to them, for instance, some guidelines for practitioners and advanced users, available in Danish and English.

The FRB employee aimed to collect and analyse information from Facebook, potentially in open, local Facebook groups. Following the learning path on Engaging with citizens, the employee focused on “how” to investigate the potential for further engagement. The added value for this stakeholder is two-folded:

- Guidance through questions and
- Pre-defined filters which orientate the user toward pre-selected results that address the aim.

This facilitates access to the knowledge distilled from the LINKS products, in this case, a list of technologies.

The learning path is captured in the following visual (Figure 13).

Figure 13: Learning path Engaging with Citizens, Collecting and Analysing Information



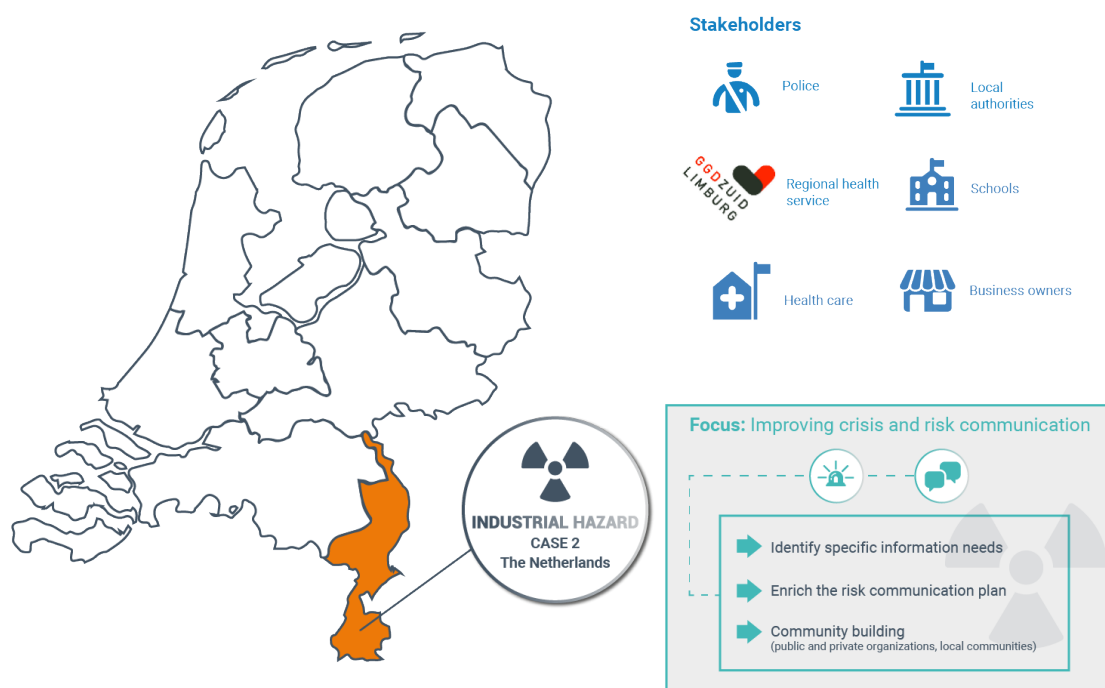
Source: WP3's contribution

The next steps for FRB entail:

- Applying one or more technologies (pilot case);
- Analysing the results and assessing if the technologies meet their expectations;
- Identifying the most promising tool based on the results;
- Selecting public Facebook group(s) to carry out sentiment analysis;
- Reaching out to other networks of, e.g. practitioners, policy and decision makers to further discuss issues and solutions that may also be relevant in different contexts.

2.2.2 User Story 2: Improving Communication

Figure 14: Dutch case, hazard scenario and benefited stakeholders



Source: WP6's contribution

As outlined in D6.2 and in D6.3, the Dutch case (Figure 14) mainly focuses on crisis and risk communication in the frame of an industrial accident. Following up the research carried out by the National Institute for Public Health and the Environment (RIVM), which revolved around the information needs and safety perceptions of citizens surrounding Chemelot (the chemical plant), the private and public entities involved in the case are interested in enriching the current risk communication plan. While the latter deals with citizens and residents from the three municipalities surrounding Chemelot, specific target groups' information needs are yet to be captured: e.g. students, healthcare professionals and people involved in the business (shop owners). Ultimately, the project's activities (especially the LINKS Community Workshops) will enhance community building and cooperation between local communities and practitioners.

In this frame, the Safety Region of South Limburg (VRZL), which is involved in the case, is interested in:

1. understanding **how to make relevant information and risk communication more accessible to all stakeholders** involved in the community through SMCS and,
2. understanding **how to best approach the target groups mentioned above, starting with the students.**

VRZL is a public organisation that acts in case of large-scale emergency solutions. It is in South Limburg, in the southeastern part of the Netherlands, near the Belgian and German border. VRZL's primary goal is to create a resilient community by "joining hands" with private and public organisations and the community. The organisation is exploring ways to improve risk and crisis communication in the case of a chemical incident (e.g. a chemical spill). Chemelot, a large chemical park located within the region, is an important risk object. The Chemelot site borders a dense urban area. Some homes are only a few hundred meters from the fences of the Chemelot site. Schools and healthcare organisations do not necessarily struggle with evacuation exercises. However, calling people back indoors or instructing people to stay indoors during a chemical emergency requires careful strategic planning. To change people's behaviour and stir it towards the right direction, it is key to engage with the local communities, also through *ad hoc* social media strategies.

Enriching the current communication plan and understanding how to make relevant communication more accessible to all stakeholders involved in the local communities would benefit VRZL and other local practitioners in the area.

The LINKS Framework can support the VRZL communication department, the risk communication working group consisting of communication advisors from Chemelot and its surrounding municipalities, with guidelines on making information more accessible. Moreover, it can assist VRZL in dealing with specific target groups, such as students.

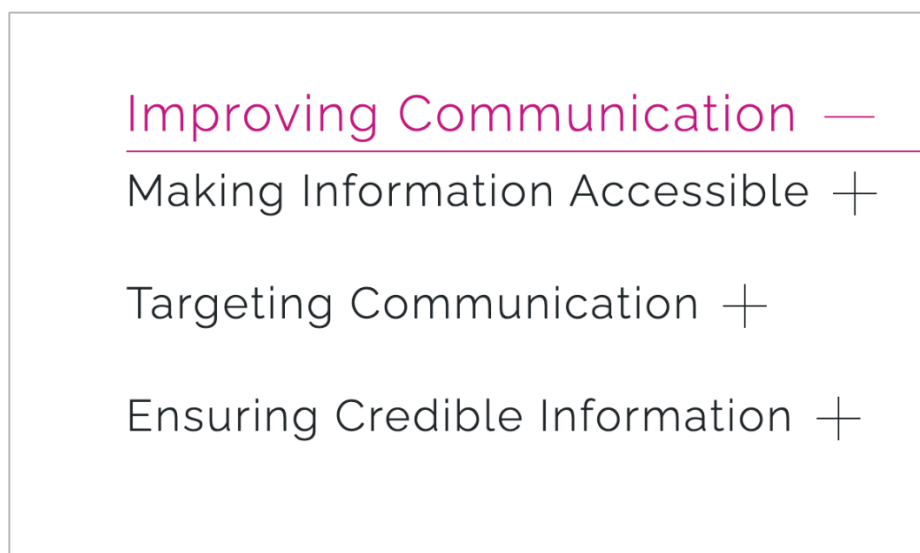
The LINKS Framework is available on the landing page of the LINKS Community Center (Figure 15).

Figure 15: The LINKS Framework compass in the LCC



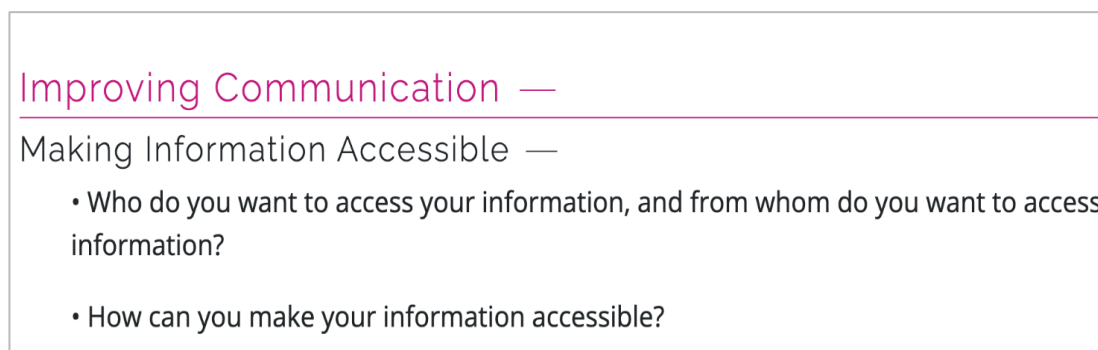
By clicking on the main theme which of relevance to VRZL (Improving Communication), three sub-themes (or focus areas) will be displayed (Figure 16).

Figure 16: The theme Improving Communication with its sub-themes in LCC



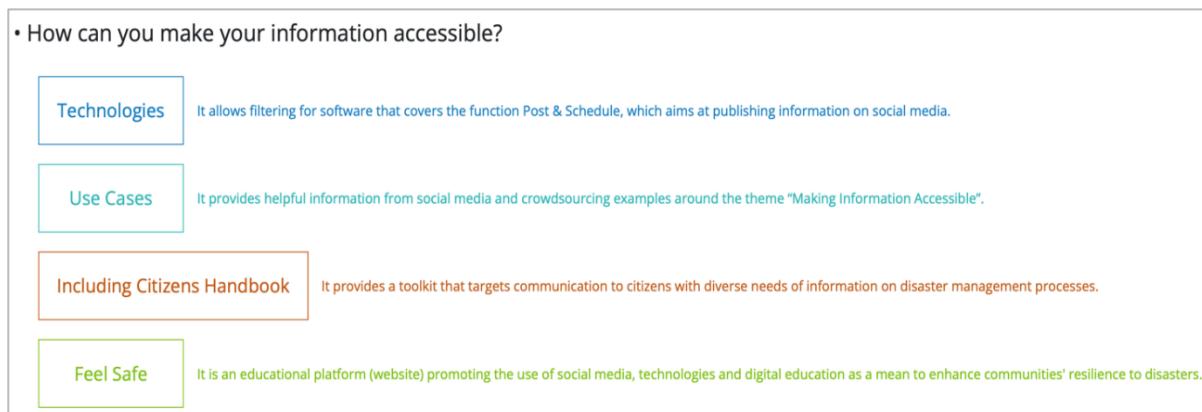
By expanding the sub-themes, the learning paths related to Making information accessible are displayed, consisting of two pre-defined guiding questions (Figure 17).

Figure 17: The sub-theme Making Information Accessible and its guiding questions in LCC




VRZL is mainly looking for general recommendations on the "how", as depicted in Figure 18. There are four options for products which can be of relevance to VRZL: access to a list of pre-selected technologies, examples from actual practices on how information can be made more accessible, a Handbook revolving around citizens' inclusion and how to target communication, and an educational platform which now seems to help approaching students (children).

Figure 18: The chosen guiding question and the products in LCC



VRZL selects the Including Citizens Handbook of the four products. Before understanding how to approach specific target groups, VRZL is looking for guidance on how to make relevant information and risk communication more accessible to all stakeholders involved in the community through SMCS. In the LCC, the employee from VRZL gets more information on the Handbook⁸, as shown in Figure 19.

Figure 19: Including Citizen Handbook main information



Accessibility
Making information accessible in disasters

The Including Citizens' Handbook provides a toolkit that targets communication to citizens with diverse needs of information on disaster management processes. The targeted stakeholders are schools (students and teachers), universities, local authorities and experts in the field of risk management, local citizens, and LINKS partners.

The Including Citizens' Handbook contains resources for a wide range of individuals, from trained people such as volunteers to citizens with a variety of vulnerability profiles. For this purpose, it is divided into four thematic areas, with each one providing in depth insight into disaster management and operation procedures per case:

1. Increasing awareness
2. Making information accessible
3. Mobilising citizens
4. Mobilising volunteers

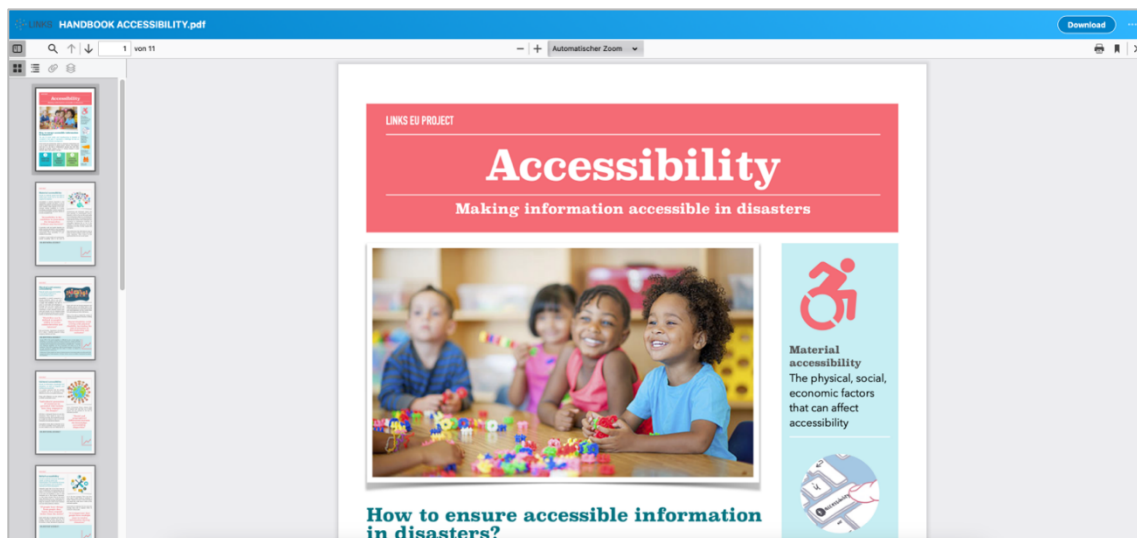
ACCESS CITIZEN'S HANDBOOK - MAKING INFORMATION ACCESSIBLE

By clicking on Making information accessible, the VRLZ employee gets access to the full pdf⁹ on this topic, as shown in Figure 20.

⁸ https://links.communitycenter.eu/index.php/Including_Citizens_Handbook_-_Accessibility

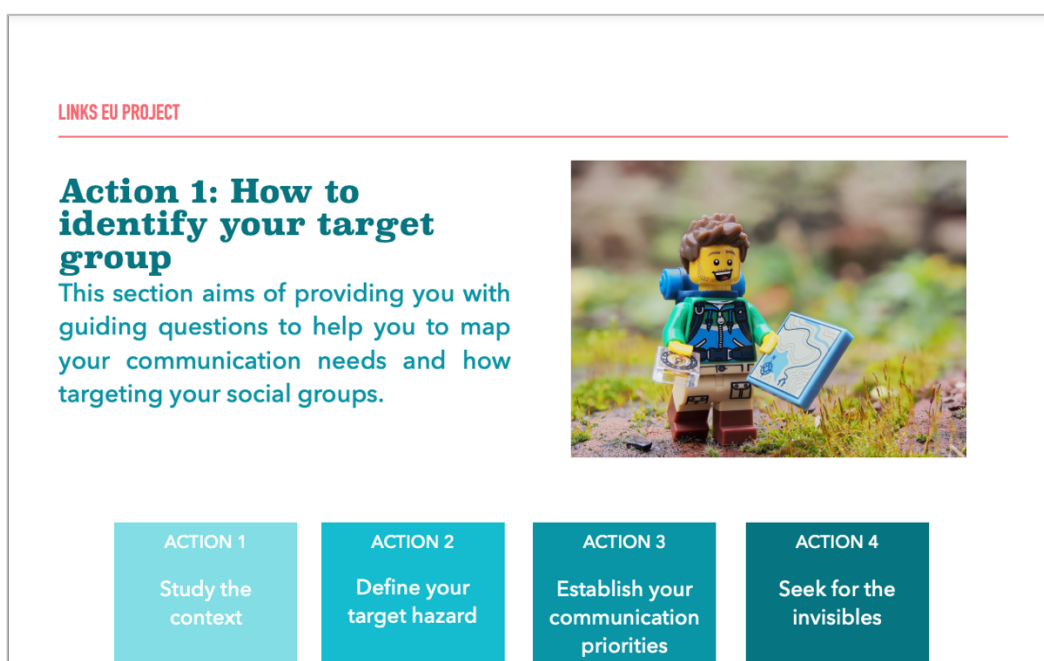
⁹ <https://cloud.links.communitycenter.eu/index.php/s/Dqikbek2YkHx83T>

Figure 20: Including Citizen Handbook – Front page



The Handbook can help VRZL to identify target groups and potential accessibility problems and provides guidelines on how to set up communication channels. All the actions mentioned on the first page (Figure 21) of the Handbook are of great interest to VRZL since there is a need for a more structured and systematic approach towards accessibility within the organisation.

Figure 21: Including Citizen Handbook – answers for targeted communication



The point of departure is crucial to understanding how to approach accessibility, specifically the target groups. The overall context and the hazard are familiar to VRZL. What would be needed is a stronger focus on communication strategies and on solutions that can address the needs of the

target groups (e.g. students)? VLRZ is looking for checklists for setting up communication channels and recommendations or examples to reach out to students (children and teenagers), as seen in Figure 22. VRZL has existing communication channels, but upgrades and adjustments might be needed. It is also essential for VRZL to connect problems to specific actions that can be carried out with the local communities (Figure 23).

Figure 22: Including Citizen Handbook – answers for setting communication channels

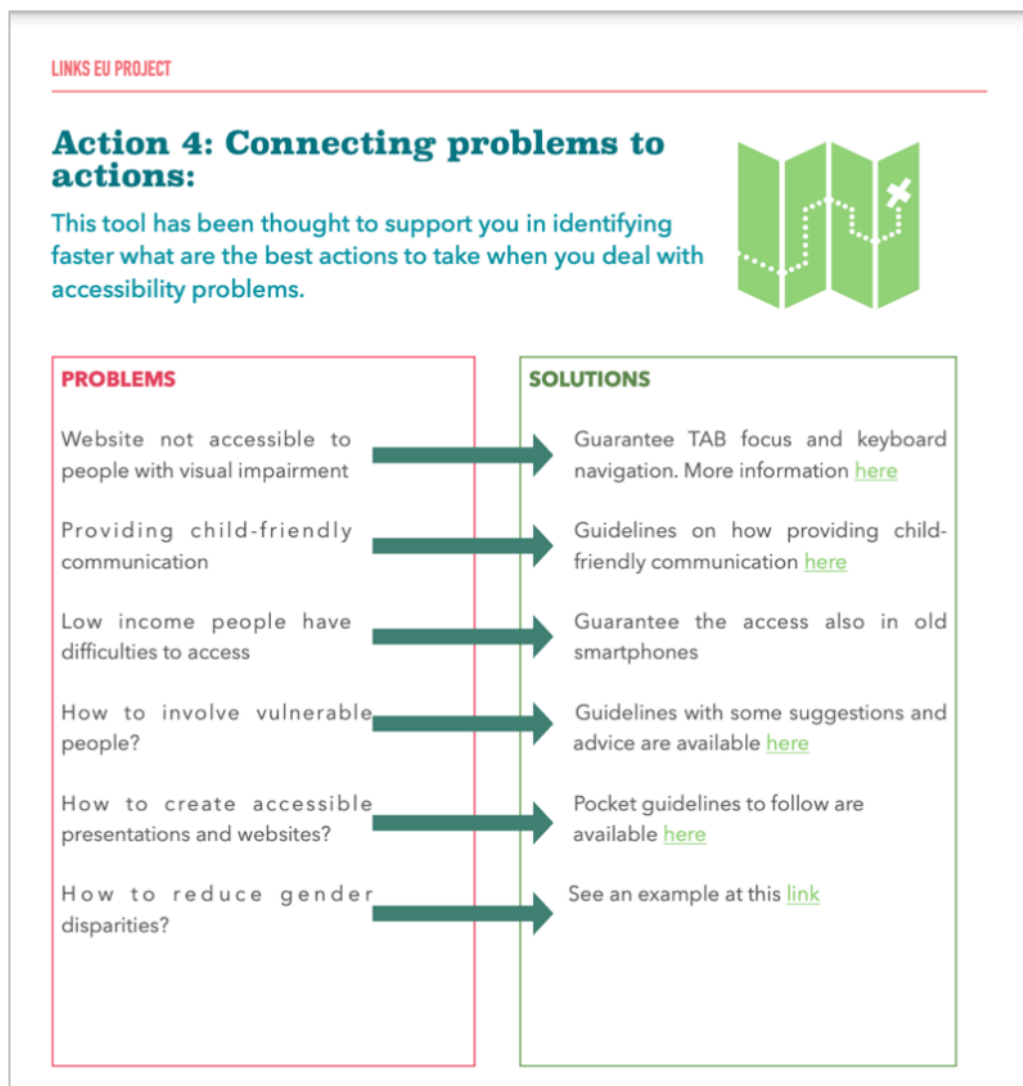
LINKS EU PROJECT

Action 3: How to set up your communication channel

In order to help you to set up in the best way your communication channel, we provide you here a checklist to create an [accessible social media post](#):

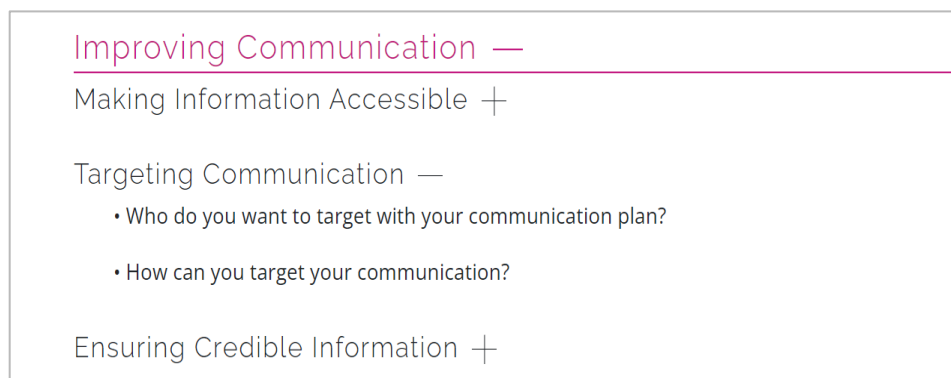
<div> <div>✗</div> <div>AVOID</div> </div>	Material accessibility	<input type="checkbox"/> Writing large section of text in 'all-caps' <input type="checkbox"/> Putting valuable information in headers and footers as screen readers will ignore them <input type="checkbox"/> Underlying large blocks of text as it reduces readability <input type="checkbox"/> Adding temporary elements <input type="checkbox"/> Adding too much information	
	Cultural accessibility	<input type="checkbox"/> Using acronyms and technical language <input type="checkbox"/> Adding emoticons <input type="checkbox"/> Using images, symbols and icons for beauty reasons	
	Institutional accessibility	<input type="checkbox"/> Creating more than one official pages <input type="checkbox"/> Using institutional pages to promote information not strictly necessary <input type="checkbox"/> Using just one social media (each social media has its accessibility rules)	
	<div> <div>✓</div> <div>DO</div> </div>	Material accessibility	<input type="checkbox"/> Creating both mobile and website design <input type="checkbox"/> Giving possibility of access to visual impairment people <input type="checkbox"/> Giving possibility of access for people with old smartphones <input type="checkbox"/> Use the right colors for texts and backgrounds <input type="checkbox"/> Including alternative text to all images
		Cultural accessibility	<input type="checkbox"/> Providing translation support in all languages, including LIS <input type="checkbox"/> Adding subtitles and audio description to videos <input type="checkbox"/> Using system to identify fake news <input type="checkbox"/> Using easy and suitable language with short sentences and clearly examples <input type="checkbox"/> Guaranteeing the keyboard navigation
		Institutional accessibility	<input type="checkbox"/> Promoting the official channels to collect verified information <input type="checkbox"/> Create direct link with institutional channels <input type="checkbox"/> Give visibility to vulnerable groups <input type="checkbox"/> Providing specific communication for vulnerable groups

Figure 23: Including Citizen Handbook – solutions to problems



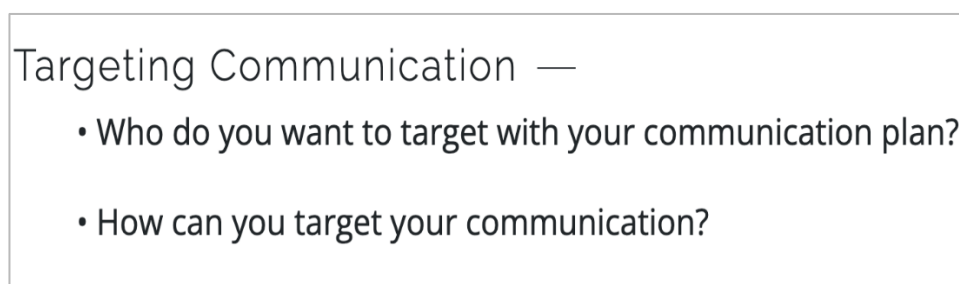
The next step for VRZL would be understanding how to approach students and tailor risk communication to them. The VRZL employer keeps reading the compass: the second learning path related to Targeting Communication can help (Figure 24).

Figure 24: The sub-theme Targeting Communication and its guiding questions in LCC



The learning path consists of two pre-defined guiding questions, as seen in Figure 25.

Figure 25: The chosen guiding questions



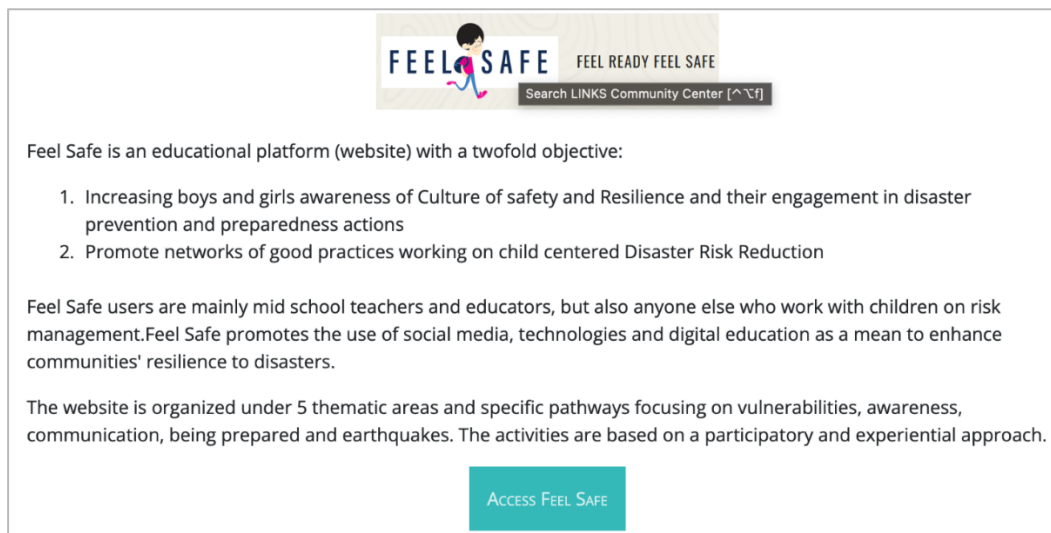
It is the "Who" that is most interesting to VRZL (Figure 26).

Figure 26: The chosen guiding question and the products in LCC



The educational platform Feel Safe seems to address the needs and expectations of VRZL. They select the Feel Safe¹⁰ icon and get an information page (Figure 27).

Figure 27: Feel Safe main information



FEEL SAFE FEEL READY FEEL SAFE

Search LINKS Community Center [^⌘f]

Feel Safe is an educational platform (website) with a twofold objective:

1. Increasing boys and girls awareness of Culture of safety and Resilience and their engagement in disaster prevention and preparedness actions
2. Promote networks of good practices working on child centered Disaster Risk Reduction

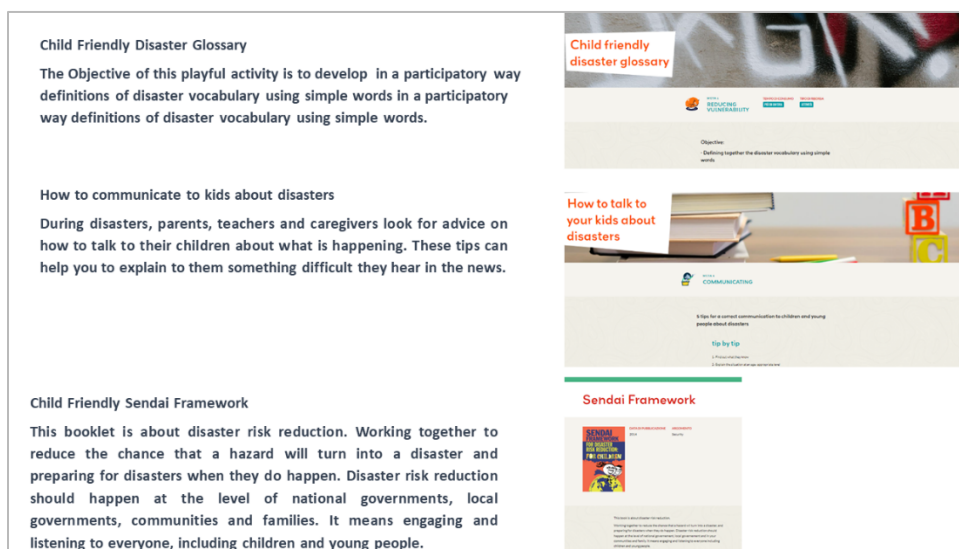
Feel Safe users are mainly mid school teachers and educators, but also anyone else who work with children on risk management. Feel Safe promotes the use of social media, technologies and digital education as a mean to enhance communities' resilience to disasters.

The website is organized under 5 thematic areas and specific pathways focusing on vulnerabilities, awareness, communication, being prepared and earthquakes. The activities are based on a participatory and experiential approach.

ACCESS FEEL SAFE

Some resources can support VRZL in getting a better understanding of how to approach kids when discussing and explaining disasters, as shown in Figure 28. A child friendly disaster glossary, some tips to how communicate with kids and even a child friendly Sendai Framework are available. The VRZL employee now has enough resources to further discuss internally within the organisation and agree on the way forward.

Figure 28: Feel Safe information on how to approach children in disaster-related discussions



Child Friendly Disaster Glossary

The Objective of this playful activity is to develop in a participatory way definitions of disaster vocabulary using simple words in a participatory way definitions of disaster vocabulary using simple words.

How to communicate to kids about disasters

During disasters, parents, teachers and caregivers look for advice on how to talk to their children about what is happening. These tips can help you to explain to them something difficult they hear in the news.

Child Friendly Sendai Framework

This booklet is about disaster risk reduction. Working together to reduce the chance that a hazard will turn into a disaster and preparing for disasters when they do happen. Disaster risk reduction should happen at the level of national governments, local governments, communities and families. It means engaging and listening to everyone, including children and young people.

Child friendly disaster glossary

How to talk to your kids about disasters

Sendai Framework

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

The VRZL employee had two aims:

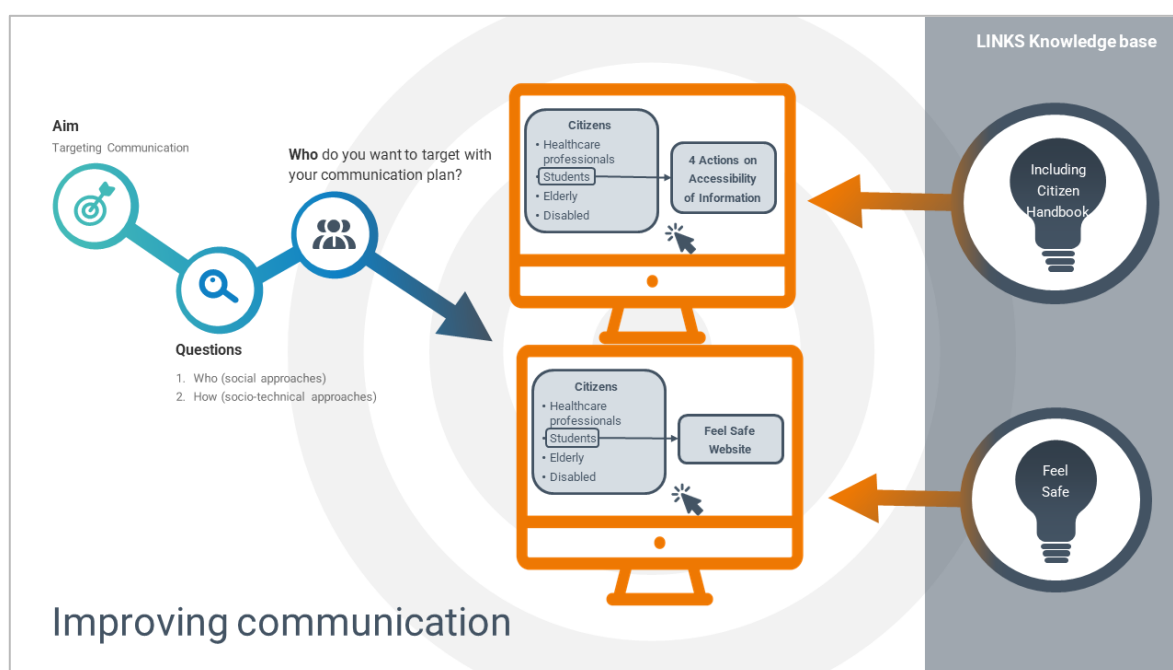
- Understand how to make relevant information and risk communication more accessible to all stakeholders involved in the community through SMCS and;
- Understand how to best approach some target groups, starting with the students.

Following the learning path on Improving communication, the employee focused on “how” to make information accessible, investigate the potential for further engagement, and target communication with a specific focus on the “who”. The added value for this stakeholder is, beyond guidance through questions, the resources which are made available that speak directly to VRZL needs:

- An excerpt from the Including Citizens Handbook on accessibility;
- The link to the Feel Safe webpage with a set of resources which can help target disaster-related information and communication

The learning path is captured in the visual below (Figure 29).

Figure 29: Learning path on Improving communication, targeting communication



Source: WP3's and WP5's contribution

The following steps for VRZL entail:

- Adjusting already existing communication strategies by taking into account accessibility problems and potential solutions;

- Presenting Feel Safe to school directors and teachers and agreeing on how it can be used in that context;
- Selecting one school (pilot) and using the available resources with teachers and students;
- Carrying out a workshop to discuss the usefulness of Feel Safe and whether it can be applied in other schools;
- Revising and enriching the current communication plan based on lessons identified and learned while exploring and applying the LINKS Framework;
- Reaching out to other networks, e.g. practitioners, to further discuss issues and solutions that may be relevant in different contexts.

3. THE LINKS FRAMEWORK DESIGN

As explained in Section 2, the second version of the LINKS Framework is designed to include a series of guiding questions (the learning paths) for each sub-theme linked to knowledge distilled from the products in the Framework. These pre-defined learning paths will be visualised in the LINKS Community Center (LCC), as shown in the user stories (2.2.1 and 2.2.1).

In this section, we provide the following:

- an updated product maturity mapping, including a technology readiness levels heatmap (3.1), see Table 1;
- an overview of the outcomes of the first round of refinement of the learning paths and the mapping/matching of the products (3.2);

3.1 Product maturity levels

As shown in the previous Section, the products provide the actual content for the LINKS Framework. The latter depends on the knowledge and resources made available through the products. The methodological deliverable (D2.7) provides an update on the progress of the products. It consists of a description of what, at the time, were the last steps taken leading to its current maturity levels. This included product updates based on the three LINKS knowledge bases and the related outcomes from the first round of case assessments.

The 5-step innovation model (Figure 30), as conceptualised in D9.2, streamlined the Technology Readiness Level (TRL) scale into five steps aimed at analysing the progress of the products by differentiating between idea generation, selection, development, testing in the validation phase, and finally, the sector launch. Given the compact character of the gauging scale, this model seeks to acquire a basic concept of the status of the products at a given time and promotes a faster comprehension of the progress in development.

Figure 30: LINKS Innovation Process Model



Source: WP9's contribution

However, for a more detailed and technical analysis, as required in this deliverable, the TRL scale is a better fit as it allows for a more specific mapping of the maturity level of the products. Specifically, we adopt the TRL scale used in the projects' work on exploitation under the Horizon Booster (HRB)

Module A program,¹¹ as it provides more detailed criteria for the analysis of the maturity level of the products.

Furthermore, it would allow for creating a heatmap based on the decided colours associated with each scale level from 0 (the originality of the product) to 9 (the complete commercial application). Figure 31 shows a TRL scale describing each level representing the product maturity level.¹²

Figure 31: Technology Readiness Levels (TRL)



Source: HRB & CloudWATCH2 Project

¹¹ See booster at <https://www.horizonresultsbooster.eu/apply>.

¹² Note that the Figure 31 visual was used in the Horizon Booster pre-assessment questionnaire but originates from CloudWATCH2, 'A brief refresher on Technology Readiness Levels (TRL)': <https://web.archive.org/web/20200126083540/https://www.cloudwatchhub.eu/exploitation/brief-refresher-technology-readiness-levels-trl>

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

TRL Progress / Product Maturity Levels						
LINKS Products	Description and how it benefits its target stakeholder	TRL	Year	Product update	Expected Technology Readiness Level (TRL)	Year
Technologies Library	The Technologies Library gathers and structures information about existing social media and crowdsourcing technologies to grasp the overwhelming market and to guide the selection and application of these technologies. For practitioners, it provides a highly needed overview of the market, gathers and structures the relevant information about these technologies and thus guides the selection and the application of suitable technology for disaster management.	TRL 6	2022	The Technologies Library has been refined and improved using various workshops, meetings and interactive sessions. This work will continue to improve the Technologies Library even further.	TRL 7	2023
Guidelines Library	The guidelines library gathers and structures existing guiding documents (guidelines, legal documents, SOP) that support the implementation and use of social media and crowdsourcing in LINK's target audiences. While the library targets disaster management organisations, it also contains documents intended for use by researchers, businesses, citizens or others interested in using SMCS in their crisis communication.	TRL 5	2022	Additional guidelines were added in English and other languages. The library is improved and verified to ensure that filters accurately reflect the needs of disaster management organisations. Abstracts are being developed to provide more straightforward overview and access to each guideline.	TRL 7	2023

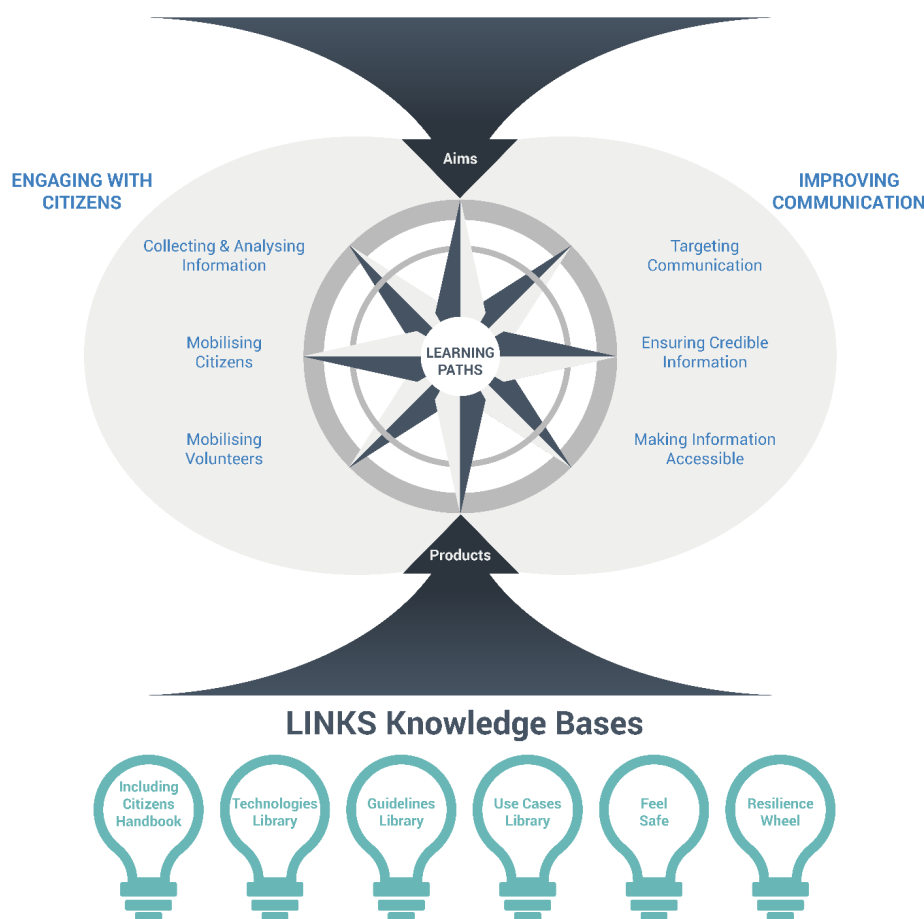
Use Cases Library	<p>The idea of the Use Cases Library is to collect experiences of how SMCS has been used or can be used in the real world. This will allow the stakeholders to find answers to specific questions, e.g.:</p> <ul style="list-style-type: none"> What technologies have organisations used to gather and analyse social media data in a disaster? What technologies were used for crowdsourcing in the flooding in 2021 in Germany? How do other DMOs organise their processing of data from Social Media? Did someone have a valuable idea to help disabled people using social media during a heatwave? 	TRL 3	2022	<p>The Use Cases Library is currently under active development as it is the newest of the LINKS products. Workshops, e.g. during the consortium meeting in Split in June 2022, have been used to refine the proposed schema and create updated versions. First-use cases have been collected using a formalised process and are currently being integrated into the LCC.</p>	TRL 7	2023
Including Citizens Handbook	<p>The Including Citizens Handbook touches upon four main thematic areas: increasing awareness, mobilising people, making accessible information and engaging with volunteers. It provides a set of tools (e.g. guidelines and checklists) in different formats that can be relevant to several target groups: from volunteers to minorities or vulnerable groups.</p>	TRL 3	2022	<p>The Handbook's is in a phase of thorough re-definition to avoid potential overlaps among the sections. The working group on the Handbook is still working on methodologies and solutions to avoid information redundancy.</p>	TRL 7	2023
Feel Safe	<p>Feel Safe is an online platform with two aims: 1) to provide educational material to engage children in disaster preparedness activities, 2) to promote knowledge and good practice in Europe around children's rights during emergencies and participation in emergency management. The website contains specific resources on SMCS, digital education and earthquake impact mitigation. The leading</p>	TRL 4	2022	<p>As of October 2022, the website structure and pathways with the educational materials have been developed. At the same time, content for good practices and useful readings is currently being developed. The upcoming work will concern i) improvement of design and graphics ii) content development iii) collaborations and partnerships.</p>	TRL 7	2023

	target group is represented by "School Teachers, Education Community and Practitioners organisations for disaster management". This product's ultimate beneficiaries are children aged 9-14 years.			The website will be launched in April/May 2023. Three workshops (with teachers, partners and children) have been carried out to ensure the co-design of the output and validation of the concept. Internal, External validation and demonstrations (TRL 4 –5 –6) will take place in December 2022 and January, February and March 2023.		
Resilience Wheel	The Resilience Wheel supports initial discussions and assessments on how social media and crowdsourcing may support and challenge disaster management processes within and across organisations. It simplifies the complexity of managing disasters through technology into a set and subset of factors through which the link between disaster management and technology can be understood	TRL 6	2022	Drivers and characteristics were revised and re-organised to reflect data and practitioner needs. The objective has been adjusted from being a tool for driving data collection to an independent tool supporting disaster management organisations.	TRL 7	2023

3.2 Refinement of the learning paths and matching with the products

As shown in Section 2, the learning paths are essential since they guide users by orienting them – through pre-defined questions towards the LINKS products. Based on their aims, relevant stakeholders can access the main themes of the LINKS Framework as well as the respective learning paths. Through the latter, the knowledge from the project is made available and distilled from specific products. By following the learning paths, relevant stakeholders will explore what they are looking for (e.g. only technologies for sentiment analysis) based on their aims and the pre-defined questions embedded in the learning paths. Figure 32 depicts the overall approach outlined above and described in the user stories (2.1.1 and 2.1.2).

Figure 32: Overall approach behind the learning paths



Source: WP5's and WP9's contribution

The outputs across the LINKS knowledge bases and results from the first case-based assessment were assessed to develop this approach. From this assessment, it became evident that the needs of various DMOs and other stakeholders are not only technically oriented. That is, they were not only interested in exploring and adopting technologies to, e.g. enhance risk communication plans, but

also socially oriented. For instance, understanding the social dynamics of local communities, and enabling two-way communication through technical and non-technical channels (e.g. meetings, newspapers), to build trust and relationships locally. The LINKS learning paths and products have also been developed from this perspective. The distinction between social and socio-technical learning paths was established to capture the wide range of answers that the products offer to address various aims and needs. For each sub-theme, two guiding questions are conceptualised from a social (people) and socio-technical (people and technologies) perspective.

Specifically, the learning paths consider social aspects to ensure citizen engagement by guiding them to products that consider inputs from populations (social systems - communities). In such learning paths, the guiding question is 'who?' and 'from whom?' capture both active (e.g., social media sharing) and passive (e.g., crowdsourcing) inputs.

Through socio-technical aspects, the learning paths aim to provide knowledge of technologies and participatory approaches that facilitate continuous multidirectional communication of information from social and institutional communication systems, i.e., people/population/communities and DMOs or stakeholders working with disaster management, and answer 'how' questions. All questions for each theme and sub-theme follow the "who" (referring to people) and "how" (referring to people and technologies) questioning approach, ensuring a joint "spine" of questions that aim to:

- connect the right products with the themes and sub-themes;
- Orient DMOs around the Framework's product answers tailored to their needs for including SMCS in their strategies and actions.

The first round of refinement of the pre-defined questions has been carried out with the involvement of the product owners. The learning path, i.e., the sub-themes and the aim of the guiding questions (GQs), are explained below.

An overview of the learning paths is provided in Table 2, while an explanation of the learning paths and the matching with the products is provided in sections 3.2.1. and in 3.2.2.

As the development and refinement of the learning paths is an ongoing process, some questions and connections with products have been adjusted if compared to what has been outlined in D6.3. For instance, the Resilience Wheel has been included and connected to two learning paths. Discussions with some product owners are still ongoing to refine the matching with the specific and distilled knowledge (e.g. excerpts) that their products offer.

Table 2 below is colour-coded as follows:

- In grey are the questions and products that cover socio-technical and technical solutions (e.g., technologies used, social media platforms, socio-technically oriented approaches etc.);
- In orange are the questions and the products that cover social aspects (e.g., the inclusion of vulnerable groups in risk communication plans).

Table 2: Overview of the learning paths

Learning paths			
Themes	Sub-themes	Aspects	Main Guiding Question (GQ)
Engaging with Citizens	Collecting and Analysing Information from SMCS	Social	1. Whom do you want to include in your collection and analysis of information, and from whom do you want to collect and analyse information?
		Socio-/Technical	2. How can you collect and analyse information?
	Mobilising Citizens	Social	3 Who do you want to mobilise, and from whom would you want mobility-affiliated information?
		Socio-/Technical	4. How can you mobilise the citizens?
	Mobilising Volunteers	Social	5. Who do you want to mobilise (interested in volunteering), and from whom in such volunteering positions would you want mobility-affiliated information?
		Socio-/Technical	6. How can you mobilise the volunteers?
Improving Communication	Making Information Accessible	Social	7. Who do you want to access your information, and from whom do you want to access information?
		Socio-/Technical	8. How can you make your information accessible?
	Targeting Communication	Social	9. Who do you want to target with your communication plan?
		Socio-/Technical	10. How can you target your communication?
	Ensuring Credible Information	Social	11. Who do you want to share credible information with, and from whom do you receive credible information?
		Socio-/Technical	12. How can you ensure credible information exchange?

The feedback from the product owners was considered with the aim of making the questions more understandable. Some overlaps were identified, and questions have been revised (e.g. rephrased) and reconsidered to ensure proper matching with the products. In the upcoming phase of the project, specifically during the second case-based assessment, the questions will be:

- Break in two, as needed, to foster critical thinking (e.g. whom do you want to include in your collection and analysis of information) and to offer more specific products within the LINKS Framework (e.g. “from whom” do you want to collect and analyse information? The long-term vision is to add a list of target groups based and a selection of products about the specific features and needs of the group, e.g. targeting communication to students);
- Discussed with the CATs (second round of refinement) to assess if the learning paths are understandable and orient them towards the products they seek.

3.2.1 Learning paths and product mapping for the theme Engaging Citizens

For the theme "Engaging Citizens" and the sub-theme "Collecting and Analysing Information from SMCS", two main guiding questions (GQ) aim to cover social and socio-technical (see Table 4) aspects. By following the learning path of the GQ1, a relevant stakeholder is interested in Identifying from whom the collection and analysis of information would be needed. For crowdsourcing approaches and passive receipt of information, they want to explore ways to collect and analyse information from reliable individuals or other organisations. The products that give solutions that include social elements, such as the inclusion of the elderly, low-income and homeless or disabled, are the Guidelines Library, the Use Cases Library and the Handbook.

Following the GQ2, as shown in the first user story outlined in Section 2, they are interested in socio-technical approaches that aid with collecting and analysing information/data from citizens or other organisations. The products that will give socio-technical solutions are the three libraries (Technology, Guidelines and Use Cases). FRB, for instance, as shown in 2.2.1., is interested in finding technologies to carry out sentiment analysis: the list of technologies that can address FRB's needs is available through the Technology Library. The Guidelines and Use Cases libraries can also offer, through pre-defined filters, e.g. crowdsourcing, relevant resources (Guidelines) and best practices (Examples), how to best collect and use social media data.

Table 4: Learning paths of the sub-theme "Collecting and Analysing information"

Learning paths			Products					
Theme: Engaging with Citizens								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technologies Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Collecting and Analysing Information from SMCS	Social	1. Whom do you want to include in your collection and analysis of information, and from whom do you want to collect and analyse information?						
	Socio-Technical	2. How to collect and analyse information from citizens?						

For the theme "Engaging Citizens" and the sub-theme "Mobilising Citizens", two main guiding questions (GQ) aim to cover social and socio-technical aspects (see Table 5). By following the learning path of the GQ3 that seeks to include the social element (i.e., citizen engagement), a relevant stakeholder is interested in mobilising citizens, for example, to evacuate or displace them. Expressly, to adopt communication approaches that include active (i.e., direct information sharing through social media platforms, web applications etc.) and passive (i.e., crowdsourcing of information relevant to specific citizens such as the elderly or young people) ways of receiving information and the use of SMCS. Such solutions can be provided by the Including Citizens Handbook and could be provided by the Use Case Library, if examples revolving around this sub-theme are included.

With the GQ4 (see Table 5), relevant stakeholders are interested in finding technologies, guidelines, best practices and socio-technical approaches to mobilise citizens through SMCS. Those can be found in the three libraries and Feel Safe. For example, the Guidelines Library includes relevant guidelines that will support DMOs and practitioners in mobilising citizens and search filters that will allow users to identify appropriate sources more efficiently, e.g., "Community management." Another example of answers provided by Feel Safe is the suggestions for implementing the formal and non-formal context of experimental activities (e.g., role plays) in a classroom that can be applied to the local communities or at home. Such activities enable students and their family members to be prepared for crises, knowing how to mobilise themselves and their assets and what to do. In addition, through the Resilience Wheel, DMOs are able to start a conversation and assess the potential challenges for including citizens through SMCS. The Resilience Wheel highlights "including

citizens" as a key driver for building disaster resilience through SMCS which is linked to a set of characteristics for the DMOs to consider when they want to mobilise citizens.

Table 5: Learning paths of the sub-theme "Mobilising Citizens"

Learning paths			Products					
Theme: Engaging with Citizens								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technologies Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Mobilising Citizens	Social	3. Who do you want to mobilise, and from whom would you want mobility-affiliated information?						
	Socio-Technical	4. How can you mobilise the citizens?						

For the theme "Engaging Citizens" and the sub-theme "Mobilising Volunteers", the guiding question GQ5 aims to cover social aspects in risk and crisis communication planning (Table 6). When this learning path is followed, the interest is to find two-way communication approaches with people interested in volunteering in disaster management preparedness/response. The two-way communication approach refers to the active and passive communication approaches, guidelines or examples enriched with SMCS. These are provided by the Guidelines Library, which offers guidance on disaster management issues related to mobilising volunteers, the Use Cases Library, the Including Citizens Handbook and the Feel Safe. For example, the educational activities conducted by school teachers guided by instructions from Feel Safe aim to bring a bridge of communication between children and volunteers.

The learning path that connects the theme "Engaging Citizens" and the sub-theme "Mobilising Volunteers" (Table 6) with products that offer socio-technical solutions is guided by the GQ6. Following this learning path, a DMO, stakeholder or practitioner can find socio-technically-oriented answers through the Technology Library, Guidelines Library, Use Cases Library and the Feel Safe. For example, guidance is provided through offered guidelines in the Guidelines Library for mobilising volunteers with search filters that allow users to identify relevant sources more efficiently, e.g., "VOST" and "Unaffiliated volunteers."

Table 6: Learning paths of the sub-theme "Mobilising Volunteers"

Learning paths			Products					
Theme: Engaging with Citizens								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technology Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Mobilising Volunteers	Social	5. Who do you want to mobilise (interested in volunteering), and from whom in such volunteering positions would you want mobility-affiliated information?						
	Socio-Technical	6. How can you mobilise the volunteers?						

3.2.2 Learning paths and product mapping for the theme Improving Communication

For the theme "Improving Communication" and the sub-theme "Making Information Accessible", the guiding question GQ7 (see Table 7) aims to cover social aspects in risk and crisis communication planning. GQ7 aims to guide toward solutions for active and passive handling of information that is either accessible or needs to be made accessible to different groups of the population (i.e., elderly, disabled, school students etc.). GQ7 receives answers regarding the information accessibility from the Use Cases Library, the Including Citizens Handbook and the Feel Safe. For example, Feel Safe aims to promote the implementation of DRR projects with children in primary and secondary schools and other educational organisations toward enhanced disaster preparedness. Additionally, the Including Citizen Handbook includes a section assisting with identifying accessibility problems (in the accessibility section of the Handbook) and provides recommendations that can help further the citizens and DMOs.

For the same sub-theme, GQ8 in Table 7 aims to guide the socio-technical aspects included in solutions provided by the products by asking how the information will be accessible. The Technology Library answers GQ8, the Use Cases Library, the Including Citizens Handbook and the Feel Safe. As shown in Section 2, in the second user story (2.2.1), information can be made more accessible through, e.g. technologies using filtering for software that covers the function Post and Schedule, while the Use Cases library can provide helpful examples focused on social media and crowdsourcing. The Handbook has an entire section on information accessibility. This part is of particular relevance for our stakeholder, VRZL (e.g. the checklist to create accessible media posts). Additionally, with various initiatives, Feel Safe aims to make information accessible by offering

translations of the included educational material to multiple languages (currently only in English and Italian) and to the disabled population with proper and related adjustments.

Table 7: Learning paths of the sub-theme " Making Information Accessible "

Learning paths			Products					
Theme: Improving Communication								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technology Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Making Information Accessible	Social	7. Who do you want to access your information, and from whom do you want to access information?						
	Socio-Technical	8. How can you make your information accessible?						

Table 8 and for the theme "Improving Communication" and the sub-theme "Targeting Communication", GQ9 aims to raise awareness around targeted risk and crisis communication plans. Specifically, it seeks to guide toward products tailored for specific target groups. The Use Cases Library, the Including Citizens Handbook and the Feel Safe provide solutions of targeted risk and crisis communication solutions. In this frame, as outlined in the second user story (2.2.2), Feel safe offers ad-hoc resources on how to approach kids when discussing and explaining disasters. GQ10 aims to lead to socio-technical solutions regarding targeted risk and crisis communications that the Technology Library provides, the Guidelines Library, the Use Cases Library and Feel Safe. Such socio-technical solutions include a list of platforms that technologies can manage, guidelines that organisations can utilise to effectively target groups of interest with their risk and crisis communication, and best practices/examples of how to best target communication using social media in different phases of disasters.

Table 8: Learning paths of the sub-theme " Targeting Communication "

Learning paths			Products					
Theme: Improving Communication								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technology Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Targeting communication	Social	9. Who do you want to target with your communication plan?						
	Socio-Technical	10. How can you target your communication?						

For the theme "Improving Communication" and the sub-theme "Ensuring Credible Information" (see Table 9), GQ11 aims to raise awareness around credible information sharing from (and between) the organisations and the citizens. This question is part of a social-oriented learning path that leads to solutions from the Use Cases Library and the Feel Safe. Finally, GQ12, and for the same sub-theme, is part of a learning path that is followed when there is interest in knowing "how" credible information can be ensured. The Technology Library provides such answers to relevant stakeholders as well as the Guidelines Library, the Use Cases Library, Feel Safe and the Resilience Wheel. For example, the Resilience Wheel encourages organisations to look holistically on the question of credible information and links it to questions of technological literacy, inter organizational collaborations and inclusions of citizens. It highlights organizational qualities for ensuring credible information related to reliable communication flows between organisations and citizens and emphasizes how information communicated through SMCS should be consistent across organisations to avoid confusion and distrust (one voice principle).

Table 9: Learning paths of the sub-theme " Ensuring Credible Information "

Learning paths			Products					
Theme: Improving Communication								
Sub-themes	Aspects	Main Guiding Question (GQ)	Technology Library	Guidelines Library	Use Cases Library	Including Citizens Handbook	Feel Safe	Resilience Wheel
Ensuring Credible Information	Social	11. Who do you want to share credible information with, and from whom do you receive credible information?						
	Socio- /Technical	12. How can you ensure credible information exchange?						

The mapping of the questions and the matching with products show there is potential for the learning paths and respective products to a) guide relevant stakeholders working with disaster management through social and socio-technical questions that should consider addressing their needs and b) provide concrete answers from products. It should be noted, as also highlighted elsewhere in this document, that further refinement of the questions is needed and the updates of the products will help to match the knowledge with each learning path more closely.

4. CONCLUSION

This document focuses on the second version of the LINKS Framework by providing the following:

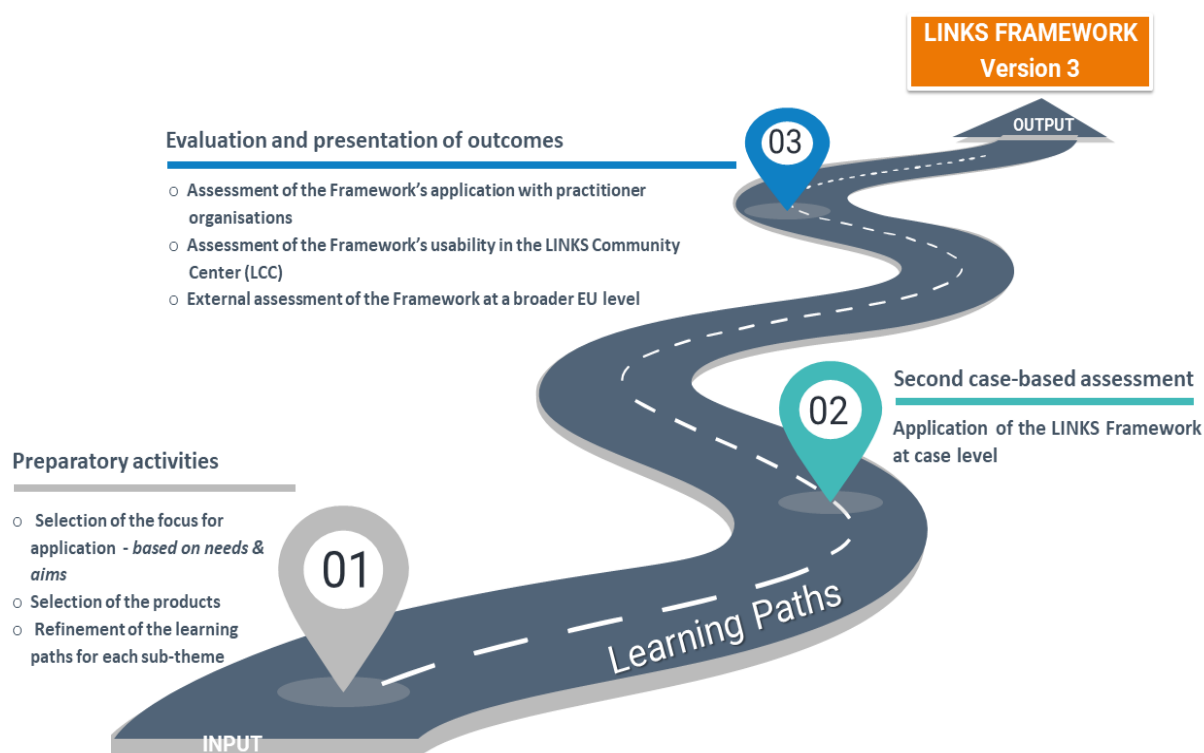
- An **overview of the steps** that led to the second version as well as **the design** of the second version;
- Two **user-stories** to show how the LINKS Framework and its products can be used by different stakeholders involved in the project, by following two learning paths revolving around Engaging with Citizens and Improving Communication.

The CATs are currently evaluating the second version of the Framework. In the section on next step below, we outline how the results from the second case-based assessments will feed into the final version of the LINKS Framework and how external evaluations will be carried out.

4.1 Next steps

The roadmap to develop the final version of the LINKS Framework is now at “pit stop” number 2, as depicted in Figure 33.

Figure 33: Toward the LINKS Framework Version 3



Source: WP5's and WP3's contribution

After the preparatory activities were carried out, the LINKS Framework is now being applied at the case level from November 2002 to February 2023. The overall activities in the cases are captured in case diaries, as describe in D6.3, Section 3. The main aim of the second case-based assessment is to explore and use the resources available in the LINKS Framework related to one or more learning path(s) and to assess the impact and usefulness of the Framework and its components locally. This process also involves product updates. The latter is critical to ensure that the LINKS products are co-developed together with the stakeholders involved in the project. Expected and actual outcomes about the application of the products are also collected through the activity diaries so that needs and gaps can be considered to develop the products and overall Framework further. The impact of the activities carried out at the case level and of the applied products is also tracked at the case level.

The results from the case assessments will be analysed and consolidated into the second case report (D6.5) in March 2023 and will feed into D5.5 (The final version of the LINKS Framework, July 2023). To design and develop the final version of the LINKS Framework it is key that:

- the results from the case assessments are taken into account to improve the learning paths and the content of the products;
- the learning paths are refined and revised to facilitate access to the products;
- the interconnections among all products are also refined to ensure the development of a well-integrated Framework in which the components complement each other;
- implementation in the LCC follows a streamlined, step-by-step approach based on the priorities and needs identified by the stakeholders;
- contribution to already EU existing initiatives is explored and discussed with relevant Directorate Generals (DGs), e.g. DG ECHO Knowledge Network (if and how the Framework can contribute to the pillars), as well as science and knowledge services of the European Commission like the Disaster Management Knowledge Centre (DRMKC).
- the Framework is evaluated and validated within a broader EU context throughout 2023, to further strengthen the Framework's applicability within different organisations and cultures to those of the setting of the LINKS project. The external evaluation should assess the Framework as a whole, namely both the added value of the learning paths (if they actually guide users who are unfamiliar with the project) and of the products within the LCC. In this regard, an external evaluation is currently being planned to entail:
 - Activities (e.g. workshops) with the LINKS Advisory Committee (LAC).
 - Workshops, meetings, and conferences with relevant target groups from Europe and beyond.

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