Co-funded by
the European Union

SYNERGIES

Innovating Preparedness by Leveraging SYNERGIES and Enhancing Results of DRM Projects

Grant Agreement No. 101121172
Starting date: 1st December 2023 – Duration: 36 months

Deliverable D7.3
Data Management Plan

DOCUMENT INFORMATION

Deliverable number	D7.3
Deliverable title	Data Management Plan
Work Package	WP7
Deliverable type[1]	Data Management Plan
Dissemination level[2]	Public
Due date	31.05.2024 (Month 6)
Document version[3]	1.1
Lead author(s)	Uberto Delprato, Salvatore A. Marchese, Francesca Vita (IES, now WGS)
Contributors	Jacqueline Floch, SINTEF AS (SINTEF); Nathan Clark, STICHTING VU (VU); Cristina Casareale, SAVE THE CHILDREN (SAVETC); Therese Habig, SAFETY INNOVATION CENTER (SIC) Richard Lüke, SAFETY INNOVATION CENTER (SIC); Paola Lorenzoni, ISTITUTO DI SOCIOLOGIA INTERNAZIONALE DI GORIZIA (ISIG); Alessia Golfetti, DEEP BLUE SRL (DBL).
Reviewers	Benjamin Hall, RESILIENCE ADVISORS (EUROPE) (RAN) Oliver Nahkur, TARTU ULIKOOL (UT)
Suggested citation	Delprato, U., Marchese, S., Vita, F. (2024) D7.3 Data Management Plan, SYNERGIES Project: Innovating preparedness by leveraging synergies and enhancing results of DRM projects, funded by the European Union's Horizon Europe Innovation Programme (No. 101121172).

[1] Type: ORDP: Open Research Data Pilot; R: Report; D: Demonstrator

[2] Dissemination level: C: Confidential; P: Public

[3] First digit: 0: draft; 1: peer review; 2: peer review 3: coordinator approval; 4: final version

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

DOCUMENT CHANGE HISTORY

Version	Date	Author	Description
0.1	12/04/2024	Salvatore A. Marchese (IES, now WGS, Uberto Delprato (IES, now WGS	Creation of the ToC
0.2	17/05/2024	Francesca Vita (IES, now WGS), Salvatore A. Marchese (IES, now WGS)	Preparation of the first draft
0.3	26/04/2024	Jacqueline Floch (SINTEF)	Contribution to the living document
0.3	02/05/2024	Nathan Clark (VU)	Contribution to the living document
0.4	03/05/2024	Cristina Casareale (SAVETC)	Contribution to the living document
0.5	06/05/2024	Richard Lüke (SIC)	Contribution to the living document
0.6	07/05/2024	Paola Lorenzoni (ISIG)	Contribution to the living document
0.7	10/05/2024	Alessia Golfetti (DBL)	Contribution to the living document
0.8	13/05/2024	Salvatore A. Marchese (IES, now WGS) Francesca Vita (IES, now WGS)	Finalisation of the document
0.9	15/05/2024	Benjamin Hall (RAN)	Peer review of the document
0.9	24/05/2024	Oliver Nahkur (UT)	Peer review of the document
1.0	27/05/2024	Salvatore A. Marchese (IES, now WGS)	Preparation of the final version
1.1	30/05/2024	Alessia Golfetti (DBL)	Final quality check and submission

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

LIST OF PARTNERS

N.	Logo	Name	Short Name	Country
1		DEEP BLUE SRL	DBL	Italy
2		INTELLIGENCE FOR ENVIRONMENT AND SECURITY SRL IES SOLUTIONS SRL	IES	Italy
3		SINTEF AS	SINTEF	Norway
4		SAFETY INNOVATION CENTER GGMBH	SIC	Germany
5		RESILIENCE ADVISORS NETWORK	RAN	Ireland
6		STICHTING VU	VU	Netherlands
7		ISTITUTO DI SOCIOLOGIA INTERNAZIONALE DI GORIZIA	ISIG	Italy
8		TARTU ULIKOOL	UTARTU	Estonia
9		UNITED NATIONS EDUCATIONAL SCIENTIFIC AND CULTURAL ORGANIZATION	UNESCO	France
10		OPENBAAR LICHAAM GEZAMENLIJKE BRANDWEER	GB	Netherlands
11		SAVE THE CHILDREN ITALIA ETS	SAVETC	Italy
12		INTERNATIONAL SAFETY TRAINING COLLEGE LIMITED	ISTC	Malta
13		SCIENCES REUNION - CENTRE DE CULTURE SCIENTIFIQUE TECHNIQUE ET INDUSTRIELLE	SRUN	France
14		REGIONAL COUNCIL NORTHERN REGION	RT	Malta
15		HET NEDERLANDSE RODE KRUIS	RCNL	Netherlands

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

16		AGENCE OBSERVAT AMENAGE HABITAT REUNION	AGORAH	France

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

PROJECT OVERVIEW

The SYNERGIES project aims to strengthen a culture of disaster preparedness by fostering a cohesive and coordinated engagement of various stakeholders in disaster management such as first and second responders, citizens, communities, research and education systems, authorities and public administrations, and businesses. SYNERGIES concentrates on five preparedness needs:

- involvement of all relevant actors in building preparedness;
- strengthening preparedness education and training;
- communicating with citizens;
- management of spontaneous volunteers;
- ensuring the sustainability of solutions for preparedness.

The project leverages the results of past Horizon 2020 projects under the call for Disaster Resilient Societies (DRS01) (e.g., LINKS, RESILOC, BUILDERS, ENGAGE, etc.). These "component projects" will integrate their results into SYNERGIES with the best practices and experiences of practitioners, refining and elevating their maturity.

Three Preparedness Cases will guide the project, allowing for orientation, progress evaluation, and demonstrations of the final results. These cases involve real-life scenarios where stakeholders, such as first responders, authorities, citizen associations, and NGOs, seek to enhance preparedness by better involving and empowering citizens.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

EXECUTIVE SUMMARY

This document serves as the data management plan (DMP) for the SYNERGIES project, outlining the comprehensive strategy for data management, storage, and protection during the project life cycle.

The document is divided into five chapters. Chapter 3 'Data Summary' outlines the management of collected data, emphasizing the importance of effective management to achieve project objectives. How data is generated and processed through a structured process is explained, detailing the types and formats of data and their use to improve risk management and emergency preparedness practices. Chapter 4 'Data Depositing' explores data deposit methods, emphasizing adherence to FAIR principles and GDPR compliance to ensure that anonymized data is properly managed and stored. Chapter 5 'Allocation of Resources' discusses the allocation of resources, detailing how the costs of curating and preserving data is covered by the project budget without additional costs for open access storage solutions. Chapter 6 'Data Security' describes the security measures taken to protect data, including secure storage systems and periodic backups. Finally, Chapter 7 'Ethical Aspects' discusses ethical and data protection policies, with a strong emphasis on GDPR compliance, the importance of informed consent, and protection through anonymization and pseudonymization of personal data.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

TABLE OF CONTENTS

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

Acronym	Description
AB	Advisory Board
CA	Consortium Agreement
CC	Creative Commons
CEN	European Committee for Standardization
CMINE	Crisis Management Innovation Network Europe
CWA	CEN Workshop Agreement
DMP	Data Management Plan
DoA	Description of Action
DPO	Data Protection Officer
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EC	European Commission
EOSC	European Open Science Cloud
EUCFR	Charter of Fundamental Rights of the European Union
EUTF	European Trust Fund
EW	Early Warning
FAIR	Findable, Accessible, Interoperable, Reusable
GA	Grant Agreement
GDPR	General Data Protection Regulation
H2020	Horizon 2020
IPR	Intellectual Property Rights
IT	Information Technology
KB4ICC	Knowledge Base for Innovative Channels and Communications
LCC	LINKS Community Center
LRT	Local Resilience Team
LST	Local Support Team
NGO	Non-Governmental Organization
ODC-ODbL	Open Data Commons Open Database License

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

ORDP	Open Research Data Pilot
PAT	Preparedness Assessment Tool
PC	Project Coordinator
PMS	Project Management structure
RaaS	Resilience as a Service
REA	Research Executive Agency
REA	European Executive Agency for Research
SMCS	Social media and Crowdsourcing
TL	Task Leader
VAT	Vulnerability Assessment Tool
WP	Work Package
WPL	Work Package Leader

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

1 Introduction

This document is the initial version of the Data Management Plan (DMP) for the SYNERGIES project. It establishes policies for the appropriate handling of data collected, generated, and processed during the life cycle of the SYNERGIES project. The plan is designed following the classic model of a data management cycle, which includes the steps of collecting, depositing, analysing and archiving project-related data.

For internal sharing among beneficiaries, a cloud storage solution, funded by the project budget, will be used to ensure that all relevant data is accessible to project partners in a secure and controlled manner. The public results of the SYNERGIES project will be deposited in publicly accessible repositories, such as Zenodo, in line with commitments made through the Open Research Data Pilot (ORDP) to ensure that the research data generated is open and reusable by the public. The project will also make use of services such as OpenAIRE, ROAR or OpenDOAR to maximize the accessibility and reuse of research data. Dissemination of the final deliverables will take place through the appropriate channels provided by European Commission guidelines.

All data will be managed following FAIR (Findable, Accessible, Interoperable, Reusable) principles, with specific emphasis on the principle of data minimization in accordance with Article 5 of the GDPR. The security measures taken will ensure that data storage capacity is adequate and that regular backups are made to protect the data from loss or damage.
In project phases where primary data will be collected, which may include private and/or sensitive data, specific measures will be taken to mitigate the risk of data misuse.

Sensitive data that must be retained for validation will be stored with regard to all necessary ethics and access control measures.

The SYNERGIES DMP is a 'living' document that will be updated annually or when significant changes occur in the project, reflecting new requirements or changes in the regulatory or technological environment.

Table 1 - Planned Versions of the DMP

Planned Date	Document
31.05.2024	*1st Version DMP*
XX.XX.2025	*2nd Version DMP*
XX.XX.2026	*3rd Version DMP*
XX.XX.2026	*Final Report DMP*

1.1 Data management and project objectives

Effective management of the data collected and generated is essential to the success and overall impact of the SYNERGIES project. The adaptation of the project objectives to this premise is as follows.

Goal 1 of the SYNERGIES project, which is "To support various formal actors (from authorities to first responders, social work, and education providers) in promoting citizen collaboration and integrating and empowering them and their communities in building preparedness," requires the challenging collection of high-quality and diverse data. Only by accessing comprehensive and detailed information regarding the various stakeholders, will be possible

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

to promote effective engagement and create a helpful and accessible interactive Atlas of best practices and lessons learned. This Atlas will serve as a guide for formal actors and community leaders in empowering citizens and communities.
Users of the Atlas will be able to select their initial conditions, such as level of preparedness or empowerment, and various aspects related to the context in which they operate. Based on this initial selection, the Atlas will propose a personalised pathway, allowing users to navigate best practices and guidance material to support the achievement of their specific goals.

At the moment of writing, the following inputs concerning DMP regarding the Atlas are expected for each of the considered development phases-sprints.

- Selection Methodology Sprint.
    - Data sources: Investigative criteria from Component projects will be adapted and refined with input from project partners.
    - Data flow: Review and adaptation of selection and filtering criteria through workshops and document review.
    - Data management: The output will be a set of refined selection criteria specific to the Atlas's focus on citizens participation, with details managed through structured reports.

- Content Identification Sprint.
    - Data sources: Data will be compiled from Component projects, Preparedness Cases and local stakeholders, Advisory Board, and extensive desk research.
    - Data flow: Systematic identification and compilation of materials will be conducted via workshops and the use of a structured data collection tool.
    - Data management: An inventory of best practices, lessons learned, and guidelines emphasising citizen participation and empowerment in DRM contexts will be managed and documented in sprint reports.

- Relevance Sprint.
    - Data sources: Materials compiled in the previous sprint will be evaluated for relevance with inputs from Component projects (especially LINKS), Preparedness Cases and the Advisory Board.
    - Data flow: Ethical and relevance evaluations will be integrated through workshops and expert consultations.
    - Data management: A refined list of materials vetted for relevance and ethical guidelines will be managed with documented revisions in sprint reports.

- New Content Sprint.
    - Data sources: Gaps identified from the existing content inventory will drive the collection of new content, focusing on inclusivity and adaptability, with the collaboration of CMINE network experts and the Preparedness cases.
    - Data flow: New content will be developed through brainstorming sessions and content development workshops led by the Synergies research team.
    - Data management: Newly developed content will be catalogued and evaluated for its comprehensive coverage and effectiveness in promoting citizen participation, with results documented in sprint reports.

- Evaluation and Validation Phases.
    - Data sources: The Atlas will be tested in real applications during the Preparedness Cases.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

- Data flow: Feedback from stakeholders will be systematically collected and used to revise and improve the Atlas.
- Data management: Continuous improvement based on stakeholder feedback will be managed through iterative revisions and validations, ensuring the Atlas meets the dynamic needs of DRM.

Equally crucial is the focus on data quality in relation to SYNERGIES Goal 2, "Promote a culture of preparedness through a capacity-building strategy focused on collaborative action in communities, analysing the needs of the skills gap, and developing an educational roadmap for key preparedness stakeholders.". The success of this goal depends significantly on the acquisition and analysis of data that will be critical to benchmarking educational practices, strategies, and actions application. This data acquisition will be implemented using the Preparedness assessment tool in various community settings; the data collected will be stored in dedicated repositories (see par. 4.1) in accordance with the data format. The data acquisition process will serve as the basis for the analysis activity, aimed at the development of training modules fully aligned with the specific needs of the communities involved.

To meet this Goal 2, SYNERGIES will develop two main training modules.

1. A training module targeting local formal and informal actors working in communities. This module will include actions to promote self-assessment of preparedness and learning from past events, along with co-design of preparatory actions involving citizens of different backgrounds and abilities.
2. An under- and/or postgraduate training module aimed at preparing future social workers, community leaders, and first responders. This module will be designed to be integrated into university curricula and to equip students with the skills needed to deal with and manage emergencies effectively.

In this way, SYNERGIES is committed to building a culture of disaster preparedness and resilience by leveraging an innovative educational approach and data driven by the real needs of communities.

Objective 3 aims to "Enable more effective information sharing by strengthening collaboration and communication and improving information exchanges between local authorities, citizens, particularly vulnerable populations, and the private sector.". Data analysis will support this goal by providing a detailed picture of population characteristics, cultural and social dynamics, trust in authorities, and education levels. This information shall be stored and made accessible to all consortium members and will be crucial for developing communication channels that are truly effective and responsive to the specific needs of different communities.

Outcome 3.1 aims to create a Knowledge Base for Innovative Channels and Communications (KB4ICC) that facilitates the preparation of tailored messages, calibrated according to the different socio-cultural characteristics of the targeted communities. So, the data collected for the identification of the right communication channel and the most suitable message construction to feed the KB4ICC, shall be stored, secured, and made accessible from the consortium and specifically from the WP3.

Also, with regard to SYNERGIES Objective 4, which concerns "Management of spontaneous volunteers with adequate understanding and consideration of the limitations and opportunities of their intervention," data are vital to the optimal management of spontaneous volunteers. They provide insight into the profile, skills and motivations of volunteers, elements necessary for their effective inclusion in emergency plans. Systematic collection of such information will support the creation of a support system (Outcome 4.1) that guides the integration of

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

volunteers into disaster response operations. The data will also contribute to the development of training tools (Outcome 4.2) that simulate disaster scenarios to improve understanding of roles and dynamics of response. All these data shall be collected in a way to protect the volunteers' sensitive information - i.e. using anonymisation or pseudo-anonymisation - and stored in a protected repository with limited access, allowing consultation to entitled person only.

Finally, SYNERGIES Objective 5 focuses on "Demonstrating the sustainability of project outcomes and providing effective solutions for users." In this framework, data will be used to assess the effectiveness of the proposed solutions and to understand their real-world, economic and application impact, supporting the solutions dissemination and future adoption in other contexts. The data will be maintained two years after the end of the project allowing the durability of the innovations developed and ensuring that prototypes have the opportunity to be translated into practical and permanent tools, rather than ending at the end of the testing phase.

Furthermore, with Outcome 5.2, the project aims to consolidate consensus on the results through the establishment of a CEN Workshop Agreement (CWA), creating guidelines and processes that will be shared through open repositories - e.g., Zenodo - and accepted by a broad consortium of stakeholders. This standardisation process and the resulting agreement will help formalise preparation practices and make the project's solutions accessible and widely applicable.

These collective efforts, based on data analysis and management, will be critical to achieving SYNERGIES' sustainability goals, ensuring that each solution contributes to long-term preparedness and effectiveness in disaster management.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

2. Legal framework

In the EU – as well as for EU-funded research – the Commission requires a high level of protection of personal data, as per Article 8, EUCFR, Article 16, EUTF and the reg. EU 2016/679 and its corollary regulation.

Nevertheless, the processing of personal data often takes place in complex scenarios, where this particular category of data is processed with other categories of data, which is commonly referred to as 'data', in general, or 'non-personal data'. In this regard, over the last few years, the EU has defined an articulated legal framework for private and public data governance, establishing ad-hoc regimes for each category of data.

For the purposes of this document, the cornerstone of the legal framework for data management and data protection, therefore, includes:

- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and the repealing of Directive 95/46/EC (General Data Protection Regulation).
- Regulation (EU) 2018/1807 of the European Parliament and of the Council of 14 November 2018 on a framework for the free flow of non-personal data in the European Union.
- Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act).

It is noteworthy that the simultaneous processing of personal and non-personal data has no mitigative effect on the legal regime and the standards of protection of personal data. This means that, when applicable, the rules provided by the reg. EU 2016/679 prevail over the other mentioned references.

For the purposes of this document, the following concepts are intended as follows.

Table 2 - Definitions provided in accordance with the European legal framework for data management and data protection.

Type of data
Data means any digital representation of acts, facts or information and any compilation of such acts, facts, or information, including in the form of sound, visual or audio-visual recording (reg. EU 2022/868, Article 2(1)).
Personal data means any information relating to an identified or identifiable natural person (data subject); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person (reg. EU 2016/679, Article 4(1)).
Special categories of personal data means personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation (reg. EU 2016/679, Article 9(1)).
Non-personal data means data other than personal data (reg. EU 2018/1807, Article 2(1); reg. EU 2022/868, Article 2(4).
Legal Bases

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Permission means giving data users the right to the processing of non-personal data (reg. EU 2022/868, Article 2(6)).
Consent means any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her (reg. EU 2016/679, Article 4(11)).
Subjects
Data subject means data subject as referred to in Article 4(1), Reg. EU 2016/679 (reg. EU 2022/868, Article 2(7)).
Controller means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data (reg. EU 2016/679, Article 4(7)).
Processor means a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller (reg. EU 2016/679, Article 4(8)).
Recipient [of personal data] means a natural or legal person, public authority, agency or another body, to which the personal data are disclosed, whether a third party or not. (reg. EU 2016/679, Article 4(9)).
Data holder means a legal person, including public sector bodies and international organisations, or a natural person who is not a data subject with respect to the specific data in question, which, in accordance with applicable Union or national law, has the right to grant access to or to share certain personal data or non-personal data (reg. EU 2022/868, Article 2(8)).
Data user means a natural or legal person who has lawful access to certain personal or non-personal data and has the right, including under Regulation (EU) 2016/679 in the case of personal data, to use that data for commercial or non-commercial purposes (reg. EU 2022/868, Article 2(9)).
Processing operations
Processing means any operation or set of operations which is performed on personal data or on sets of personal data (also in electronic format), whether or not by automated means, such as collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction (reg. EU 2016/679, Article 4(2); reg. EU 2018/1807, Article 3(2); reg. EU 2022/868, Article 2(12)).
Profiling means any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular, to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements (reg. EU 2016/679, Article 4(4)).
Access means data use, in accordance with specific technical, legal or organisational requirements, without necessarily implying the transmission or downloading of data (reg. EU 2022/868, Article 2(13)).
Sharing of data means the provision of data by a data subject or a data holder to a data user for the purpose of the joint or individual use of such data, based on voluntary agreements or Union or national law, directly or through an intermediary, for example under open or commercial licences subject to a fee or free of charge (reg. EU 2022/868, Article 2(19)).
Security
Pseudonymisation means the processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organisational measures to ensure that the personal data are not attributed to an identified or identifiable natural person (reg. EU 2016/679, Article 4(5)).

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Anonymisation means the processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject (reg. EU 2016/679, Article 4(5), ex converso).
Security of the processing means that taking into account the state of the art, the costs of implementation and the nature, scope, context and purposes of processing as well as the risk of varying likelihood and severity for the rights and freedoms of natural persons, the controller and the processor shall implement appropriate technical and organisational measures to ensure a level of security appropriate to the risk, including inter alia as appropriate: (a) the pseudonymisation and encryption of personal data; (b) the ability to ensure the ongoing confidentiality, integrity, availability and resilience of processing systems and services; (c) the ability to restore the availability and access to personal data in a timely manner in the event of a physical or technical incident; (d) a process for regularly testing, assessing and evaluating the effectiveness of technical and organisational measures for ensuring the security of the processing (reg. EU 2016/679, Article 32(1).
Secure processing environment means the physical or virtual environment and organisational means to ensure compliance with Union law, such as Regulation EU 2016/679, in particular with regard to data subjects' rights, intellectual property rights, and commercial and statistical confidentiality, integrity and accessibility, as well as with applicable national law, and to allow the entity providing the secure processing environment to determine and supervise all data processing actions, including the display, storage, download and export of data and the calculation of derivative data through computational algorithms (reg. 2022/868, Article 2(20)).

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

3. Data summary

3.1 Origin of data

In the SYNERGIES project, data will be generated through a structured process that reflects the specific phases of the project:

1. **General project input phase** - In this initial phase, generic data related to understanding and preparedness for disaster management will be collected, including input from existing literature, previous projects, and initial benchmarks.
2. **Study Phase** - This second phase is essential to establish a solid base of data and metrics that will guide the next stages of the research. This data collected comes from the initial interactions with the case studies, the submission of questionnaires, and the establishment of indicators and proxies.
3. **Methodological Development Phase (Integration)** - In this phase, collected data will be processed to develop functional methodologies. This includes the creation of models and frameworks that can be used to address the needs identified in the conceptualization phase.
4. **Implementation Phase (Preparedness cases)** - This final phase sees the implementation of the methodologies in real-world environments, where the data collected will be used to further validate and refine the methodologies and practices developed.

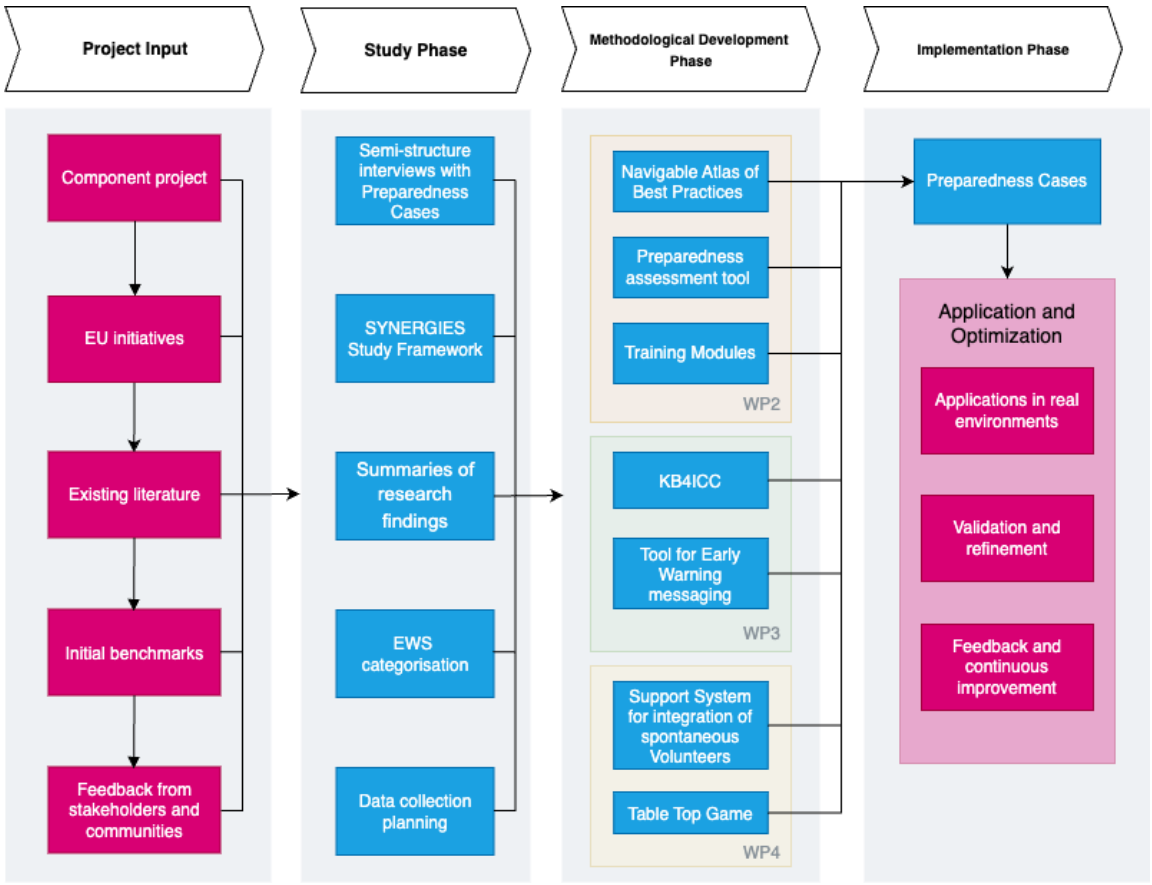

Figure 1 - The SYNERGIES holistic framework

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

3.1.1 General project input phase

The SYNERGIES project harnesses synergies among various disaster management actors, including first responders, communities, and public authorities. With the goal of improving disaster preparedness and response, SYNERGIES has taken cues from several previous projects. Here is how each project brings knowledge and experience in SYNERGIES.

- The **ENGAGE** project provides the CoS, a comprehensive catalogue of validated solutions that strengthen the collaboration between citizens, first responders, NGOs and public authorities, with the aim of increasing societal resilience. These solutions have been classified according to the type of capacity they contribute to strengthening, including communication with or alerting citizens; improving preparedness levels among citizens; improving autonomy, coping abilities, and proactiveness of citizens; improving involvement of and cooperation with citizens' and organizing and coordinating volunteers. For some selected solutions, the contextual factors that impact on their implementation and their use are being described. The CoS is released under the Creative Commons CC BY 4.0 license. People using this result can: share, copy, redistribute, adapt, and build upon the material for any purpose, even commercially. The attribution is that people using the guidelines must give credit to the ENGAGE project and EC support. No warrants are given.
- The **RESILOC** project provides the RaaS tool for collecting data and assessing local resilience, the RESILOC project will enhance SYNERGIES' understanding of communities' ability to withstand and recover from disasters and crises by including specific resilience indicators that were integrated into the overall dataset. Along with the RaaS tool, which implements the methodology for assessing resilience, RESILOC brings the conceptual framework that underpins the approach and methodology used to develop the RESILOC Resilience Indicators matrix and its set of 'indicators', and associated 'proxies', to measure community resilience - total of 70 indicators and 260 associated proxy measures across 6 resilience dimensions: Disaster Risk Reduction (DRR), Economic, Environmental, Governance, Infrastructure, and Social.
  Moreover, SYNERGIES will capitalise on the participatory approaches and tools developed and tested in RESILOC to promote civic engagement for resilience assessment and enhancement. A practical example of such an approach is the RESILOC Local Resilience Team (LRT) concept, a voluntary informal group/partnership of resilience experts and stakeholders established at local level in RESILOC communities. The methodology for stakeholders' mapping and engagement will be capitalised and used as a tool to mainstream communication, as a platform for enhancing the participation of volunteers, and in the Local Support Teams establishment within SYNERGIES.
- The **LINKS** project brings the online platform "LINKS Community Center" (LCC) as input to SYNERGIES. The LCC is a web-based platform that consolidates project results in one place and aims to foster a community around the use of Social media and Crowdsourcing (SMCS) in disaster management. It is accessible via any web browser, including on mobile devices. Access to the different results is free and does not require registration. Besides other results from the component project, the LCC includes four interlinked SMCS Libraries (focused on Technologies, Guidelines, Use Cases, and Crisis Communication Strategies). These structured collections offer comprehensive information across a range of SMCS topics and provide the possibility for its users to contribute content (for the contribution process the user needs to register). So, a larger and more active community will increase its usefulness and sustainability. Furthermore, the LCC provides access to Feel Safe, which is an online

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

platform aiming at providing educational material to engage children in disaster preparedness activities and promoting knowledge and good practice in Europe around children's rights during emergencies and participation in emergency management. The website is intended for supporting educators, schoolteachers, and organisations for disaster management in presenting these topics to children aged 9-14 years. The Feel Safe methodology and activities will be integrated into SYNERGIES 'training and educational modules'. Along with the Feel Safe platform, the LCC brings the Including Citizens Handbook, a digital toolkit and e-learning platform providing insights and instructions on how to involve citizens in disaster management processes, e.g., by using social media platforms. It includes guidance on how disaster management organisations can include citizens and their unique resources and skills into disaster management processes.
SYNERGIES will benefit from the content of the toolkit in terms of improving communication to the population and mobilisation and management of spontaneous volunteers.

- The **BUILDERS** project brings the Vulnerability Assessment Tool (VAT) as input to SYNERGIES. The VAT is a dynamic tool that helps to assess the crisis threats to individuals and how quickly and what kind of help they need. To do this, following a crisis scenario or a real crisis situation, first the sources of hazard are mapped: (1) what is the direct impact of the hazard on people (e.g. injury or poisoning); (2) which vital services and support structures may be disrupted, and (3) which communication barriers hamper accessing or understanding of risk and crisis information. Following this mapping, vulnerable groups can be specified and their need for assistance assessed, including evaluating the urgency and type of help needed for various groups in the hazard situation. BUILDERS also bring Ethical Principles of engaging citizens, evidence about training needs of caregivers and community leaders, fighting misinformation, regulatory framework for engaging spontaneous volunteers and solutions for management of volunteers.

These contributions, from a variety of sources and projects, enabled the SYNERGIES project to take a complex and well-rounded approach, making strategies more inclusive and based on data and in-depth analysis.

3.1.2 Study Phase

In the study phase, the SYNERGIES project will endeavour to comprehensively understand the landscape of disaster preparedness and resilience in societies and preparedness cases. To achieve this, the project partners will undertake various activities, including:

- Engaging in interviews via semi-structured interviews with project preparedness cases, including first responders, authorities, citizen associations, and non-governmental organisations, to capture diverse perspectives, experiences and understand their priorities, challenges related to disaster preparedness.
- Analysis of existing frameworks, guidelines, and tools for disaster preparedness to delineate the SYNERGIES Study Framework.
- Analysis of existing literature on disaster preparedness, including studies on citizen involvement, stakeholder collaboration, and effective preparedness strategies.
- Summaries of relevant research findings from the five previous Component Projects.
- Analysis of Early Warning Systems, communication patterns and their categorisation for the identification of key recipients and channels for disseminating preparedness information

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

- In-depth analysis of the three Real Preparedness Cases to identify specific contexts, challenges, and opportunities for enhancing citizen involvement and empowerment in disaster preparedness. Documentation of lessons learned and insights gained from the Real Preparedness Cases to inform the project's activities.
- Baseline assessments of current levels of citizen involvement, stakeholder collaboration, and preparedness practices in the communities and organisations involved in the project.

By collecting and analysing these types of data during the study phase, the SYNERGIES project team can gain a better understanding of the landscape of disaster preparedness and the specific needs and opportunities for improvement. This data will serve as the foundation for developing the project's target interventions, strategies, and tools to enhance collaboration and empower citizens in disaster management.

3.1.3 Integration phase

The integration phase of a project involves bringing together various components, datasets, or systems to work together towards common goals. The activities involved inevitably lead to the production of several types of data, in addition to those obtained during the previous phase, which may differ from them and must therefore be managed and archived accordingly.

In the context of a multidisciplinary project like the SYNERGIES, the integration phase plays a crucial role, consolidating information gathered during the previous study phase and understanding how tools and methodologies from different sources can be adapted to work in synergy to achieve the project results and objectives.

The integration phase typically consists of several key steps:

- data collection and aggregation;
- data harmonisation and standardisation;
- cross domain analysis;
- framework alignment;
- knowledge transfer;
- interdisciplinary collaboration;
- interdisciplinary integration.

Data collection and aggregation involves gathering data from various sources including component projects, preparedness cases, literature reviews, and stakeholder inputs; it also comprises organising and aggregating data into a central repository or platform.

In SYNERGIES, all data generated within and by the project are envisaged to be stored in different repositories, in line with the type of data; we therefore intend to have different repositories each of which is purposely selected to host specific types of data. More details on data depositing are presented in the specific section (4.1 Description of data depots).

Data harmonisation and standardisation are critical processes in data management, aimed at ensuring consistency, compatibility, and interoperability across different datasets or data sources. Data harmonisation allows identification of common elements or variables across multiple datasets that represent the same concept or information. In SYNERGIES the focus is not on harmonisation of data like demographic ones, aligning variables such as age, gender, ethnicity, and education level to a common set of categories or standards. However, the identification of common elements or variables across multiple sources that represent the

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

same concept or information is important. Therefore, it will be crucial to standardise the words and semantics, ensuring they can be used consistently during the project lifespan. For this reason, it is intended to produce a glossary of SYNERGIES as an output of this process, representing a collection of terms as defined and agreed upon during the first phase of the SYNERGIES project whilst maintaining the flexibility and capacity to evolve during later stages. It is intended to be used for the coordination of research activities but mainly for coherent and sound communication activities within the project and with external stakeholders.

The cross-domain analysis serves to identify the synergies and interdependencies between the thematic areas of the component projects and SYNERGIES objectives, facilitating a holistic understanding and development of integrated solutions.

- Data from various sources (such as the component projects - LINKS, ENGAGE, and the Preparedness Cases), will be integrated in the Atlas platform with the aim of analysing potential cross-domain synergies that enhance understanding and response strategies for disaster risk management (DRM). Moreover, the structured data collection tool developed within the Content Identification Sprint will be used to systematically incorporate and analyse interdependencies among component projects.
- Looking for opportunities or common underlying factors across domains, may support the identification of shared patterns and causal relationships. In this sense, the contribution from BUILDERS and RESILOC through their respective tools - Vulnerability Assessment Tool and RaaS - will be integrated via the development of the Preparedness Assessment Tool, facilitating the capture and collection of data, and supporting the identification of relevant information for the Atlas application in preparedness cases.
- Leveraging insights from the ENGAGE project, the training modules may be enriched with tailored approaches to empower community members. Moreover, the Including Citizens Handbook from LINKS may equip the training modules with practical strategies for involving citizens, making them an educational tools, tailored to the specific needs and contexts of communities.
- Building upon insights from the ENGAGE project's Catalogue of Solutions (CoS), the KB4ICC will be enriched by a comprehensive repository of innovative strategies for enhancing communication in disaster management. Furthermore, lessons learned from the LINKS project will contribute to providing valuable perspectives on leveraging social media in communication strategies.
- The project will leverage insights from component projects like RESILOC and LINKS to enhance the Tool for Early Warning. Drawing upon resilience indicators identified using the RaaS tool, the project can refine early warning messaging strategies to effectively mitigate disaster risks. Additionally, insights from the LINKS project's online platform will contribute with valuable resources on technologies and guidelines upon which to build the early warning system. Through cross-domain contributions, the project will benefit in optimising the Tool for Early Warning to provide timely and accurate alerts, empowering communities to take proactive measures.

The alignment of conceptual frameworks and methodologies is crucial to ensure that the integration of the various component projects is coherent, allowing for a methodological synergy that makes the integration process fluid and effective.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

- The PAT's development framework will be realised by aligning the frameworks of the component projects RESILOC and BUILDERS, considering how each framework addresses key relevant aspects. This will involve adapting existing frameworks to better align with project-specific requirements, modifying processes or establishing new metrics to ensure smooth operations between the VAT and the RaaS application.
- The Atlas's development framework will be aligned with the frameworks from existing component projects, ensuring that methodologies are compatible, and that coherent integration is facilitated. The conceptual framework developed during the Selection Methodology Sprint, will be deployed to maintain consistency across projects and enhance the effectiveness of the Atlas.
- The Training Modules framework will come up from the alignment of component project LINKS and Ready2Help frameworks, taking advantage of the component like FeelSafe and the Citizen Handbook developed in LINKS, enriching and integrating them with the mobilisation of spontaneous volunteers' management practices, strategies and procedures implemented by Ready2Help.
- The KB4ICC and EW will be based on a framework that benefits from the majority of the component projects frameworks - aligning standards, guidelines, best practices and methodologies - as well as local frameworks from the preparedness cases, for the creation of the personalised messages capable of reaching specific group of recipients. The experience from LINKS on the foster in social media, from RESILOC on the constitution of Local Resilience Teams, or either from Ready2Help and ENGAGE, will provide a variety of assets from which to build up the KB4ICC. Likewise, the alignment with the Preparedness Cases framework on the management of crisis situations, will provide the specific requirements to improve interoperability, ensure compliance, and establish interfaces between different systems and enhance efficiency.
- Lessons learned from the LINKS and BUILDERS project contribute valuable perspectives on mobilising and managing spontaneous volunteers. By incorporating these insights into the Support System, a more effective and coordinated response to emergencies may be reached, leveraging the unique skills and resources of volunteers.
- The design of the Table top game will benefit from the participatory approaches developed in RESILOC, such as the Local Resilience Team (LRT) concept.

The alignment process will include updating documentation, providing training and education to stakeholders, or implementing new solutions to facilitate operations; the newly produced content will then be stored to the appropriate repository. Documenting the process and communicating key findings, decisions, and recommendations to relevant stakeholders, will help to ensure transparency, accountability, and shared understanding among project partners involved.

Knowledge transfer between the project team is not only encouraged but drives the project itself, leveraging specific experience and lessons learned from each component project's thematic area, enriching the integrated approach with different perspectives. This exchange facilitates insight and innovation, providing a wealth of knowledge that can be applied to the wider SYNERGIES context.

- Knowledge transfer will be facilitated through structured engagement moments, such as workshops and participatory collective reviews, as outlined

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

for example in the various sprints (e.g., Content Identification, Relevance, and New Content Sprints).

- Lessons learned and best practices from the Advisory Board and Local Support Teams in preparedness cases will be capitalised upon to enrich the Atlas content and functionality, as well as the KB4ICC exploitable communication channels and personalised message design.
- The CoS provided by ENGAGE includes solutions relevant for thematic areas engagement and empowerment (WP2), communication (WP3) and spontaneous volunteering (WP4). Based on the research scope within each thematic area and related selection criteria, it will be possible to extract knowledge from existing solutions, transferring them to each group and thus build a solid foundation for subsequent activity.
- The RaaS provided by RESILOC, not only constitutes a tool, but also includes the related approach and methodology of use together with a matrix of suitable indicators and proxies; these will be transferred through manuals, tutoring of experts and participation in training sessions to facilitate their effective usage in the Preparedness Assessment Tool.
- The “LINKS Community Center" (LCC) from LINKS brings the contents of the online platform, sharing technologies, guidelines, use Cases, and crisis communication strategies; likewise, it provides access to the Feel Safe educational material and platform 'training and educational modules’. Along with the Feel Safe platform, the LCC brings the Including Citizens Handbook. These will act as reference on how to adapt best practices to specific situations of Preparedness Cases, encouraging experimentation and enabling recipients to innovate based on the knowledge gained.

During the knowledge transfer process, it is important to monitor progress and evaluate the effectiveness of knowledge transfer efforts. This could involve monitoring metrics such as knowledge retention, skill acquisition, performance improvements or outcomes resulting from transferred knowledge. The process of knowledge transfer may involve the creation of manuals, procedures, documentation or other records of knowledge that should be organised and archived in a way that facilitates their retrieval and dissemination. This will involve regular review and updating, incorporating feedback from recipients, identifying emerging knowledge needs and adapting approaches to changing circumstances or requirements. By adopting knowledge transfer, collective knowledge and skills can be effectively harnessed to foster innovation, improve performance and achieve project objectives.

The project claims interactions between different disciplinary fields, supporting interdisciplinary collaboration to overcome traditional divisions and stimulate innovation in addressing the complex challenges of crisis situations. Combining these different areas of knowledge helps to tackle the complexity of preparedness in productive and innovative ways.

- Interdisciplinary collaboration will be promoted by engagement of stakeholders involved in the project, as seen in the development of the Atlas where technological and social innovations converge.
- The Atlas will aim to foster innovation in crisis situations by bridging gaps between different thematic domains, such as social media engagement, communication strategies, and ethical considerations in DRM.
- The constitution of the Local Support Teams will result in the establishment of interdisciplinary teams, consisting of individuals with expertise in different disciplines relevant to the different project tasks and objectives. These teams

This project has received funding from the European Union’s research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author’s view, and the Commission is not responsible for any use that may be made of the information it contains.

will include researchers, practitioners, policymakers, and other stakeholders who bring diverse perspectives, skills, and knowledge to the table.

- The integration of the VAT and RaaS in developing the Preparedness Assessment Tool, will lead to a strong interdisciplinary collaboration, integrating knowledge and expertise from different approaches and disciplines to develop new comprehensive solutions. This will require synthesising diverse perspectives, methodologies, and findings into a new unified framework.
- The Training Modules design, aimed at addressing selected target groups highly influential in communities, will engage interdisciplinary collaboration in collaborative problem-solving, drawing on collective expertise to analyse problems, generate ideas, and develop innovative solutions. This will involve brainstorming sessions, interdisciplinary research, experimentation, and iterative refinement of ideas based on feedback and evaluation.
- The KB4ICC and Tool for Early Warning development, will bring the opportunity to go beyond disciplinary silos, leading to the development and implementation of new innovative solutions compliant with the general guidelines for the implementation of a community-based disaster early warning system.

Last but not least, by integrating the different disciplines, we can enhance the specific expertise of each project partner and maximise the synergy potential of the consortium. This process is made possible by the constant seeking of collaboration between disciplines, constituting the rationale and the fundamental to achieving the overall objectives of the SYNERGIES project.

- The Atlas's will integrate diverse expertise and insights from various component projects. Collaborative problem-solving and integrated solution development will be promoted within the development phases of the Atlas considering the diverse cultural, geographical, and social contexts provided by the component projects and preparedness cases.
- The Preparedness Assessment Tool development will represent an interdisciplinary integration synthesis, recognising the relevance of multiple disciplines to a particular problem. It identifies how insights and approaches from different fields can complement each other and contribute to a comprehensive solution.
- The Training Modules design will synthesise response to different disciplinary needs, developing a program to address the challenges/gaps identified. This will involve identifying common connections across disciplines and integrating solutions into a unified program of actions.
- The KB4ICC and Tool for Early Warning development will involve the integration of methodologies and approaches from different disciplines on the exchange of information and the way alert messages are structured. This will require adapting or combining methods and techniques (also experimental) to suit the characteristics of the target group/audience and reach the different vulnerable groups envisaged by the project objectives.
- The Support System for Integration of Spontaneous Volunteers can draw upon the wealth of knowledge provided by the ENGAGE project's Catalogue of Solutions (CoS), the project refines strategies for organizing and coordinating volunteers during disaster response efforts. Additionally, lessons learned from the LINKS project contribute valuable perspectives on mobilizing and managing spontaneous volunteers through its online platform.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

- The Tabletop Game will exploit the relevance of multiple disciplines approach, during which interdisciplinary teams will collaboratively plan how to integrate their expertise. This may involve defining roles and responsibilities, setting goals and objectives, and establishing a shared vision.

Interdisciplinary integration requires sharing data, knowledge, and insights across disciplinary boundaries of each project partner. This involves creating mechanisms for sharing information, such as repositories, collaborative platforms, or regular meetings, through which each member can store, exchange and update data on ideas and findings raised during the project lifespan.

3.1.4 Implementation phase

In the implementation phase of the SINERGIES project, the goal is to develop a conceptual framework that integrates knowledge and methodologies gained from component H2020 projects (i.e., ENGAGE, LINKS, RESILOC, IMPACT, BUILDERS) and the national Ready2Help project.

In this phase, several tools are being created:

- the Preparedness Assessment Tool;
- the Atlas of best practices, lessons learnt and guidance material;
- the Training Modules;
- the Knowledge Base for Innovative Channels and Communication (KB4ICC);
- the Tool for early warning messaging;
- the Support System for integration of Spontaneous Volunteers in Preparedness Plans.

The Preparedness Assessment Tool (hereafter PAT) is a tool designed to assess crisis preparedness through a detailed analysis of a community's vulnerabilities and resilience. This tool consists of two main parts: the Vulnerability Assessment, which identifies sources of danger and vulnerable population groups by specifying the type and urgency of support needed; and the Resilience Assessment Tool (RaaS), which maps indicators of resilience to facilitate strategic and operational planning.

The PAT allows for identifying gaps in preparedness and planning interventions supporting the identification of the right area to improve, especially through the adoption of strategies and tools gathered by the Atlas. It is intended primarily for policymakers, civil defence workers, emergency responders, and municipal social services, who may use this tool to assess and improve their emergency response ability. The effectiveness of the PAT will be reinforced by its use in the preparedness cases worst-case scenarios, where preparedness will be measured before and after the adoption of solutions enlisted by the Altas, thus ensuring continuous improvement in community response capabilities. The two tools involved in the PAT were identified as keystones for the construction of the PAT due to their complementary characteristics, and in part driven by their recognition at the European and local level, confirming their impact and usefulness in the field of crisis management. In particular, the Vulnerability Assessment Tool was co-created with practitioners in crisis management and social care and has been used in several table-top exercises with different crisis scenarios. First, it was tested in three cases - disruption of electrical supply due to a major storm in South-Eastern Estonia (October 2019), COVID-19 pandemic in Estonia (March 2020 onwards) and cyber-attacks on Estonian state information systems (November 2020). On the 30th of September 2020, a large-scale table-top exercise was organized by the research team and

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Estonian Rescue Board. Experts from the fields of crisis management, social protection, health care and information systems, as well as local government representatives were involved.

Furthermore, the RaaS tool was noticed during the RESILOC project by the community of Dve Mogili - a small municipal town located in the north-eastern part of Bulgaria - which spontaneously decided to join the experimentation, applying the RaaS tool for the assessment of local resilience against fire risk and fake news. Similarly, the communities involved in the RESILOC project, such as Gorizia and Catania, also validated the potential of the tool through activities after the project ended. Gorizia adopted the "Local Resilience Strategy of the Municipality of Gorizia", elaborated based on the assessment carried out through RaaS, whose main document was officially adopted by the City Council with Municipal Resolution (Delibera) n. 235 on the 24th of November 2022 and are available on the Municipality of Gorizia website at the addresses:

- The RESOLUTION - https://backoffice-comuni.regione.fvg.it/insiel/get_file_albo/031007/7713091/a1/
- The GUIDELINES for the development of resilience policies for the municipality of Gorizia - https://backoffice-comuni.regione.fvg.it/insiel/get_file_albo/031007/7713091/a2/

Meanwhile, the Municipality of Catania, requested training and technical support activities, noting the recognised need to maintain the full operability of the services provided, requesting the continuation of technical and training support services related to the RaaS platform beyond the end date of the project for a duration of 6 months. In addition, external projects funded by Horizon Europe research and innovation programme, have shown interest in the adoption of RaaS. In particular, the scientific coordinator of RESILOC has been included in the Advisory Board of the ClimEmpower project, while the possibility to create synergies between ICARIA project and RaaS is being explored, assessing the possibility of implementing RaaS in the Greek case of the ICARIA project.

The Atlas, developed as part of the "SYNERGIES" project, is designed as a comprehensive resource for knowledge sharing and capacity building, the Atlas contributes to fostering a culture of preparedness among stakeholders involved in its development and utilisation. The Atlas aims to distil best practices, lessons learned, and guidance materials into a navigable platform accessible to a wide range of users.

Using the detailed analysis and evaluation carried out through the PAT, the Atlas will support the identification of effective approaches for citizen empowerment, considering diverse cultural, geographical, social, and economic contexts across the European Union.

One of the key features of the Atlas will be the integration of ethical principles, ensuring that citizen engagement processes are conducted ethically and responsibly. This includes the automated selection of ethical guidelines from relevant sources, such as the "LINKS" project, to support ethical decision-making in disaster risk management initiatives.

Furthermore, the Atlas will undergo a rigorous evaluation and validation process, aided by the PAT usage, involving stakeholders and real-world applications in preparedness cases. Through its emphasis on evidence-based, context-specific, and participatory approaches, the Atlas aims to empower citizens and communities to enhance their resilience to disasters, ultimately contributing to the overarching goal of sustainable disaster risk reduction within the European Union and beyond.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

During the implementation phase of the Atlas, a rich variety of data may emerge, offering valuable insights into its effectiveness and usability. Firstly, user interaction data provides a window into how individuals engage with the platform. This includes details on which functionalities are the most used, which resources are accessed most frequently, how users navigate through the Atlas; as well as the feedback on the user-friendliness and relevance of each functionality/resource provided.

Also, information on which best practices, lessons learned, and guidance materials are frequently accessed or recommended, will offer content utilisation data, giving insights into the specific materials within the Atlas that are most utilised.

Moreover, some contextual data may be captured through the PAT, capturing the diverse cultural, geographical, social, and economic contexts. This data will shed light on community profiles, community characteristics, and the prevailing disaster risk factors. Likewise, during the evaluation and validation of the proposed tools, some feedback and insights may come from stakeholders together with data from real-world applications in preparedness cases. This data and feedback will foster continuous improvement, ensuring that the Atlas raises in relevance and effectiveness in disaster risk management practice.

During the implementation of the project Training Program, various types of data will be generated to evaluate the effectiveness and impact of the training modules designed for key community actors.

Firstly, data on the usage of the training modules may emerge. This includes information on how often the modules are accessed or utilised by the intended audience, which comprises first responders, social workers, teachers, and community leaders. Additionally, feedback from participants may be collected to gauge the modules' effectiveness, relevance, and usefulness. Moreover, understanding participation rates and completion rates will provide insights into the engagement level with the training materials.

Secondly, we will assess the outcomes of the training sessions. This involves analysing data from preparedness self-assessments conducted by local actors, as well as evaluating the impact of co-designed preparedness actions involving citizens with diverse needs and capacities. By measuring changes in knowledge, skills, and attitudes among participants before and after the training, we can determine the effectiveness of the learning interventions.

Furthermore, we will monitor the adoption of the university education module in academic settings. This includes tracking the number of universities or courses that integrate the module, gathering feedback from instructors and students regarding its relevance and effectiveness.

By collecting and analysing these diverse types of data, we will be able to evaluate the implementation phase's success in achieving the project objectives. Moreover, this data will guide us in refining and improving the training and education strategies throughout the project lifecycle, ensuring that they effectively contribute to building a culture of disaster preparedness within communities.

As we embark on implementing Result 3.1, the Knowledge Base for Innovative Channels and Communication (KB4ICC), our primary focus will be on understanding how effectively this tool is utilised. We'll closely monitor its usage by project partners also involving the advisory board members, keeping track of how they utilise it to craft tailored messages. Gathering feedback from users will be crucial; we need to hear their thoughts on whether the KB4ICC is truly helping them to reach different audiences effectively. Moreover, we'll pay special attention

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

to the legal aspects, ensuring that the KB4ICC is equipped to navigate the diverse regulatory arrangements across European countries.

Moving forward to Result 3.2, the development of an Early Warning Messaging Tool, we'll be keenly observing its adoption and impact. We'll document the types of messages generated using the tool and how they are disseminated to various channels, gathering data from project partners feedback on its functionality and effectiveness. By working closely with organizations, including authorities and first responders, we'll gather data on how they are utilizing the early warning messaging tool in real-world scenarios. Their experiences and observations will provide invaluable insights into the tool's performance and any challenges encountered.

Ultimately, success will be measured not only by the technical capabilities of these tools but also by their endorsement and adoption. This data will guide us in refining our strategies to better serve project objectives and the needs of more effective communication and information sharing in disaster preparedness, especially for vulnerable groups.

Diving into implementing Result 4.1, which involves developing a Support System for the integration of spontaneous volunteers into preparedness plans, our attention will be on understanding how this system is utilised and adopted by authorities and organisations involved, gathering feedback from users on its effectiveness in providing best practices and guidance for managing spontaneous volunteers. Moreover, we'll track the adoption of the system by authorities indicating its acceptance and integration into their planning processes. By collecting data on their participation and feedback on the learning activities, we can gain insights into the effectiveness of the Support System in enhancing understanding and collaboration among stakeholders.

Turning our attention to Result 4.2, the development of a tabletop game simulating the role of organised and spontaneous volunteers in disaster management, we'll be keenly observing its playthrough and evaluation. We'll gather data on its educational value and effectiveness in simulating real-world scenarios, documenting scenarios played and outcomes achieved during tabletop game sessions. So, we can assess its ability to complement the Support System and enhance understanding of volunteer management in crisis scenarios.

This data will provide valuable insights into the adoption, impact, and integration of these tools into professional practices and policies, ultimately contributing to more effective disaster preparedness plans and actions.

3.2 Data Types and Formats

The type of data that will be collected and processed within the lifespan of the project will involve both primary and secondary data. In specific parts of the analysis, personal data and special categories of personal data will be generated and processed. The table below will provide an overview of the type and format of data that will be involved in the various project phases.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Table 3 - Overview Data Types and Formats by Project Phase.

Project phase	Collection Method	Details	Expected Type of Data 1/2/P/P*/C/G[4]	Format	Storage
Project input phase	Literature Review	Academic	2/G	PDF	GDrive
		Grey	2/G	PDF	GDrive
	Previous project	Academic	2/G	PDF	GDrive
	Initial benchmarks	Academic	2/G	docx, PDF	GDrive
Study phase	Literature Review	Academic	2/G	PDF	Zenodo GDrive
		Grey	2/G	PDF	
	Interviews	Phone	1/P*/P*/C/G	Transcripts or summarised report (docx/PDF)	GDrive
		E-mail	1/P/P*/C/G	Transcripts or summarised report (docx/PDF)	GDrive
		Face to face	1/P/P*/C/G	Audio file (mp3/Wav.) Transcripts or summarised report (docx/PDF)	GDrive
	Minute of meeting	E-mail	2/G	docx, PDF	GDrive
	Local analysis	Indicators and Proxies definition	1/2P/C	xlsx, CSV	GDrive
	Survey	Emergency preparedness	1/2P/C/G	Filled in Sheet and summarised results (report) (PDF)	GDrive
	Records	Meetings	2/G	mp4	GDrive
Methodological Phase	Records	Meetings	2/G	mp4	GDrive
	Interviews	Face to face	1/P/P*/C/G	Transcripts (docx/PDF) Audio file (mp3/Wav.)	GDrive
	Workshops & Sprints	Personal	1/P/P*/C/G	sketches, post-it notes, flip-chart sheets attendance list (photos: JPG, PNG; scans: PDF)	GDrive

[4] Data Types: 1 = primary: 2 = secondary; P = private; P* = sensitive; C = confidential; G = general.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Project phase	Collection Method	Details	Expected Type of Data 1/2/P/P*/C/G[4]	Format	Storage
	Questionnaires	Online	1/P/P*/C/G	Transcripts (docx/PDF) mp4	GDrive
	RaaS	Indicators	1/P/P*/G	xlsx, CSV, XML	*To be clarified*
		Proxy	1/P/P*/G	xlsx, CSV, XML	*To be clarified*
	VAT	Indicators	1/P/P*/G	docx, PDF	*GDrive*
Implementation phase	Workshops	Personal	1/P/P*/C/G	sketches, post-it notes, flip-chart sheets attendance list (photos: JPG, PNG; scans: PDF)	GDrive
	Records	Meetings	2/G	mp4	GDrive
	Both qualitative and quantitative data will be collected	Field design and evaluation	*To be clarified*	*To be clarified*	*To be clarified*

3.3 Data Utility

In the research processes conducted by SYNERGIES, data generation assumes strategic importance. Consortium researchers will use such data to deepen understanding of the metrics and strategies that determine and influence preparedness, thereby providing an empirical basis for evolving risk management practices.

At the same time, the results emerging from the analysis phase have the potential to transcend the boundaries of the consortium, providing valuable input to researchers and specialists working in preparedness and disaster risk management and mitigation. With the aim of promoting knowledge circulation and cross-sector collaboration, it employs an approach of maximum openness in data accessibility, balanced by a careful regard for ethics and proper categorization of the information processed.

Following the research phase, the selected data will serve as a benchmark for calibrating the preparedness of the communities involved in the SYNERGIES project. These data may be extended to include or inform the practices of adjacent or similarly risk-prone communities. The practical value of the data then extends into their ability to provide transferable references to other contexts.

To protect against potential misuse, SYNERGIES is committed to pursuing a policy of data minimization and anonymization, ensuring that necessary personal data are stored securely and managed with the highest integrity.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

In conclusion, all data attributable to SYNERGIES project activities and results are viewed as critical resources, not only for the current initiative but also as a foundation for future studies and projects in the context of preparedness. This view is consistent with the SYNERGIES consortium's commitment to provide data that are not only useful and accessible but managed with a strong sense of ethical responsibility and protection.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

4. Data depositing

4.1 Description of data depots

At Synergies, storage, management and access to project-related data will take place through a dedicated and distributed IT infrastructure that ensures data security, accessibility and interoperability. The cloud storage platform will be adopted as the primary solution for data sharing and management among consortium partners. This system will ensure a regular backup mechanism and will be protected by restricted email address access and by additional password-based authentication if required. The cloud solution will be kept active for the entire duration of the project with costs covered by the SYNERGIES budget. In parallel, the project website (described in detail in D5.2[5]) will be created, where all the public data and deliverables will be published.

All data generated will be handled following SYNERGIES' Open Access policy, unless there are legitimate reasons why this is not possible, such as the protection of intellectual property or other commercial interests of the beneficiaries. The FAIR principles will guide the organisation of data to maximise discovery, access and reuse.

Interoperability will be ensured through the adoption of standard metadata such as Dublin Core and DataCite Metadata Schema, which will be used to describe all datasets. Data reusability will be promoted by distributing data under licences that allow their full reuse, preferably under CC-0 or CC-BY licences.

The project will also ensure that data is processed in accordance with data protection laws, including the GDPR, and ensure that only anonymized data is handled. The detailed DMP will describe the procedures and policies adopted for data lifecycle management, including IPR issues and exploitation opportunities.

SYNERGIES will also employ robust risk assessment, including risk identification, quantification, response and monitoring to ensure safe and effective data management during the course of the project.

All data generated within and by the SYNERGIES Project will be stored in 5 different data deposit types.

- SYNERGIES Google Drive.
- SYNERGIES Website (Public deliverables).
- SYNERGIES PAT Repository.
- SYNERGIES Atlas Repository.
- Zenodo:
    - Open Access Repository (publications);
    - Open Access Repository (research data).

The linkages of the different deposit types are illustrated in the figure below.

[5] Matera, S., Cecconi, M. (2024)

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

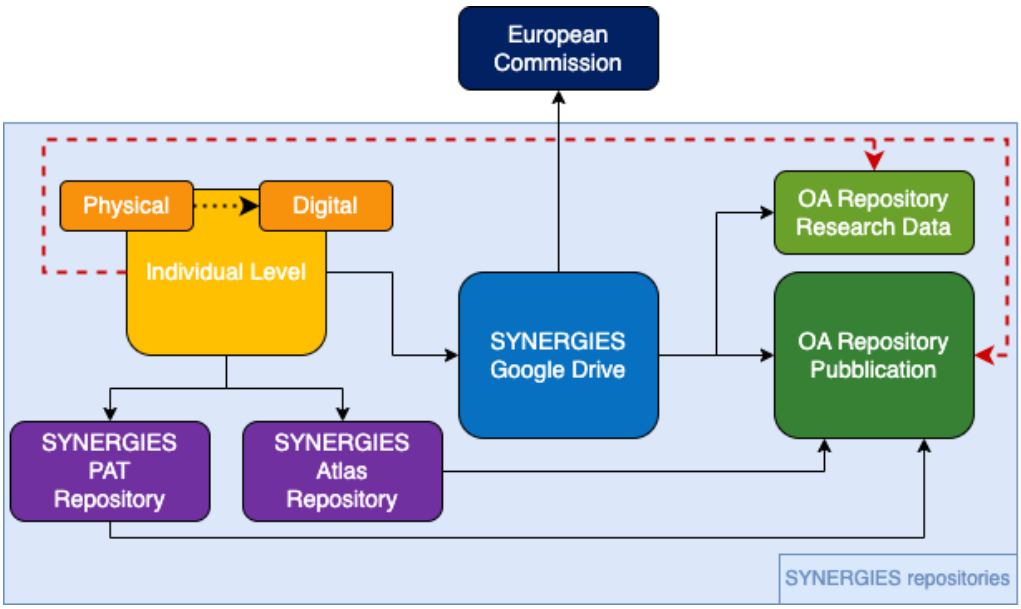

Figure 2 - SYNERGIES Data Depots.

4.2 General requirements

Data deposited at the internal or public level of the project must be:

- clearly identifiable by the file name with respect to
  - the naming convention found in SYNERGIES D7.2 Project Handbook[6] (par. 4.3.2).
- deposited in
  - the file designated to the Task, WP or related topic (if internal);
  - the online repository of agreements and/or disciplines (if public).
- of usefulness by ensuring
  - conclusive or aggregated versions of the data collected;
  - computer readable versions for commonly used software licences.
- retained for a minimum duration of 5 Years if deposited for the purpose of validating the results.

4.3 Data-specific depositing requirements

4.3.1 How to review the documents in Google Drive

All relevant data from interviews (transcripts, voice recordings) and those from related group interactions, such as workshops, involving the documentation of the questions (paper notes, transcriptions or voice recordings) or the induced graphic material (sketches, post-its, flipchart sheets) will be converted into a digital standardised format, for instance: *.docx file, *.pdf, *.jpg or *.xml file with metadata and deposited in dedicated folders with restricted access on SYNERGIES Google Drive repository.

The originals of such data may be further retained at the beneficiary level, provided that this is possible to exclude third party access to "sensitive data". This is the case if:

- The documents do not contain "sensitive data".
- “Sensitive data” has been anonymized or pseudonymized.

[6] Golfetti, A., Pasquini, A. (2024)

This project has received funding from the European Union’s research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author’s view, and the Commission is not responsible for any use that may be made of the information it contains.

- Physical access to unauthorised users can be prevented.

4.3.2 Deliverables

Within the SYNERGIES project, the delivery process is well defined to ensure consistency and quality. Each deliverable linked to the project work packages is submitted through the project deliverable review process described in D7.2 (project handbook), which is coordinated by DEEP BLUE S.R.L. (DBL). It is the responsibility of the beneficiaries to upload the quality-verified deliverables to the SYNERGIES repository before the date established for their submission. This step is essential to maintain the high standard required by the project and to facilitate the review and final approval of the deliverables.

Once approved, the project's public deliverables and reports will be made available at no cost on the SYNERGIES website, ensuring transparency and facilitating the dissemination of project results. The free accessibility of these resources emphasises the project's commitment to open science and knowledge sharing with the broader community.

4.3.3 Indicator based datasets

In the SYNERGIES project, attention to the management of indicator-related research data is a priority. Within the project, the task of managing indicator-related data involves a set of well-defined processes that ensure the integrity, security, and accessibility of the information.

Once processed, the indicators data are housed in the Resilience Assessment System (RaaS) inventory, where they are kept and organised to facilitate their effective use. The RaaS platform is designed to be an intuitive interface that allows users to easily access the data they need, with mechanisms for easy extraction and analysis of resilience indicators. This supports not only the internal work of SYNERGIES consortium members but also extends the reach to external researchers, policymakers and other stakeholders who could benefit from such data.

Governance of data access in the RaaS inventory is a priority, given the possible sensitivity of some information. The project takes a proactive approach to protecting personal and sensitive data, in line with privacy and data protection regulations such as GDPR. Access is therefore tightly regulated and limited to authorised users, with the goal of preventing misuse of the data, while ensuring maximum transparency and availability for legitimate uses. This balance between accessibility and security is critical to maintaining stakeholder trust and ensuring that SYNERGIES' data is used responsibly.

4.3.4 Publications

Regarding publications, a self-archiving process will be followed. All partners may deposit publications stemming from the project at their own discretion into a discipline specific repository and provide open access to these repositories as soon as possible. For the benefit of clarity and review, purposes the Beneficiary are also requested to deposit a copy of the publication in the SYNERGIES Google Drive Cloud, as a consortium main repository.

The dissemination of the project results, research and studies will be done via peer-reviewed research articles, published in academic journals (as specified in Table 9 – Plan for C&D Activities and Events, par. 2.2.3 of GA). They will be published with open access (green access). Beneficiaries are required to deposit an electronic copy of the publication in a suitable repository. Publications must be "machine-readable", that is in a format that can be used and understood by a computer.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

They must therefore be stored in text file formats that are either standardised or otherwise publicly known so that anyone can develop new tools for working with the documents. Thus, scanned versions of printed publications do not fulfil this requirement.

4.3.5 Publication related data

If research data, including associated metadata, are necessary to validate the results presented in scientific publications, beneficiaries must deposit them as soon as possible in a research data repository and take measures to allow third parties to access, extract, exploit, reproduce and disseminate free of charge.

4.4 FAIR Data

In the framework of the Horizon Europe programme, SYNERGIES will join the Open Research Data Pilot (ORDP), with the aim of improving and maximising access and reuse of data generated by research and development projects. SYNERGIES will voluntarily engage in this initiative following the FAIR principles, ensuring that the research data collected, derived, and generated are curated so that they are findable, accessible, interoperable and reusable.

All partners of the SYNERGIES project will be required to synchronise their efforts in collecting, generating, and depositing research data related to the project, keeping in mind an open access policy.

The extent of open access to the project's research data will be limited by the 'EC Principles on Ethics and Data Protection' (ART. 14), the GDPR and national data protection regulations that override the GDPR.

The data will not be made accessible if:

- Research results must be protected (Art.16).
- Confidentiality and Security obligations apply (Art. 13).
- Personal data protection applies (Art.15).

If open access on research data is provided, beneficiaries are requested to provide information about the tools and instruments necessary for validating the related research results within the repository in which the research data was published. If possible, the tools and instruments themselves may be shared. The graphic below illustrates the data to be considered under the ORDP.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

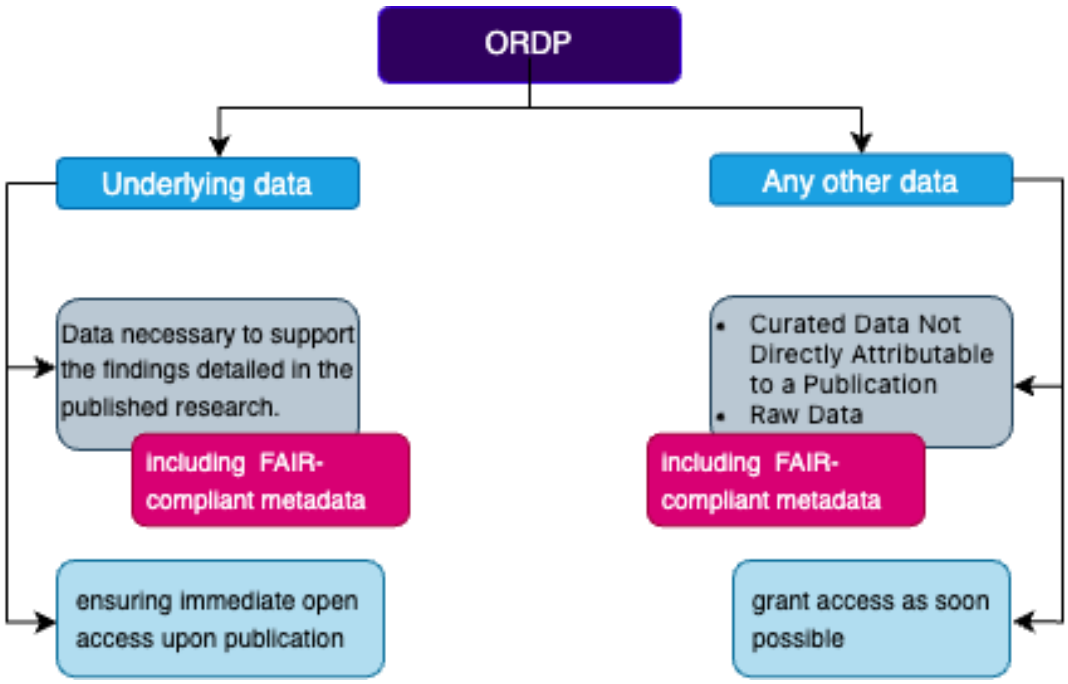

Figure 3 - Data to be considered under the ORDP following article 17 of the GA.

4.4.1 Making data findable, including provisions for metadata

For the purposes of SYNERGIES, the Consortium will adopt specific measures to make data findable by persistent identifiers. The provisions for metadata are available at chapter "Metadata".

Each beneficiary undertakes to provide open access to their research data through the self-archiving process (green access) to prevent the creation of data silos and allow the timely validation of project-related publications.

The goal is to make publications and related data publicly accessible by depositing them in an organisation-based repository as soon as possible, and ideally no later than six months after the official publication date.

To validate the deposited publication, the beneficiaries will also have to guarantee open access to the bibliographic metadata that identifies the deposited publication via the repository, ensuring that:

- The (meta)data is retrievable via its identifier using a standardised communication protocol.
- The protocol is open, free and universally implementable.
- The protocol includes an authentication and authorization procedure, where necessary.
- Metadata is accessible, even when the data is no longer available.

The detailed technical implementation of these requirements will be decided as the project evolves. The data will be published via a repository recommended by the European Commission for open access to data, such as Europe PubMed Central, arXiv, OAPEN Library, Zenodo, within a period not exceeding six (6) months after the generation of the data.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

4.4.2 Making data openly accessible

For the research purposes of SYNERGIES, the Consortium and its partners will deposit data only in trusted repositories, according to the conditions defined by appropriate arrangements.

Within the SYNERGIES project, it is crucial to ensure the open accessibility of research data and related publications. This means that each beneficiary is required to make their research data available through self-archiving, promoting open access to eliminate information silos and facilitate rapid validation of project-related publications. The aim is to make publications and associated data freely accessible, ideally within six months of official publication.

To ensure the traceability and identification of scientific contributions[7], access to bibliographic metadata must be guaranteed through a repository that adheres to standardised communication protocols, with adequate authentication procedures. This helps ensure that metadata remains accessible, even when the original data may no longer be available.

For access and dissemination of data, preference will be given to archives recognized or recommended by the European Commission, such as Europe PubMed Central, arXiv, the OAPEN Library or Zenodo. This data will be published within a maximum of six months of its generation, unless restricted by data protection regulations, as outlined in Section 6 of the DMP.

The specific technical implementation of these requirements will be defined as the project progresses, with an eye always attentive to the evolution of the field and the needs of the research community.

4.4.2.1 Data

Generally, the SYNERGIES Consortium embraced the following open data policies:

- Open access to scientific publications: each beneficiary will ensure open access (free of charge) to all peer-reviewed scientific publications relating to project results. In particular, the project participants are committed to Open Access Publishing, and will prioritise publication venues and promote Open Access to its publications.
- Open access to research data: regarding digital research data, the beneficiaries will deposit the data, including associated metadata needed to validate the results presented in scientific publications (if any), in a research data repository, and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the data as soon as possible. As an exception, the beneficiaries do not have to ensure open access to specific parts of their research data if the achievement of the action's main objective would be jeopardised by making those specific parts of the research data openly accessible.

4.4.2.2 Metadata

For the purposes of data findability and accessibility, the Consortium and its partners will provide the data (and metadata, if any) in a form that can be harvested and indexed, also including qualified references to other data.

[7] cf. Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016)

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

4.4.3 Making data interoperable

In the SYNERGIES project, ensuring data interoperability is essential to facilitate effective cooperation between different actors and systems in the field of emergency management. To achieve this goal, the project strives to use (meta)data structured through formal languages that are accessible, shared, and widely applicable. This approach not only allows easy integration of SYNERGIES data with other external resources but also ensures that these data can be easily interpreted and used by both automated systems and human operators.

The (meta)data[8] produced will follow FAIR principles, which advocate the creation of data that is locatable, accessible, interoperable, and reusable. Specifically, the project will adopt standardised and vetted vocabularies to maintain consistency and quality of metadata. These vocabularies will be chosen to align with international standards and to be inclusive of the specific needs of the SYNERGIES project, such as volunteer management and emergency preparedness.

In addition to ensuring the use of standardised and widely used data formats, the SYNERGIES project is committed to including qualified references to other datasets in the metadata. This not only helps contextualise the data but also creates an easily navigable network of information that can be used for more complex analyses and decision support.

In conclusion, the SYNERGIES project, through these practices, aims to make data not only interoperable but also easily accessible and useful to a wide range of stakeholders, contributing significantly to the resilience and effectiveness of emergency management internationally.

4.4.4 Increase data re-use

SYNERGIES aims to maximise data reuse, making it a valuable resource for the scientific community and all stakeholders involved in emergency management. To ensure data reusability, several measures will be taken, focusing on the creation of accurate and relevant metadata, including clear information on licences for data use, data provenance, and adherence to community standards relevant to the application domain.

Open access will be a cardinal principle, with data provided in standardised formats to facilitate interoperability and reuse even outside the immediate context of the project.
The value of the data will be further enhanced by adopting licences that promote reuse and sharing, such as those of the Open Data Commons Open Database License (ODC-ODbL), which allows data to be processed and shared on the same terms, thus stimulating the creation of an ecosystem of open and shared data.

The SYNERGIES project's commitment to data reusability is consistent with its mission to contribute to preparedness in the context of emergency management by strengthening the existing knowledge base and fuelling continued innovation. Through these practices, SYNERGIES aims to leave a lasting legacy that will extend well beyond the formal duration of the project, facilitating new discoveries, improving practices, and informing future policies in a sustainable and open manner.

[8] cf. Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. (2016)

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

4.4.5 Data storage

In the SYNERGIES project, data storage management is designed to ensure that all data collected and generated are stored efficiently and securely. This includes the implementation of data storage solutions that meet stringent security and reliability requirements as stipulated by the European Executive Agency for Research (REA) guidelines.

By choosing state-of-the-art cloud storage services, SYNERGIES employs systems that offer not only the scalability needed to accommodate the growing volume of data but also the resilience to protect against loss or damage. These services also enable backup and disaster recovery plans, which are essential for data recovery in the event of a disaster.

The selection of standardised data formats and the creation of access protocols that clearly define who can access and modify data further contribute to the integrity and security of data storage in the project. In this way, SYNERGIES ensures that data are stored in a form that allows for optimal use both during and after the conclusion of the project, supporting the long-term goals of emergency management research and innovation.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

5. Allocation of resources

The costs for making data FAIR are part of the work of the project; therefore, it is difficult to extract them from the technical work. The costs will be covered by the grant. There will be a joint responsibility over data management in the project between the project coordinator, WP leaders, responsible for project data, responsible for Open Data Repository.

For administrative and management purposes, the person in charge of data management in SYNERGIES is Valentina Pagnanelli (valentina.pagnanelli@dblue.it).

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

6. Data security

6.1 General

Where the reg. EU 2016/679 does not require higher security standards, data will be stored in certified repositories with the highest security standards. The Consortium and its members opted for the following options.

Table 4 - SYNERGIES repository(ies) service and providers.

Service(s)	Provider(s)	Responsible partner(s)
Cloud computing and collaboration tools	Google	DBL
Hosting infrastructure for RaaS	Google Cloud Platform	IES (now WBG)
Hosting infrastructure for Atlas	To be defined	ISIG
Zenodo	CERN's Data Center	IES (now WBG)

In addition to software and hardware security standards, data will be protected by applying strict data protection procedures. Any personal data will be processed legally and fairly: collection of data will be adequate, relevant and not excessive in relation to the purposes of the project; data that identifies individuals (personal data) will not be kept any longer than necessary: once the project has finished, data will be completely anonymised if possible, meaning irreversibly preventing identification of the data subject. Any personal data will be destroyed two years past the termination of the project. The Consortium will comply with European (i.e., GDPR) and national legislation relevant to the countries where data collection is taking place.

Data collected for research purposes (including questionnaires, interviews, field observations, audio/screen recordings (where applicable)), as well as promotional materials gathered during data collection activities and project events that may be video recorded or photographed, will be subjected to current European regulations on matters of data handling and privacy (GDPR, Regulation (EU) 2016/679). The research outcomes will always be reported without contravening the right to privacy and data protection.

- Secure Storage Policy: any partner is accountable for the processing activities performed within its research and administrative activities. All the processing activities shall be compliant with the applicable legislation and with the Consortium policies. Storage practices shall be compliant with minimization and confidentiality principles. Removable storage will include large-capacity hard drives that will be kept in locked cabinets.
- Anonymisation Policy: according to the minimization principle (reg. EU 2016/679, Article 5(1)(c)), partners shall process «personal data shall be […] adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed» and «if the purposes for which a controller processes personal data do not or do no longer require the identification of a data subject by the controller, the controller shall not be obliged to maintain, acquire or process additional information in order to identify the data subject» (ibidem, Article 11(1)). Against this background, the Consortium adopts a specific anonymisation policy that prescribes the anonymisation of all personal data that does not explicitly require processing in an identifiable format.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

Any partner is accountable for the anonymisation techniques adopted by its team. Generally, the main reference for anonymisation is the Working Party Article 29 (WP29) Opinion 5/2014 on Anonymisation Techniques (WP29, 2014).

- Secure Access Policy: data will be encrypted, and password protected. Only members of the team directly working with the data ("need to know") will have authorization to access the data. Each Data Controller will be responsible for de-identification of the data or establishing a procedure to be followed by other partners in charge of personal data.
- Secure Sharing Policy: if data might be transferred for further processing to other project members, sharing needs to have an adequate legal basis. The admitted legal basis includes the consent of the data subject; and the legitimate interests of the controller(s) if justified by documented interrelation among task(s) and/or WPs.

Monitoring of Data Transfer: the data will not be transferred outside the Consortium without prior authorisation.

In the SYNERGIES project, it is crucial to ensure that the generated datasets are stored securely and sufficiently. Project beneficiaries will be required to take the necessary measures to ensure adequate and secure storage capacities. In addition to individual archiving, a portion of data relevant to the progress of the project will be stored and curated in an online repository dedicated to the project and managed by the project coordinator. This repository will support data restoration in the event of accidental deletion through regular backups; however, each beneficiary will be responsible for the security of their data and must also ensure that data created or modified by them is adequately saved through their IT infrastructures.

6.2 IPR Management

The management of intellectual property rights (IPR) is essential for the correct treatment of the knowledge and the IPR generated will in any case be defined in the Consortium Agreement (CA), which will be negotiated and signed by all partners before the official start of the project, following the Horizon 2020 IPR recommendations and the available SYNERGIES standard document.

Within SYNERGIES, public use of the deliverables will be ensured through their publication under the appropriate licence, respecting the restrictions for confidential documents, which will be available externally only with prior written consent of the SYNERGIES Consortium.

Regarding IPR management, the Exploitation Plan included in a specific work package will include a section on IPR Management. This task will monitor the IPR activities of SYNERGIES and, based on this, create the IPR Management list and analysis of third-party intellectual property rights. The evaluation of the SYNERGIES IPRs will involve mapping the IPRs to the SYNERGIES deliverables, as a basis for providing stronger and more practical IPR agreements for these specific IPRs, if necessary. Furthermore, novelty searches will be carried out on the deliverables and patent applications will be made, if applicable.

Within the consortium, individual partners maintain advanced publication activity through research conferences and specialised publications. This activity will be managed at individual partner level but will be coordinated with the dissemination activity. The consortium will also publish joint research articles, involving at least two partners. These items will be available on the SYNERGIES website. Furthermore, in accordance with the new Horizon 2020 rules, open access will be guaranteed to all scientific publications resulting from SYNERGIES actions. A separate budget is allocated for this purpose.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

7. Ethical aspects

Ethics in SYNERGIES are covered within the Ethics Guidelines D6.1[9]. In relation to this document, and data management with the project, all partners who collect or process research data at the request of and on behalf of the SYNERGIES project are required to comply with the GDPR and the 'standards for ethics and data protection' set by the European Commission. They share responsibility for processing and managing data, particularly personal data, in a responsible and ethical manner throughout the duration of the project. In cases where the processing of such research data involves joint data controllers, the partners must define their respective responsibilities in an agreement made available to the data subjects and provide them with a single point of contact[10].

7.1 Definitions

"***Personal data***" generally means "any information relating to an identified person or identifiable natural person"[11].

"***Identifiable natural person***" or "***data subject***" means a person who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person"[12].

"***Special categories of personal data***" (formerly known as "sensitive data") should be considered data subject to more stringent data protection safeguards. They include personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and processing of genetic data, biometric data intended to uniquely identify a natural person, data relating to health or data concerning the sexual life or sexual orientation of a natural person"[13].

Table 5 - Sensitive Data by Task.

Task	Keywords	Activities	Regular personal data	Sensitive data
1.1	Evaluation & Validation Plan	Questionnaires to stakeholders	Name, Age, Education Level, Country of residence, Gender, No. of stakeholder	None anonymised
		Individuals in vulnerable situations/vulnerable groups interviews (presence of vulnerable groups and their needs)	Name, Role, Occupation	Voice Recordings
3.2	Knowledge Management Methodology	Interviews, workshops	Name, Occupation, Social media, User stories (...)	To be clarified

[9] Clark, N., Boersma, K. (2024)
[10] cf. Article 4 (2) GDPR & Art. 26 GDPR
[11] cf. Article 4 (1) GDPR
[12] cf. Article 4 (1) GDPR
[13] cf. Article 9 (1) GDPR

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

3.3	Tool for Early Warning Messaging	Questionnaires	Telephone number	None anonymised
4.3	Lessons learned on management of spontaneous volunteers	Interviews to spontaneous volunteers	Lessons learned	To be clarified
6.1	Ethics	Collection and management of research ethics approvals	Opinions/Approvals	To be clarified

7.2 Protection measures

SYNERGIES is committed to ensuring maximum data protection and compliance with ethical standards when conducting research and data collection activities, in accordance with the General Data Protection Regulation (GDPR). For each consortium partner involved in research and data collection activities, a Data Protection Officer (DPO) will be appointed who will have the task of supervising compliance with the GDPR and will act as a contact point for any issue relating to the processing of personal data.

Particular attention will be paid to informed consent, which is crucial for all primary data collection activities. Consent procedures will clarify the purpose, sharing and retention of data, as defined in the SYNERGIES grant agreement. To this purpose, Information Sheets and Informed Consent forms have been created (see D6.1) in the languages (English, French, Maltese, Dutch) where data is anticipated to be collected. These materials provide details on the scope of the research, as well as how the participants' data will be managed and stored. They also include the contact information for the DPO for the lead institution responsible for the research activity, the SYNERGIES Project DPO, the project Ethics Advisory Board, and the Project Coordinator, so that participants may exercise their privacy rights or raise questions or concerns about the management of their data.

To protect the privacy of individuals, anonymization and pseudonymization techniques will be applied to data, and are outlined in D6.1. This will reduce the risk of accidental identification, especially when processing sensitive data. The project will adhere to the principle of data minimization, ensuring collecting only the data necessary for the specified research purpose. Furthermore, all consortium members will be trained to follow the ethical standards and principles of the GDPR, such as transparency, data minimization and data subject rights. In particular, partners should apply the following principles defined under art. 5 of the GDPR:

- lawfulness, fairness and transparency;
- purpose limitation;
- data minimisation;
- accuracy;
- storage limitation;
- integrity and confidentiality;
- accountability.

Regarding the use of publicly available data, SYNERGIES will only use information intended for public sharing, respecting users' privacy settings.

In cases of data processing operations that present higher ethical risks, SYNERGIES will conduct a Data Protection Impact Assessment. This assessment will be carried out as appropriate, in line with what is established in the grant agreement, to mitigate any negative effects on data subjects. All data collection tools will undergo ethical review before their use.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

This ensures that all research activities are conducted with the utmost respect for ethical standards and data protection laws.

Special attention will be paid to the protection of minors' personal data. Where data may be collected from minors, consent will be obtained from a parent or legal guardian in accordance with the GDPR and ethical guidelines.

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

8. Conclusions

The SYNERGIES project's data management plan outlined a robust and integrated methodological framework to ensure that all data collected, generated, and analysed during the project lifecycle are managed effectively, securely, and in accordance with FAIR principles. Strategies adopted emphasized the protection of personal and sensitive data, GDPR compliance, and the adoption of strict ethical measures for data collection and use.

The DMP will be a living document and it is planned to be updated during the project life cycle each year (if necessary).

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

References

Clark, N., Boersma, K. (2024): D6.1 Ethics Guidelines, SYNERGIES Project: Innovating preparedness by leveraging synergies and enhancing results of DRM projects, funded by the European Union's Horizon Europe Innovation Programme (No. 101121172).

European Commission (DG Research and Innovation) (2018): Ethics and data protection

European Commission, Directorate-General for Research & Innovation (2016): H2020 Programme, Guidelines on FAIR Data Management in Horizon 2020, Version 3.0.

European Research Council (2017): Guidelines on Implementation of Open Access to Scientific Publications and Research Data in projects supported by the European Research Council under Horizon 2020, Version 1.1.

Golfetti, A., Pasquini, A. (2024): D7.2 Project Handbook, SYNERGIES Project: Innovating preparedness by leveraging synergies and enhancing results of DRM projects, funded by the European Union's Horizon Europe Innovation Programme (No. 101121172).

Matera, S., Cecconi, M. (2024) D5.2 Website, *SYNERGIES Project: Innovating preparedness* by leveraging synergies and enhancing results of DRM projects, funded by the European Union's Horizon Europe Innovation Programme (No.101121172).

Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* (2016): The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3,** 160018 doi:10.1038/sdata.2016.18

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101121172. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.