Data Management Plan

WorkPackage 1 - DL 1

PROJECT

Project number:	[101136765]
Project acronym:	[Unite.WIDENING]
Project name:	[Raise excellence in R&S&I in HEI for widening countries]
Project Call:	HORIZON-WIDERA-2023-ACCESS-03-01 — European Excellence Initiative

DL1.1 DATA MANAGEMENT PLAN

DL Date:	27/06/2024
DL Version:	1.0
DL Dissemination level:	Public
Work Package:	WP1 – Project Management
DL Due date:	30 June 2024
DL submission date:	28/06/2024
DL update date:	N/A
Keywords:	Data Management Plan, European University Alliance, Research and Innovation, European Research Area, European Excellence Initiative
Abstract:	The Data Management Plan (DMP) describes the data management life cycle for the data to be collected, processed and/or generated during the project and after the project ends. The plan aims to provide common guidelines as suggestions for the consortium for the management of the Unite!Widening project research data, states what data will be created, and how, and outlines the plans for data sharing and preservation. It gives an overview of the type and format of these data and of the storage and sharing systems also in relation to the objectives of the project and to the data utility. To make data findable, accessible, interoperable and re-usable (FAIR), the DMP includes information about the handling of research data during and after the end of the project, which methodology & standards will be applied, whether data will be shared/ made accessible and how data will be curated and preserved, noting what is appropriate, given the nature of the data and any restrictions that may need to be applied. This plan follows the principles set in the Horizon Europe programme, and the same principles and norms set by a previous Unite! project, Unite!H2020, that participated in the H2020 extended Open Research Data (ORD) pilot. The first version of the DMP, delivered within six months of the start of the project, reflects the initial plan jointly agreed by the consortium about the managing of the project research data in accordance with the FAIR data principle and EU General Data Protection Regulation (GDPR). The DMP is a live

	document to be updated as necessary, and to be updated at the mid-term and the end of this project.

History of changes

Version	Publication or release date	Change
0.1	29/05/2024	Initial version (draft) - AAVANZ
0.2	03/06/2024	Revision by UL (Coordinator)
0.3	24/06/2024	Revision and comments by consortium partners
1.0	28/06/2024	2nd Revision by UL (Coordinator)

Abbreviation list

CA – Consortium Agreement
CC0 – Creative Commons Public Domain Designation
CC-BY – Creative Commons licence - must attribute the author of the work
CRM – Customer Relationship Management
DL – Deliverable
DMP – Data Management Plan
DOI – Digital Object Identifier
E+ – Erasmus+
EC – European Commission
EEA – European Education Area
EEI – European Excellence Initiative
ERA – European Research Area
ERC – European Research Council
EU – European Union
GA – Grant Agreement
GDPR – General Data Protection Regulation
H2020 – Horizon 2020
HEI – Higher Education Institution
HR – Human Resources
IPR – Intellectual Property Rights
IRIS – joint network of Integrated Research and Innovation Services
OA – Open Access
ORD Pilot - Open Research Data Pilot
OS – Open Science
PC – Project Coordinator
PL – Poland
PT – Portugal
R&I – Research and Innovation
S&R&I – Science, Research, and Innovation
S&T – Science & Technology
STEM – Science, Technology, Engineering and Mathematics
TT – Technology Transfer
TTO – Technology Transfer Office
WP – Work Package
WPL – Work Package Leader
WPLB - Work Package leaders Board

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Context and Project Objectives

Unite! aims to forge connections between universities across Europe, allowing students to pursue degrees across EU countries, enhancing the global standing of European higher education institutions. Unite! seeks to revolutionise European academia through pioneering, interdisciplinary education, research, and entrepreneurship, co-created with students and faculty. By bridging disciplines and addressing societal challenges, Unite! is to set a new standard for European higher education.

The University Network for Innovation, Technology and Engineering - Unite! - is one of the first 17 European University Alliances originated from the Unite! E+ project, selected in a pilot call for proposals under the Erasmus+ programme, as part of the EC initiatives for the establishment of a European Education Area (EEA) enabling all young people to benefit from the best education and training and to find employment across Europe.

Involving 7 top level European universities (Technical University of Darmstadt – coordinator of the Unite! alliance, Aalto University, Grenoble INP graduate schools of engineering and management - University Grenoble Alpes, KTH Royal Institute of Technology, Politecnico di Torino, Universidade de Lisboa, Universitat Politècnica de Catalunya – BarcelonaTech) highly ranked in their shared focus areas - Science, Technology, Engineering and Mathematics (STEM), architecture and design, the Unite! Alliance kicked-off in early November 2019 with the Unite! E+ project aiming at developing a long-term joint strategy for education.

The UNITE.H2020 project, started on January 1st 2021 and completed on December 31st 2023, involved the seven universities of the Unite! Alliance and is coordinated by Politecnico di Torino. The project was selected in a call related to the Horizon 2020 action to support the R&I dimension of the European Universities with the aim of contributing to the ERA (European Research Area) together with the EEA.

The overall objective of UNITE.H2020 is to develop a shared, integrated, long-term R&I strategy for the Unite! European University Alliance, emphasising its STEM nature, that structurally and sustainably impacts society addressing the SDGs and the EU Missions. Through the UNITE.H2020 project, the Unite! Alliance aims at taking up the challenge launched by the EC to develop, in synergy with its education dimension implemented by the Unite! E+ project, a shared, integrated, long-term research and innovation (R&I) strategy through the definition of a common R&I agenda, while developing, during the 3-year project, several pilot initiatives in the field of Energy - with special reference to the Green Deal, Artificial Intelligence, and Industry 4.0.

The **Unite!Widening** project aims to enhance scientific excellence and maximise knowledge impact by fostering extensive collaboration across European universities and partners from diverse regions. The **Unite!Widening** project, which runs for 5 years, until 31/12/2028, has been designed to be a complementary project, supported by the European Universities Initiatives. The project is led by the University of Lisbon.

The idea behind **Unite!Widening** is drawn by the differences in conducting successful transnational research and innovation (R&I) projects within European Universities. Some are more disadvantaged than others due to a lack of scientific infrastructure, the ability to establish or access networks, maintain, and retain talents or overcome structural barriers at an institutional,

regional, or national level. Under Horizon Europe, the European Commission seeks to bridge these gaps by literally 'Widening' the scope of funding to strengthen R&I across Europe, also empowering growth and innovation in widening countries like Poland and Portugal.

The objectives of the **Unite!Widening** project are the following:

1) **Raise and mainstream excellence in science and in value creation through deeper and geographically inclusive cooperation in alliances of HEI, and particularly in less research-intensive institutions with focus in Widening countries, achieving long-term collaboration** - The more innovative countries such as Sweden, Finland, Italy, France, Germany, Spain and Austria will support Portugal and Poland to build research and innovation capacities and to achieve research excellence in line with the policy objectives of the European Research Area. For that in WP2 the partners will reformulate and adapt the strategies and proposed actions/events/guidelines to the PL and PT ecosystems and their institutions in five main dimensions: research for the green transition; human resources & ERA talents; Research infrastructures & Resources; synergies between academia and industry/business; and Equal European Space for Open Science & Innovation. The project also intends to ensure the application and implementation of best practices, some from WP3 and WP4, others from outputs and previous activities of Unite! H2020 and Erasmus+ projects and the use of different communication and dissemination strategies, such as conferences and reports, providing insight into the R&I differences between the Widening and non-Widening environments or the statement of agreements and mutual interactions between those sets of countries (WP5).

2) **Improve global competitiveness and visibility of Europe's HEI, creating critical mass in key areas such as the green transition and Horizon Europe mission areas -** A new S&I Skills Academy will be created which activities and trainings in different formats will help to improve S&R&I skills in PL/PT partners, and also in other EU countries, particularly other Widening countries (WP4).

3) **Successful institutional reform, upgrade and strengthening of HEI capacities in the R&I dimension (empowerment to be actors of change), through integrated collaboration between institutions and other actors in local ecosystems notably those located in Widening countries** - Under WP2 an assessment of S&I institutional approaches and best practices is fundamental to reach the project goals and will be performed through a review of existing studies, practices, policy documents, and roadmaps, among others. While the information about S&R&I institutional approaches is wide, the perspective within this WP is to assess all to establish guidelines for the reform of approaches in Widening countries, specifically reformulating the strategies of PL/PT ecosystems. Under WP4, to implement the principles of sharing RI and resources in PL and PT, the Widening institutions (academia and industry/business) will use the list/collection of RI&R input from WP2 to support the creation of four Living Labs.

4) **Modernised research careers in higher education sector, interoperable with other sectors and improved global competitiveness of research in HEI by strongly increased critical mass in terms of upskilling, knowledge creation and circulation in the green transition and other key European policy areas such as European Missions** - Under WP3, Training sessions for tutors and support staffs will be designed and implemented, covering topics such as: Research and Innovation Management; Research Careers; Digital and Green Transition; Equity, Inclusion; Gender Equality; Internationalisation and Doctoral School.

5) **Accelerated digital transition of the R&I dimension of the higher education sector across the entire ERA** - Under WP2, the digital campus framework developed in Unite! will be extended to provide information about availability of shared resources and to streamline and simplify access for all, namely the PL and PT researchers. Also, at WP4 the connection between academia and business/industry leads us to an integration of the European values in line with the SDG approach, especially through the promotion of the green and digital transition towards an innovation hub (as the example of creation of green and digital villages in PL and PT based in the non-Widening experiences with the local coordination of the industrial/business partners).

6) **Contribution to implementation of the relevant ERA Policy Agenda actions in higher education sector -** The final goal of the project as a whole is to reduce the innovation gap between Widening and non-Widening countries and to hopefully generalise the results and benefits to other Widening countries (WP4 and WP5), providing new and better ways for universities to work together across borders, irrespective in which Member States they are located, supporting institutional transformation and mainstreaming a culture of excellence in research and business creation.

Unite!WIDENING will enhance the strategic capacity for research management of the Alliance, and the partners from the Widening countries in particular, by expanding and building on the IRIS network to create a strong community of research managers to share expertise and best practice (in line with ERA Action 17). IRIS aims at providing targeted support services to the Alliance, to researchers and research managers and administrators. IRIS ensures support for additional funding sources to implement activities at European level.

This project is part of the UNITE! ecosystem. Unite! aims to forge connections between universities across Europe, allowing students to pursue degrees across EU countries, enhancing the global standing of European higher education institutions. Unite! seeks to revolutionise European academia through pioneering, interdisciplinary education, research, and entrepreneurship, co-created with students and faculty. By bridging disciplines and addressing societal challenges, Unite! is to set a new standard for European higher education.

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1. Data Summary

1.1 Overview of the data in relation to the project

1.1.1 Purpose and nature of the data

The project is organised in 5 high-level Work Packages (WPs) that are split in 13 sub-WPs, to separate the 5 WPs per each reporting period.

Data collected or produced in **WP1** (**Project management & Quality Assurance**) and **WP5** (**Outreach without borders**) does not constitute research data and will not be an object of the DMP. In cases where data produced or collected in these WPs is considered relevant for research, either the producing partner, WP leader or the coordinator should follow the DMP procedures (within the process expressed in section 4.2).

In the remaining WPs data is collected or produced that is in relation with either the management of Research or actual research, therefore it is the object of this DMP and an overview is provided below.

In **WP2 Assessment and Reform of Science, R. & Innovation institutional approaches**, an assessment of S&R&I institutional approaches and best practices of non-Widening countries will be performed through review of existing studies, practices, policy documents, and roadmaps.

The methodology in this WP includes:

- Critical analysis of the R&I services provided in Wroclaw University of Science & Technology (PL) and University of Lisbon (PT) together with local development and innovation hubs, business incubators, innovation agencies and technology parks.
- Identification of upskilling and networking needs of research managers and administrators in the two Widening universities, according to the four ERA Action 17 key objectives, such as upskilling, recognition, networking, and capacity building for research managers
- Planning of actions to strengthen research management in the two universities to be set up in **WP3** and carried out in **WP4** and **WP5**.

The expected outcome within this WP is to establish guidelines for the reform of approaches in PL/PT ecosystems.

In **WP3 Training and Capacity Building considering Multi-Dimension Roadmap**, training and capacity building activities will be defined, to improve skills in PL/PT partners, and other EU countries, particularly other Widening countries. Also, a new S&R&I Skills Academy will be set to guarantee the adaptation, mitigation or change of the subjects delivered during and after the project lifetime.

The collection of information about researchers, research groups and data available about contents already in use for the different partners should be carefully accessed and adapted according to the needs of the Widening Project activities in WP3. The data collected for the assessment of the training will be used to improve the following training actions and adapt the characteristics of all the modules developed during the current activities. The collection of video, images and pictures for later use will be treated carefully and according to the ethics, reliability and data protection of the privacy for each case.

In **WP4 Building Inclusive Collaboration for Excellence,** a set of innovative methodologies in PL and PT ecosystems, such as matchmaking events or other mechanisms available to enhance and accelerate collaboration between researchers will be applied. Also, Grant Writing offices, TTO, etc, will be created or repurposed and will benefit from Joint Interdisciplinary Agendas based on previous projects' outputs, such as the IRIS Network or synergies with other alliances. To promote the link between academia and business some events will be promoted, such as a 2 green villages to showcase innovation (with the inputs of desk research of **WP2**); a collection of initiatives of seed funding partially composed by project budget and partially from lending/crowdfunding (applying best practices from Widening countries in PL and PT); extend the Unite Open Science Forum to PL and PT and, as a final and valuable purpose will create three S&R&I Centres of Excellence based in S&T Parks and fostering innovation between companies and academia for Widening countries. To perform the principles of sharing Research Infrastructures and Resources in PL and PT, the Widening institutions (academia and industry/business) will use the list/collection of RI&R input from **WP2** to support the creation of four Living Labs, in PL and PT.

To promote a fair, attractive and cooperative conditions for researchers in PL and PT some actions to be implemented include: organisation of co-visiting chairs or mutual tutoring workshops to support the creation of truly wider research communities in Europe; the creation of a research transparency dashboard based in the Metacampus extension IT Platform and the development of the Code of Ethics for Research in PL and PT, based on the EU Reform Assessment Principles, to become part of a toolkit created in the scope of Research Assessment Framework; and organise two programmes of acceleration in ERA Chairs and Talent Attractiveness and an Expert Tutoring Programme for ERC (derived from the **WP3** S&R&I Skills Academy provided trainings). Seven Industry embedded PhD Scholarships with joint supervision (ULISBOA/ PWR) will be conducted. These Industry embedded PhD Scholarships are expected to produce research data that will be handled via the same procedures as laid out in this DMP, specifically to consider Open Science practices and Research Data Management.

The matchmaking events outputs, together with other outputs of **WP2** and **WP4**, will feed into the design of policy recommendations towards EU policy makers to strengthen the future R&I European agenda in Widening Countries.

To optimise resources and increase internal dissemination, whenever possible, Unite!WIDENING will explore synergies with other events already ongoing throughout the Unite! Alliance, be it alliance community meetings, Dialogues, or events organised under other Unite! related projects.

The project WPs conduct the following generic types of tasks that are associated with data collection and generation.
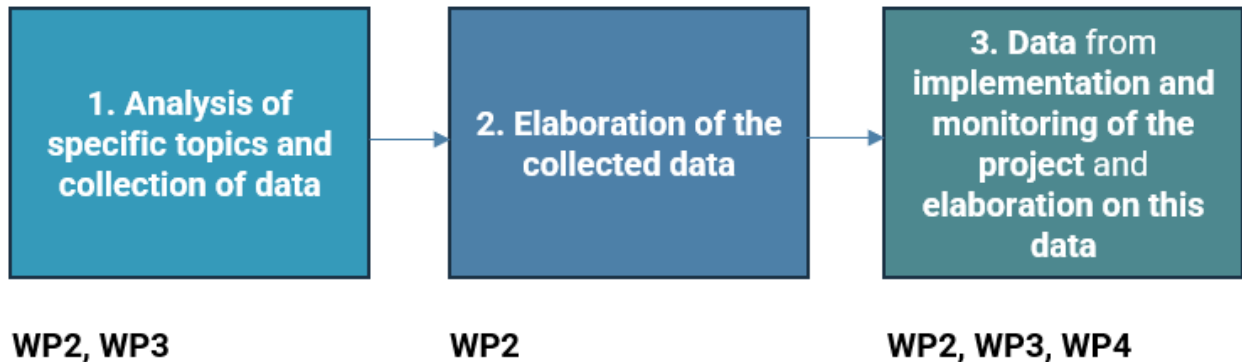
The data collected and generated in each WP, <u>together with related DLs</u>, for each of the above generic types of tasks, is the following:

1. **Analysis of specific topics and collection of data** from desk research, surveys, interviews, current policy agendas (e.g. on green transition of the two Widening countries), and project events (e.g. conferences, policy forums, staff weeks, and matchmaking events).
   1.1. **WP2** - Analysis of diverse documentation (roadmaps, guidelines, handbooks and white papers) such as e.g. ERA agenda/careers, Research Assessment Principles, the five EU Missions 2030, the R&I European Strategy 2020-24, and the Unite!E+ and Unite!H2020 project outcomes. Analysis of the R&I services provided in Wroclaw Tech and ULisboa.
   Open science policy forums, mutual learning exercises and co-creation sessions in PT & PL and with all EU Alliances participating in the open science's FOREU group.
   1.2. **WP3** - Assess and monitor the activities of a new Science & Innovation Skills Academy by a set of guidelines, to guarantee the adaptation, mitigation or change of the subjects delivered during and after the project lifetime.
   Four annual staff weeks will be organised for research support staff by PL and PT, addressed in priority to their staff.

2. **Elaboration of the collected data** – preparation of reports, handbooks, catalogues, repositories, tools/databases, and state of the art analysis.
   2.1. **WP2** - Adaptation of the HRS4R (Human Resource Strategy for Researchers) <u>Handbook to PL and PT - Handbook of HRS4R for Widening Countries (DL4.3)</u> Enhancement and update of the online catalogue of Unite! Research Infrastructures and resources. Standardizable information compiled about all the Tech Transfer Organizations (TTOs) which are relevant to the 9 partners (e.g., description, contact information), and shared on the Digital Campus. <u>Enhanced, extended and updated online catalogue of RIs + directory of TTOs (DL4.3).</u> This will be available on the Digital Campus of Unite! and its database will include open-access RIs in some industrial partners and, possibly, the RIs of the EPICUR Alliance (partner of Unite! in the aUPaEU EU project), and, on a voluntary basis, of other EU Alliances. A permanent scheme for joint Maintenance, Repair, and Operations (MRO) will be designed and implemented to prevent safety risks and performance issues of the tool, ensuring its continuous improvement, and

maintaining the accuracy of its database. Pooling RIs and resources will materialise equal access to state-of-the-art equipment between Widening and non-Widening partners. <u>Design and implementation of a long-term scheme for joint MRO (Maintenance, Repair, and Operations) of the above (DL5.2). Risks-benefits analysis on allowing external users access to an RI (DL5.3).</u>

Analysis of the concept of Open Local Innovation Communities for Green and Digital Transition.

Reports of the conferences (to help build the research communities and increase their international visibility) and of the matchmaking events (support the engagement with created networks, aiming to identify synergies, e.g. human capital joint activities).

<u>Report "Research management needs in PL and PT - identification of gaps and future actions" (DL4.1).</u>

<u>Development of Gender, Inclusion and Equity Plans in research careers – Survival Guide to Widening Countries (DL5.1).</u>

3. **Data** resulting from the **implementation and monitoring of the project's actions** and **elaboration on this data**: preparation of R&I strategies, white papers, guidelines, roadmaps, policy recommendations, and training materials & best practices.

   3.1. **WP2** - Multi-dimensional roadmap. Reformulation and adaptation of the R&I strategies and proposal of actions, events, and guidelines to the ecosystems in PL and PT in 5 main dimensions: research for the green transition; HR & ERA talents; research infrastructures; academia and industry/business synergies; equal European space for Open Science & Innovation.
   <u>New Policy Recommendations for R&I Widening Countries Agendas E-Book (DL4.1).</u>
   Set of four networks of strategic research communities (two in PT and two in PL).
   Strategy for the new Industry-Embedded PhD School in PL&PT focused on industrial/business partnerships.
   <u>Legal framework and agreement template for UDS segment in PL and PT - UIDS (Unite Industrial Doctoral School) DL5.5.</u>
   White paper to support University managers and policymakers of PL, PT and Widening countries in the development of European Open Science and Innovation Universities, enabling a European Open Science and Innovation Area among Widening and Non-Widening countries. <u>White Paper UNITE "A new university Open Science & Innovation Strategic Roadmap" - adapted version to Widening countries (DL4.5). Report - Establishment of the Research Assessment Framework in Widening Countries (DL5.4).</u>
   <u>Best Practices Report in Outreach and involvement of citizens in R&I (DL5.6).</u>

   3.2. **WP3** - Training and capacity building activities, considering the Multi-Dimension Roadmap, based on best practices, to improve skills. Training in different formats (e.g. face to face, MOOCs, workshops, webinars, hackathons, Canvas Model, Lego serious play models or other similar methodologies) emphasising inclusiveness and equity. <u>Guidelines to the creation of a Science & Innovation Skills Academy (DL6.1).</u>
   S&R&I Skills Academy operation manual, with guidelines for its set-up, preparation of courses, and their delivery will be prepared for other Widening countries and

institutions to implement a similar strategy, adapted to their specific academic/business context and needs - linked to the digital campus, available for the consortium and users from outside organisations, especially from other Widening countries and will be based on an Open Science & Open Data approach.

"Train the Tutors" and "Train the Support Staff" programmes. <u>Training Programmes Contents and Guides – Manual (DL7.1).</u>

Topics are preliminarily sub-divided in different dimensions:

- Research and Innovation Management - IPR, Knowledge valorisation, Entrepreneurship | Access to finance/Seed Funding, R&I Agendas | Tools to facilitate the digital management | ERC Accelerator Programmes;
- Research communities - Management of scientific workshops | Creation of research communities | Creation or reform of support structures ("Researchers Support Offices" | Societal Outreach | New Pedagogical models in trainings | Use of Research Infrastructures;
- Internationalisation - The role of cooperation in S&R&I systems | Rankings and Scientific Papers | How to create a community of international research;
- Doctoral School - Doctoral School International Impact and Attractiveness| Building connections with local innovation and the industrial ecosystem! Train Supervisors for PhD International Collaborations;
- Research Careers - Career Assessment, Ethics, Evaluation Models | | Work Abroad: legal and administrative issues | Onboarding Early-Stage researchers and Post Docs | Tutoring Young Professors/Researchers| HRS4R;
- Open Science – From modern science to open science | Open Data | Transdisciplinary research;
- Digital & Green Transition - Promote a charter for green transition to make a commitment between partners;
- Equity, Inclusion, Gender Equality - Transparency, Cultural Diversity, Gender balance.

Evaluation of Training impact, following the main local training regulations and models, with focus in trainers/tutors training. <u>Training Implementation Report (DL8.1)</u> and <u>Training Impact and Assessment Report (DL8.2).</u>

3.3. **WP4** - Application of methodologies in the PL and PT ecosystems, divided in five specific dimensions/tasks.

Using the outputs of WP4 including the extension of the IRIS Subset Network to PL and PT, the Living Labs in strategic areas, the crowd/lending seed funding (partially funded by the project), the acceleration programmes for some EC Funding typologies or the implementation of a Research Transparency Dashboard. Exchange of best practices and advanced R&I support. PL and PT will implement offices to support the implementation of R&I Agendas.

Matchmaking events will strengthen research collaboration of PL and PT in the topics of:

1) Boosting success in Horizon EU calls participation;
2) Open Science methodologies for ethical research;
3) Research infra-structures and improvement of research careers;

4) Others, to define according to the Strategic Areas outputs.

Other mechanisms to enhance and accelerate collaboration between researchers, especially those from PL and PT, include IT tools from Unite! H2020 will be adapted (e.g. Metacampus platform, where advertising or searching for R&D capacities, thematic areas and scientific production of any of the Alliance's universities can be conducted). Additional IT tools,developed in the framework of the aUPaEU project, will be adapted to fulfil other needs.

Promotion of the green and digital transition towards an innovation hub (e.g. creation of green and digital villages in PL and PT, following best practices, with local coordination of the industrial/business partners):
1) adapt the Stakeholders Forum, a structure from Unite!E+, to further promote the synergies in SDGs between industrial and academia partners, with e.g. Open Science Green Villages (1st half of the project);
2) implement (last 20 months of project) 2 green villages to showcase innovation; promote a call for new initiatives between academia and business/industry supported by seed funding partially composed by project budget and partially from lending/crowdfunding (applying best practices from Widening countries to PL and PT); Crowd/Lending Funding initiative – Widening Capacities Funding in PL and PT (DL 9.1).
3) extend the Unite Open Science Forum, widening it to the specificities and strategic scientific areas, to PL and PT;
4) create three S&R&I Centres of Excellence, based on the 5 EU Missions, and S&T Parks, to foster innovation between business/industry and academia in Widening countries.

Handbook on good practices and data sharing for living labs. Striving for the development of living labs in that manner, this will also work toward interconnecting them and pooling the data they produce. Interconnecting Unite! living labs and pooling the data they produce to strengthen the widening and non-widening ecosystem (DL 9.2). Communication between the Data privacy officers /data privacy legal advisors of the collaborating parties early on to draft correct data transfer agreements may be needed for enabling the pooling of data of Unite! living labs.

The project will leverage its results, outputs, outcomes and impact produced by Unite! Living labs through events of the Unite! Consortium, and a roundtable, open to specialists and non-specialists, for exchange and debate of ideas and views about living labs. Evaluation of the industry embedded Doctoral Schools in Widening Countries (DL10.6).

Two pilots based on Open Science Practices in the context of the research communities defined in strategic areas in PL and PT, organisation of two programmes of acceleration in ERA Chairs and Talent Attractiveness an Expert Tutoring Programme for ERC. The two programmes will be based on experience and material directly derived from the S&R&I Skills Academy training (provided in WP3).
Guidelines and recommendations for the further development of Joint Interdisciplinary & trans-European R&I Structures - Widening countries (DL 10.1).
Stakeholders Analysis Pilot Tests (The Business/Academia Cooperation based on SGDs in PL and PT) (DL 10.2). Implementation of 2 pilot tests in the context of Research Assessment – contents/reports for Visiting Chairs and Sabbatical Periods (mixed across the industry and academia) (DL10.4).

An improved Research Assessment Framework toolkit composed by:

- A research transparency dashboard based in the Metacampus extension IT Platform;
- The Code of Ethics for Researchers in PL and PT, based on the EU Reform Assessment Principles; The updated HRS4R templates/guidelines to apply to the EC calls;
- A comprehensive guide to the research careers in PL and PT.
  - Toolkit to Research Assessment Framework – contents and materials (including the Development of UNITE Code of Ethics and Diversity in Research Environments in PL and PT); Development of the Research Transparency Dashboard – PL and PT – website (DL 10.3).

Actions in industry-embedded doctoral research in PL and PT: re(definition) of the rules for joint academia/industry supervision funding programmes (including mutual supervision between Widening and non-Widening and industry/business mandatory internships in PL and PT strategic areas), preparation of internal teams to raise the number of competitive & winning proposals to calls such as MSCA (connecting PhDs to industry) and improve the visibility of certain strategic areas in PL and PT (with IRIS), creation of an International Board for Impact Assessment and valorisation of Research for Widening countries with the participation of other partners from Widening countries in different EU Alliances, with a significant presence of business/industrial actors and one representative of the local/regional/national bodies. Development of Expert Programmes to improve the success rate in ERA Chairs and Talent Attractiveness & Expert Tutoring for ERC Plus Programme Accelerator (DL 10.5).

Bootstrap Industry-Embedded PhD School in each Widening country (PL and PT) to offer PhD scholarships based on the principle of mutual supervision in a Widening and non-Widening country with direct industry participation, including topic select and co-supervision. Mobility schemes to Joint Supervision programmes (1 Widening and 1 non- Widening supervisor) for PL and PT students – Digital framework (DL9.3).

1.1.2 Types and formats of data

The project data will consist mainly of:

1) Data from desk research, surveys, interviews, and project events.
2) Project reports, handbooks, catalogues, repositories, tools/databases, and state of the art analysis, resulting from the analysis and elaboration of the data collected above in 1).
3) Data from the results of the project's implementation, including potentially the research data resulting from work of the Industry embedded PhD Scholarships / industry doctoral schools.
4) Draft reports, papers, guidelines, such as, e.g. R&I strategies, white papers, roadmaps, policy recommendations, and training materials & best practices resulting from the analysis and elaboration of the results of the project implementation.

The project data will consist mainly – but not exclusively – of the following types and formats:

- Text documents: as a general rule, Word files (e.g. .DOC/.DOCX, .RTF, .ODT, .PDF file extensions) will be used for drafting text documents, which could be shared in this format for modification among the project participants, while PDF files will be used for the final version of the documents.

- Presentations: PowerPoint files (e.g. .PPT/.PPTX, ODP file extension) will be commonly used to draft project slideshows, while PDF files will be used for the final version of the documents.
- Spreadsheets: data could be collected and/or organised in spreadsheets, such as Excel files (e.g. .XLS/.XLSX, ODS file extension) and comma separated values (.CSV).
- Images/ photos and audio/ video recordings: different file extension for images/ photos (e.g. .JPG, .PNG, ODG), audio (e.g .WAV, .MP3, .OGG) and video (e.g .MP4, .AVI file extension) recordings will be used.
- Datasets used in data research management, and surveys, such as CSV (comma separated values) and raw data or specific data formats from software or equipment/measurements used in research activities by PhDs during the Industry embedded PhD Scholarships (if applicable).
- Databases applications used in the context of the metacampus or Agora Platform

Some of the formats may be proprietary such as XLS, DOC or PPT, however these formats will be used for efficiency's sake during the active data management and analysis steps in the project. We will check for compatibility issues, if any, with partners. For long term preservation, appropriate preservation-friendly formats, such as XLSX, DOCX, PDF or CSV, will be preferred, with both DOCX version and PDF version available for each document.

1.1.3 Personal data

Personal data of the project participants as well as of other people involved in the project activities such as surveys, desk research, interviews, case studies, recordings etc. will be treated following the EU General Data Protection Regulation (GDPR), as further explained in Section 6 of this document. All the data breaches will be recorded according to the Polish and Portuguese GDPR regulations or national extensions of the European legislation. A repository of information about eventual incidents/data breaches will be recorded in a safe database, and, according to the European regulations will be reported to the national entity that guarantees the data protection privacy (CNPD in Portugal; ???? in Poland).

Whenever possible, and feasible for the implementation of the project's objectives, fully anonymized data collection will be applied e.g. in surveys and interviews. All the disclaimers for the use of images, pictures, videos or any information that contains personal data will be used in the different activities of the project.

1.1.4 Re-used Data

The following types of already existing data – but not exclusively – will be re-used:

- Official documents of partner Institution: e.g. Strategic Plans, Policies, Regulations, data related to previous and ongoing partner's Institution activities/initiatives; useful for example for the analysis of the state of the art carried out by the WPs, as well as to plan, implement, monitor, and evaluate the project's activities.
- Data of the Unite! Alliance: e.g. data collected during the Unite! E+ and UNITE.H2020 projects, as well as Unite! Alliances templates, communication plan, official documents; these are all expected to be useful to implement and integrate the **Unite!Widening** activities in the Unite! Alliance.

- Official documents at the global, EU and local level: e.g. policies at global, EU and local level, funding programmes; that are useful to plan, implement, monitor, and evaluate the project's activities.

Depending on the data to be reused, the need for a specific access permission by a single partner or the whole consortium will be evaluated.

Data reuse is expected to happen since the **Unite!Widening** project's activities have as inputs some DLs from the previous Unite! projects (in particular, Unite!E+ and Unite!H2020). Specifically, the following are expected to be used as inputs:

- **WP2** will use as inputs:

  1) Unite!H2020 WP2 - Guidelines/Roadmap R&I Agenda;
  2) Unite!H2020 WP4 - Stakeholders Analysis (Business/ Academia cooperation);
  3) Unite!H2020 WP2 - IRIS (Integrated R&I Support Services);
  4) Unite!H2020 WP5 - Handbook of HRS4R;
  5) Unite!H2020 WP2 - Network of Research Experts – Renewable Energies;
  6) Unite!H2020 WP5 - Gender, Inclusion and Equity Plans.
  7) Unite!H2020 WP3 - Online catalogue of research infrastructures (RIs);
  8) Unite!H2020 WP8 - White Paper "Joint Structures across The European Universities"; aUPaEU - Partnership between Unite! and EPiCUR;
  9) Unite!H2020 WP5 - Guidelines to Research Assessment Framework; Unite!E+ Com2 - Digital Campus Framework;
  10) Unite!E+ Com8 - Open Innovation Community for the Green Transition;
  11) Unite!H2020 WP 7 - Best practices in Outreach and involvement of citizens in R&I;
  12) Unite!E+ Com7 - Analysis/development of the legal framework and agreement for UDS (UNITE Doctoral School);
  13) Unite!H2020 WP6 - D6.1 Unite! Open Science and Innovation Strategic Roadmap;
  14) Unite!H2020 WP6 - D6.3 White paper: "A new University open science & innovation governance model & policy for a sustainable world".

- **WP3** will use as inputs:

  1) Unite!H2020: WP4 - Stakeholders Analysis (Business/ Academia cooperation); WP2 - Network of Research Experts - Renewable Energies; WP5 - Workshop Mentoring Researchers; WP6 - Open Science Competences; WP2 - IRIS (Integrated R&I Support Services);
  2) Unite!E+ Com8 - Developing LLL programmes (micro-credentials) to support green transition;
  3) Unite!H2020 WP5 -Equity, Inclusion and Gender;
  4) Unite!H2020 WP 7 - Best practices in Outreach and involvement of citizens in R&I;
  5) Unite!E+: Com7 - Doctoral Education & Innovation and Society; Com7 - Doctoral Education & Innovation and Society.

- **WP4** will use as inputs:

  1) Unite!H2020 WP2 - IRIS (Integrated R&I Support Services) and WP5; Unite!H2020 WP8 – Matchmaking events with other alliances
  2) Unite!H2020 WP4 - Stakeholders Analysis (Business/ Academia cooperation);

3) Unite!E+ com8 – Innovative actions for campuses to become green villages for the innovation;
4) Unite!E+ Comm1 Seed Funding Initiatives;
5) Unite!H2020 WP6 - Open Science Policy Forums
6) Unite!H2020 WP3 - Online catalogue of research infrastructures (RIs);
7) Unite!H2020 WP3 - Pilot research project illustrating the sharing of resources;
8) Unite!E+ Cm 2 - Digital Campus;
9) Unite!H2020 WP5 - Guidelines to Research Assessment Framework;
10) Unite!H2020 WP5 - Guidelines to Research Assessment Best practices;
11) Unite!H2020 WP5 and WP6 - Guidelines to Research Assessment and Open Science connection Best practices;
12) Unite!H2020 WP4 - Stakeholders Analysis (Business/ Academia cooperation); Unite!E+ Com7 – Doctoral Education & Innovation and Society;
13) Unite!E+ Com7 - Doctoral Education & Innovation and Society.

1.1.5 Expected size of the data

At this project stage there is not yet an estimate of data size.

Limitations may exist in the used systems, for example in Zenodo the total files size limit per record is 50GB (max 100 files).

For other purposes, the use of some internal platforms could request additional requisites for dimension, typology and metadata information,

Potential technical development of IT tools related to Metacampus may be part of activities in WP4 to enable FAIR data storage in connection to Metacampus.

1.2 Data utility and storage/ sharing systems

1.2.1 Storage and sharing systems

The data generated/ collected by the project partners can be:

- Partners' research data: all the data generated/ collected by a specific partner;
- WP's research data: all the data generated/ collected in the context of a specific WP;
- Project research data: all the project data that can be useful to the whole consortium and, in some cases, to the whole Unite! Alliance and/or other groups (e.g. other alliances, stakeholders).

These data will be appropriately stored and shared among partners and, for some of them, with others outside the consortium using different storage and sharing systems. These systems are indicated below as they are currently known, and are expected to be handled at partner level (internal partner use for project purposes) at WP level (data storage and sharing with partners working in a single WP) and at consortium level (all partners).

Other systems can be added in future revisions of the DMP, and each partner can opt to use a higher-level system for its internal data storage uses, for example to store all partner data at a WP-level storage and sharing system or all at consortium-level exclusively.

Partner Level

Partner's internal data storage systems – for partners' research data and backup of WP data.

Each project partner will use its internal facilities to store all the data generated/ collected by the members of that partner (e.g. data collected with desk research, interviews, surveys, analysis, and for the monitoring of the project's activities, internal working documents). For example, internal systems such as Google Forms may be used for surveys, or Microsoft OneDrive / Google Docs for collaborative editing of documents. Each beneficiary should ensure adequate backup and data recovery system for its own research data stored at their local storage systems for the time period required in accordance with GA (five years after the final payment and until the end of any on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement) and in accordance with specifications in section 5. Moreover, WP leaders are encouraged to keep a backup of the most relevant data of the WP activities on their internal institutional storage systems for the required time period in accordance with GA. Partners are also responsible to treat personal data collected and stored at their facilities in accordance with GDPR.

WP Level

Microsoft Teams: At UL ? (location)/ other systems – for WP research data/ collaborative files

A Microsoft Teams platform of the project has been created and it is available to store and share the WP data among the WP team in WP specific folders or channels, especially for the WP's collaborative working documents. However, each WP Leader can define the most suitable storing and sharing system for the WP's internal data other than Teams. Also, documents needing collaborative editing from the whole consortium can be shared on the Teams, and WP Leaders are encouraged to copy the most relevant WP data in the Microsoft Teams. Other relevant information could be shared, as a final document, in the UNITE! Internal platform UShare (explained in the following section).

Consortium Level

uShare project repository – for project research data to be shared among the whole consortium / whole Unite! alliance. uShare is hosted at partner TUDa, is the Unite!'s result repository which stores all documents and results created within Unite!. For the Unite! Widening project a set of separate folders have been created.

The uShare repository of the Unite! Alliance (https://ushare.unite-university.eu/#/) will be used to share all the relevant project data, including research data, that can be useful to the whole consortium to follow the development of the project. A uShare account is created for all the project members. In addition to the partner's internal storage system and WP storage system, each partner and WP leader should store all the relevant data on uShare in order to share and collect all the relevant data related to the project activity in a unique repository. The uShare repository is used by the whole Unite! Alliance. Depending on the data type, different types of permission (i.e. reading, writing) can be set for the uShare folders and also private folders can be created with limited access permission. Each project member has reading permission in all the project folders and writing permission in the WP in which is involved.

Zenodo and/or other open repositories – for project open research data

Zenodo repository will be used to store and share the research data that the consortium will decide to make open. An ad hoc community will be created for **Unite!Widening** project data. Some institutional/cooperative data repositories developed/used by Unite! universities will be also considered as long as they meet the Horizon Europe requirements and/or have quality seals (e.g. CoreTrustSeal).

Depending on the research field practices – e.g. social sciences - other open repositories could be used to store and share the research data that the consortium will decide to make open.

Web Site - Other data storing and sharing systems of the project are the website (https://unite-widening.eu/) and the partner's websites with pages dedicated to Unite! and associated projects, the Alliance social media and the partner's OA publications institutional repositories. However, since they are related to communication and dissemination activities, they will not be an object of the DMP.

Unite! Level

Joint digital platform (Unite!)

Some partners of the consortium used Metacampus, the Moodle platform of the Unite! alliance, for certain initiatives within the UNITE.H2020 project. For instance, a file sharing capacity among Unite! partners and their respective ecosystems to highlight their strengths, aiding in the establishment of the network of Technology Transfer Offices (H2020 WP4) and the cataloguing of the significant Research Infrastructures (RIs) of the Unite! alliance (H2020 WP3). Given that Metacampus is primarily a learning management system designed for educational activities, several UNITE.H2020 project initiatives have transitioned to the Agora platform. Developed within the aUPaEU project (Horizon Europe Framework Programme under Grant Agreement No 101095314) this platform includes acceleration services, such as the Research Infrastructures catalogue (H2020 WP3) and the IRIS Notice Board listing (H2020 WP2) to better suit non-educational activities and providing added value services such as CRM (customer relationship management), surveys, feedback, events and showcases. This Metacampus will be used by **Unite!Widening** in the same way, and for similar purposes, as indicated in section 1.1.

IRIS – as indicated above, the joint network of Integrated Research and Innovation Services (IRIS) is used to share expertise and best practices and aims at providing targeted support services to the Alliance, to researchers and research managers and administrators. IRIS ensures support for additional funding sources to implement activities at European level.

Agora - The agora is a virtual space for the Unite! alliance. Students, staff members, and researchers from different universities work together in the agora. The Unite! agora supports innovation and entrepreneurship with funding, mentorship, and cutting-edge facilities and labs. Shared infrastructures: facilitate access to shared research infrastructures among partners to encourage their researchers to utilise these facilities; Showcases : share outcomes and insights that provide best practices and experiences to support broader global outreach; Stakeholder handling: empower to effectively manage engagement with stakeholders in support of digital transformation; R&I notice board: proposal ideas, development of your R&I profile, and forming research collaborations, project consortia and seed funding.

1.2.2 Data Utility

The different research data (partners', WP's and project research data) could be useful to a specific group of people ("data utility") in or outside the project. The potential data utility, storage/ sharing mode and scope are summarised in the next table.

Table 1 - Data Utility

Data Utility	Storage/Sharing scope	Storage/sharing mode	Examples of data
Partners' research data			
Single partner	To implement and monitor the project activities For data storage and preservation	Partner's internal data storage system	- Data generated/ collected by the partner - Internal partner's working documents - Initial drafts of project's outputs e.g. DLs.
WP's research data			
WP members	For coordination and collaboration among partners on the implementation of project activities	Defined by each WP leader e.g. Microsoft Teams, WPL's internal storage system, uShare	- Data generated/ collected for the specific WP e.g. surveys, interviews - Internal WP's working documents
Project research data			
Whole project consortium	To follow the project activities development For coordination and collaboration among partners on the implementation of project activities	uShare, Teams, IRIS, Agora	- All the most relevant data generated/ collected in the project - Projects collaborative working documents
Whole Unite! Alliance	To follow the development of the R&I dimension of the Unite! Alliance and integrate the alliance activities with Unite!Widening	uShare, IRIS, Agora	Desk researches, interviews, surveys, state of the art analysis, project reports, catalogues/ databases / tools, repositories, white papers, handbooks, guidelines and best practices
Other Universities/ Alliances/ Networks (e.g. EUA, CLUSTER, Magalhaes)	To be informed about the state of the art in e.g. Digital/Green transition themes, Industry Doctoral schools To be informed about the Unite! Alliance and its development model To set the basis for collaboration with Unite! Alliance (WP4)	IRIS, Zenodo and/or other systems (case-by-case evaluation)	
Researchers	To be informed about the state of the art in e.g. Digital/Green transition themes, Industry Doctoral schools To be informed about the project activities that involve the R&I dimension of the universities Unite!		

Students	To be informed about the transformation of the EU R&I dimension – particularly PhDs and industry doctoral school To be informed about the project activities that involve the R&I dimension of the universities of Unite!		
Industry and Industry Associations	To be informed about the Unite! development and impact, particularly in regard to the dual transition To be informed and get involved in specific activities of the projects e.g. living labs, industry doctoral school,		
EC Policy makers, National and Local Governments	To be informed about the transformation of the EU R&I dimension, in particular of the Unite! Alliance. To receive inputs for the full roll out of the European University Alliances and the related future actions e.g. funding and legal aspects To be informed about the Unite! development, in particular the green transition	IRIS, Zenodo and/or other systems (case-by-case evaluation)	White papers, handbooks, best practices and guidelines

2. FAIR data

2.1 FAIR Data overview

Data should be findable, accessible, interoperable and reusable (FAIR) with the aim to allow knowledge discovery and innovation and subsequent data and knowledge integration and reuse. After an overview of the metadata used the following sections refer to the approach to meet these requirements.

2.2 Making data findable, including provisions for metadata

METADATA is a common and key element for all FAIR data requirements, and metadata contributing to make data FAIR will consist of all the data-related information.

For the most relevant and official documents, such as the project deliverables, reports, and white papers, a common **Unite!Widening** project document template will be used with the metadata to be included at the beginning of the document.

As an example, metadata in the project deliverables could be (following the metadata defined in the Unite!H2020 project):

- Document title
- Project Title
- Project Acronym
- Grant Agreement Number
- Project Call
- Funder
- Project starting date
- Duration
- Work Package
- Deliverable
- Deliverable leader
- Deliverable type
- Dissemination level
- Deliverable due date
- Deliverable submission date
- Author(s) – Partner(s)
- Document version and date
- Keywords
- Abstract
- History of changes table (e.g. version, date, author(s), partner(s), description)
- Table of contents
- Abbreviation list and/or legend

Metadata is associated with the data file (external to it). Some repositories (e.g. Zenodo) allows the insertion of metadata that will be associated with the uploaded document (for example Zenodo's metadata is compliant with DataCite's Metadata Schema minimum and recommended terms, with a few additional enrichments).

At this stage of the project, eventual metadata standards for specific disciplines that will be subject to research activity are not yet known. In case metadata standards do not exist for such discipline(s), the type of metadata will be created, and how, will be defined in subsequent versions of this DMP document. In case there is metadata about data that, for some reason, cannot be published itself, the decision to make such metadata public will be made (in the process described in 4.2) on a case-by-case basis.

2.2.1 Discoverability of data (metadata provision)

As a general rule, clear naming and organisation of the project data in the different storing and sharing systems will be carried out to favour data discoverability.

To favour data discoverability, depending on the data and storage system, a readme file could be also provided, consisting in a text file in the main folder with description of the folder structure and related files.

In the following, for the different storage systems, the folder structure and metadata facilitating data findability are indicated.

Discoverability in the partner's internal data storage system: the data will be organised in different folders based on the data related topic and named with a shared naming system aiming at describing the file content.

Discoverability in Microsoft Teams: the data will be organised in different folders/ channels on the basis of the data related topic. A specific folder and/or channel for each WP.

Discoverability in uShare: clear file naming and organisation in different sections (i.e. Communities) corresponding to the different WPs; a readme file in the main folder could be added to outline the folder content and data organisation.

Discoverability of published data in Zenodo and/or other open repositories: creation of a community dedicated to the project, collecting all the project related file stored on Zenodo and/or other open repositories; editing of medatada associated to the uploaded file (e.g keywords, type of document and DOI). Zenodo supports several Metadata types and sources: all metadata is stored internally in JSON-format according to a defined JSON schema. Metadata is exported in several standard formats such as MARCXML, Dublin Core, and DataCite Metadata Schema (following the OpenAIRE Guidelines).

2.2.2 Identifiability of data – standard identification mechanism

The open data will have an associated DOI, created in Zenodo and/or other open repositories.

To identify documents related to the **UNITE!Widening** project, the project name will be always indicated in the file name, as described in the following section.

2.2.3 Naming convention

A shared naming convention will be used for the data and document files such as deliverables. Depending on the kind of data, the file name can include different information, as reported below (in bold the parts of the name that should always be present):

> <date:yyyy.mm.dd>_**UNITE.Widening**_<WP number>_<**description1**>_<description2>_<person(s)/partner(s)>_<file version>_rev <revising partner>_<date of revision>_upd<date of update>.<**ext**>

Date: date of the event to which it is referred, such as a meeting, workshop

Project name: UNITE.Widening

WP number: for data referred to a specific WP

Description1: Main topic/ event to which the file is referred

Description 2 (3, 4...): further information to better describe the topic

Person(s)/Partner(s): Surname of author(s) or person(s)/partner(s) the file is referred to

File version: for file derived by a revision procedure (e.g. periodic revision of the Data Management Plan, revision procedure of a Deliverable by partners)

Partner(s)/person(s) revising the file

Date of revision

Date of update: for files subjected to periodic update

File extension

Examples:

UNITE.Widening_WP1_D1.1_Data Management Plan_v1.0.pdf

UNITE.Widening _<WP>_<description1>_<description2>_<file version>.<ext>

2024.02.01_UNITE. Widening_KoM_Agenda.pdf

<date:yyyy.mm.dd>_UNITE.Widening_<description1>_<description2>.<ext>

2024.02.27_UNITE.Widening_GrazMeeting_Overview of UNITE.Widening Slides_UL.pdf

<date:yyyy.mm.dd>_UNITE.Widening_<description1>_<description2>_<person(s)/partner(s)>.<ext>

Unite.Widening_ Minutes exploitation meeting_upd 2024.03.08.pdf

UNITE.Widening_< description1>_upd<dd.Month.yyyy>.<ext>

UNITE.Widening_WP1_ QRM final draft _ QAB _ rev AAVANZ _ 2024 04 18.docx

UNITE.Widening_<WP>_<description1>_<description2>_rev <revising partner>_<date of revision>_.<ext>

2.2.4 Approach towards search keywords

File names will be as descriptive as possible so that the search process based on the file name will be enough in most cases. For the most relevant and official documents (e.g. project deliverables, publications), keywords will be included in the file itself, as well as in the repository metadata, thus facilitating data discoverability.

2.2.5 Approach for clear versioning

For documents needing the draft of different versions (e.g. the Data Management Plan), the file version will be indicated in the file name (see section 2.2.3 above). The main author will indicate the file version of the first draft (i.e. v0.1) and then send the draft to the partner for revision. After a partner's revision, the author will edit a new version of the file including all the inputs received by the partners (i.e. v0.2) and, if needed, send it again for a further revision. When the revision phase is completed, the author will edit the final version of the file (i.e. v.1.0). When a new revision is needed (e.g. Data Management Plan to be updated after some months), the author will draft the new version (i.e. v1.1) that will be revised by the partners one or more times leading to different version (i.e. v1.2, v1.3 etc.) until the final new one has reached (i.e. v2.0).

e.g. UNITE.Widening_WP1_D1.1_Data management Plan_v1.0

The person(s) revising the file could add the partner's name and/or person(s) name in the file name.

For these files, the revision history table will be clearly indicated as metadata in the file itself.

For publications, the dataset versioning of Zenodo can be used.

2.3 Making data accessible

Overall, the project research data should be openly accessible, in line with the Horizon Europe requirements for Open Access and Open Data.

2.3.1 Repository

Data that has been selected for open access will be stored on Zenodo and/or other open repositories and made openly accessible with timing/ restriction evaluated and agreed on a case-by-case basis over the course of the project.

The arrangements and conditions with the identified repository have been analysed by considering their policies and conditions, specifically at https://about.zenodo.org/policies/, https://about.zenodo.org/privacy-policy/ and OpenAIRE guidelines https://guidelines.openaire.eu/en/latest/.

Among other aspects, Zenodo policies include longevity, arrangements for content, including a Digital Object Identifier (DOI), removal, access and reuse, and user access / identity.

2.3.2 Data

The project will combine different measures to foster open access to the project research data. Restrictions on use of published data are not foreseeable, not during the project execution nor after its end.

In accordance with the OA obligations, for dissemination purposes, in addition to peer reviewed publications, research data needed to validate the publications will be made openly accessible.

Project deliverables that are "public" according to the GA will be made openly accessible on Zenodo. Some deliverables that are "confidential" according to the GA will be made openly accessible on Zenodo after the approval of the WPL and the project General Assembly. In general,

deliverables are made openly accessible after their approval by the EC but different timing can be evaluated.

Each WP leader, in agreement with his/her WP team, could propose a set of qualitative data to be made openly available after the end of the project (e.g. desk research, surveys, interviews, transcripts, case studies, raw data collected during the project).

Personal data and pseudonymized data, unless specific consent given, will not be openly accessible, unless in the form of anonymised data. Any research data containing personal or pseudonymized data may be archived to a repository (for example to Zenodo) with restricted access to be accessible only by parties who have been granted a permit for a purpose compatible with the original purpose for processing. A Data Access Committee to evaluate/approve access requests to personal/sensitive data is not foreseen, instead the Coordinator and/or the WPLB - Work Package leaders Board will make a decision if such aspects arise.

All the project data that will not be considered suitable for open access by the consortium will be kept closed definitively, or during a certain time period, for example to seek protection of the intellectual property (such as patents) before publishing, according to the conditions in the GA (articles 16 and 17) and the CA (sections 6, 8, 9, and 10).

Most of the data will be text, documents, presentations, spreadsheets, images, audio, and video, not requiring specific software tools to access the data, therefore is via free access in Zenodo.

2.3.3 Metadata

Metadata in Zenodo are publicly accessible and licensed under public domain. No authorization is ever necessary to retrieve it. Metadata clearly and explicitly include the identifier of the data it describes, to enable the user to access the data.

Data and metadata will be retained for the lifetime of the Zenodo repository. This is currently the lifetime of the host laboratory CERN, which currently has an experimental programme defined for the next 20 years at least.

Metadata are stored in high-availability database servers at CERN, which are separate to the data itself.

Documentation is available at Zenodo to access and read the data, that can be accessed online and via API.

2.4 Making data interoperable

Most of the project data could be easily shared among researchers, since they will be files requiring common software to be read and modified. Most of the data will be text documents as Word or PDF files (e.g. .DOCX, .RTF, .PDF, .ODT), presentations as PowerPoint (e.g. .PPTX, .ODP) or PDF files, spreadsheets as Excel files (e.g. XLSX, ODS), images (e.g. .JPG, .PNG, ODG), audio (e.g. .WAV, .MP3, .OGG) and video (e.g. .MP4, .AVI).

Data in these file formats are expected to be interoperable among the project partners. However, as reported in Section 1.1.2, other formats will also be specifically evaluated if any interoperability problem will arise among partners and also for the files that need to be shared outside the **UNITE!Widening** project (e.g. open data) in order to increase data interoperability. For example, spreadsheets could be made open available in CSV format.

Specific vocabulary for inter-disciplinary interoperability

Depending on the specific topic, the standard or usual language of the related discipline will be used in the document. In view of an interdisciplinary interoperability, the presence of an abbreviation list could facilitate the text readability and comprehension to researchers of different areas.

The data produced by the project may contain qualified references to research data of Unite! and/or documents produced by other Unite! projects such as Unite!E+ and Unite!H2020.

2.5 Increase data re-use

2.5.1 Metadata for data re-use

The naming of the files and their clear organisation in different folders, as well as associated metadata (see also metadata description in section 2.2) will allow the understanding and contextualization of the data, facilitating data re-use.

As regards metadata, in all the documents, the title, date and author(s) will be indicated to allow the contextualization of the data. Moreover, for the most relevant documents (e.g. project deliverables), additional metadata will be provided in the document itself, and among them, the summary and the file version could be useful for data re-use, for example during draft revision among the project partners.

For more complex documents, all the information needed to better understand the data will be included directly in the file or in an associated file in the same published datasets, such as:

- an abbreviation list and/ or a legend for documents containing many abbreviations/ acronyms;
- an introduction/ summary or other additional texts, to better explain the presented data (e.g. objective of data collection, data origin, procedure used for data collection and elaboration);
- instructions/ guidelines e.g. for files that have to be completed/ elaborated/ commented by other researchers;
- a readme file e.g. to clarify the relation among datasets, such as the process of data analysis leading from the raw data to the result data. Readme files can also outline the content and organisation of a folder, to clarify the relation among datasets, helping data re-use. In addition, readme files can be easily used for indexing.

2.5.2 Licences

The licences needed to access the **UNITE!Widening** data will be evaluated over the course of the project on a case-by-case evaluation (preferably CC-BY and CC0 licence).

2.5.3 Data use by third parties

It will be possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user, the data needed to validate the results presented in scientific publications and all the dataset(s) that will be identified over the course of the project.

In case of requests to use partially or totally data produced by the project, a document will be produced to guarantee the perfect and reliable use of the data according to the GDPR rules.

2.5.4 Data quality assurance process

Each partner is responsible to ensure data quality during data collection, generation, data entry or digitalisation and data checking. Data quality control may include for example:

- clear naming and organisation of the project data in folders;
- creation of accompanying notes and documentation about the data, instructions, and/or guidelines about the data;
- checking data completeness and cleanliness;
- periodic check of the data management procedures by all the partners and proposal/discussion of possible corrective actions.

3. Other research outputs

At the moment of preparation of this DMP, no other research outputs are expected to be generated or re-used throughout their projects. Yet, in the PhDs / industry doctoral schools that may be the case depending on the subject matter of the research activities selected. Such outputs can be either digital (e.g. software, workflows, protocols, models, patents, scientific papers etc.) or physical (e.g. new materials, antibodies, reagents, samples, etc.).

If such research data is generated, the same principles in this DMP for FAIR use and Open Access will be followed.

A revision of this DMP during each report period should be made in order to make visible the effects of eventual contemplation of other research outputs.

4. Allocation of resources

4.1 Costs for making data FAIR

All the partners with the supervision of the coordinator will collaborate to make the project data FAIR.

In order to manage data and make them FAIR, a relevant effort will be required to the whole project consortium. The cost of such activity is strictly connected to the cost of personnel working time.

Moreover, other costs are present, such as partner's costs for data access, storage, security and backup at their local storage system(s).

4.2 DMP responsibilities

All the partners with the supervision of the coordinator collaborate to implement the DMP and to make project data FAIR.

In accordance with the GA, the project coordinator is responsible for the delivery and update of the Data Management Plan and for the management of **Unite!Widening** data (collected, processed and/or generated in the project) following the FAIR principles. The project coordinator will act being firstly responsible for protecting and managing project data and outputs in terms of Intellectual Property Rights (IPR).

Each partner is responsible for ensuring proper management and processing of all data collected during the project, complying with the EU GDPR.

The process to conduct the DMP procedures is depicted in the following image, at the **partner**, **WPL** and **coordinator** levels, integrated in the process to review project outputs (e.g. documents, papers, DLs).
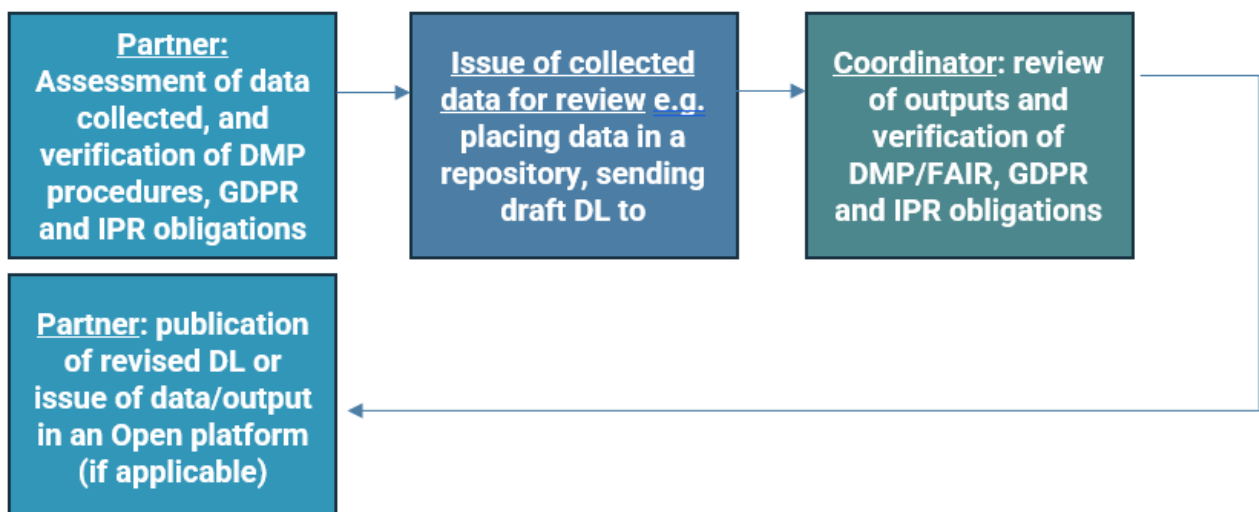
The process above reflects the situation where each output is analysed at the different management levels, and the publication/issue of data/output in an Open Platform can be decided, on a case-by-case basis, by the Coordinator, and/or involved WPL(s)/partner(s). The coordinator may determine the need for additional obligations, for example, ensure that ethical pre-review are sought whenever applicable.

For the research data generated in the PhDs / industry doctoral schools the principles in this DMP for FAIR use an Open Access will be applied directly. In this case usually the aim is to have data publication as soon as possible (unless GDPR and IPR obligations prevent such publication for a given time period):

- each responsible and involved persons in the PhDs / industry doctoral schools **shall** be informed of the obligations for FAIR data use and Open Access by the Coordinator (or the WPL);
- this information will include the repositories that can be used for compliance with these obligations, and key information from this DMP (e.g. Metadata, reference to project funded by the EC, etc.); optionally the researcher(s) involved can opt to publish data in a different repository, as long as the conditions in the repository are identical;
- Each PhD / industry doctoral school responsible **must** inform the coordinator and WPL about the research data published, information to access, identifiers etc.

In cases where the decision making needs to involve the use of joint/common Unite! digital infrastructure for data storage and/or access, the coordinator may opt to contact the **Unite! Digital Campus Technical Commission** for decisions pertaining to data. Examples of such cases include the use of the Metacampus to store data coming from **Unite!Widening**, and related GDPR management (if applicable).

This common Unite! Digital infrastructure includes:

1. Unite! Website
2. Unite! uShare
3. Metacampus
4. Agora

4.3 Costs and potential value of long-term preservation

Beside the national legal constraints and obligations, each beneficiary should keep a backup of their produced data, documentation, drafts at their own facilities for this required time period. Moreover, WP leaders are encouraged to keep also a backup of the most relevant data of the WP activities on their internal institutional storage systems (and to storing the most relevant WP data in the Teams/uShare) for the same time period.

Free of charge long term preservation will be ensured for all the open data stored on Zenodo.

5. Data security

5.1 Data recovery

Each beneficiary should ensure an adequate backup and data recovery system for its own research data stored at their local storage systems.

Data recovery on the uShare repository can be done through the ATIC service at UPCnet, which developed the uShare repository for the Unite! Alliance. Default backup policy establishes daily copies are done with a 28 days retention period (availability). Also, aimed to guarantee system continuity in case of disaster, a full backup with 1 year retention period is made every trimester.

Data recovery on Microsoft Teams can be done through SharePoint.

In Zenodo, all data files are stored in CERN Data Centres, primarily Geneva, with replicas in Budapest. Data files are kept in multiple replicas in a distributed file system, which is backed up to tape on a nightly basis.

5.2 Secure storage and transfer of sensitive data

The partner collecting the personal and sensitive data will be responsible for their collection and management in accordance with the EU GDPR. Data containing sensitive personal data will be stored by the responsible partner together with the privacy consent forms in secure password protected environments according to the EU GDPR. Further details can be found in Section 6 Ethical aspects.

5.3 Long-term Archiving and Preservation

Long term preservation is ensured for all the data stored on **Zenodo** and/or other open repositories (e.g. open data).

6. Ethics

As indicated in the GA (article 14: Ethics and Values and article 16: Data protection) the ethical issues in this project are related to the collection of personal data and their treatment. The ethical pre-reviews should be sought whenever applicable, since the requirement for ethical review may vary per country, and journal, the process described in 4.2 also includes the responsibility for applying to ethical pre-review.

Each partner has indicated in this DMP its own Data Controller and Data Protection Officer.

Personal data will be collected, processed and stored during the project. This will be personal data of the staff directly involved in the project and of external people (e.g. from interviews, surveys).

Personal data of each beneficiary's staff involved in the **UNITE!Widening** project will be mainly collected and processed for administrative/ management purposes. The use of them for communication/dissemination activities could be also considered, after explicit consent of the involved people.

Personal data of people not directly involved in the project will be also collected in some interviews/surveys to personnel belonging to the partner's universities or other universities, industries, stakeholders and other potential actors of the **UNITE!Widening** project, such as civil society (e.g. with survey tools, such as LimeSurvey, of Google Forms). The personal data from these interviews/ surveys (e.g. video and/or audio recording, questionnaires etc.) will be collected/ processed/ analysed/ stored for the project activity implementation in compliance with the GDPR and specific procedures will be adopted to ensure data protection/confidentiality/ privacy.

In the CA, the beneficiaries set specific responsibilities regarding data protection (CA section 4.4), in compliance with EU GDPR. In accordance with the GA, the beneficiaries may grant their personnel access to personal data only if it is strictly necessary for implementing, managing and monitoring the Agreement. The beneficiaries must ensure that the personnel is under a confidentiality obligation.

As regards the personal data collection, only voluntary people over 18 will be interviewed, with possibility of withdrawing at any time the not aggregated/ anonymous data, unless there are exceptions for such right to withdraw consent for research and archival purposes in GDPR. Each partner in charge of the activity (e.g. survey) is responsible to inform people about the project and for the collection of the privacy consent form from the participants for the participation and data use (e.g. publication and sharing). The partners carrying out the activity will ensure that participant consent covers data preservation including the length of time the data will be held, data sharing in the future, the potential for researchers undertaking other projects to access these data and the possibility that this dataset may be available as part of an open access publication or an open access dataset.

Regarding privacy and data protection, data will be anonymized, wherever possible. If it is not possible, stringent measures in relation to data protection will be used, such as necessary security to maintain confidentiality of records, and protect the privacy of individuals i.e, encryption, coding, use of pseudonyms and removal of identifying contextual information.

As regards storing of personal data, all data will be kept in secure password protected environments (e.g. access controlled areas), will be made anonymous if needed and used solely for the purposes of the project. Where data will be collected in electronic format (through on-line questionnaires), the partner responsible for that activity will ensure that precautions will be made to ensure confidentiality, anonymity, privacy, and security. The consent forms will be stored in a data repository.

Regarding the specific themes to be covered in the PhDs / industry doctoral schools there may be ethics or legal issues that can have an impact on data sharing, but at this stage they are not known. If such aspects are identified, they will be referred to in subsequent updates of this DMP.

7. Other issues

7.1 Specific procedures for data management

The Unite!Widening Management Team can be contacted via the e-mail unite.widening@tecnico.ulisboa.pt.

General information on ULISBOA (partner 1) approach to GDRP and data protection https://www.sas.ulisboa.pt/regulamento-geral-de-protecao-de-dados and https://www.sas.ulisboa.pt/politica-de-privacidade

General information on TUDa's (partner 8) approach to Data Management: https://www.tu-darmstadt.de/tudata/datenmanagement/planung_und_antragsstellung/datenmanagementplaene/datenmanagementplaene.en.jsp

7.2 Data management contacts in each partner

Partner	DMP Contact(s) and notes (if applicable)
1. Universidade de Lisboa (ULISBOA)	DPO - Dr. Tiago Abade: rgpd@ulisboa.pt Privacy team - Ana Rigueiro: ana.rigueiro@reitoria.ulisboa.pt
2. Associação para o polo tecnológico de Lisboa (LISPOLIS)	Miguel Diamantino: mdiamantino@lispolis.pt
3. Inovação unipessoal LDA (AAVANZ)	Nuno Cunha: nuno.cunha@aavanz.com
4. Politechnika Wrocławska (PWR)	Piotr Rutkowski: piotr.rutkowski@pwr.edu.pl
5. Wrocławski Park Technologiczny Sa (WPT SA)	Łukasz Wyszkowski: lukasz.wyszkowski@technologpark.pl
6. Agencja Rozwoju Aglomeracji Wrocławskiej Spółka Akcyjna (ARAW SA)	Mateusz Jarzombek: mateusz.jarzombek@araw.pl
7. Politecnico Di Torino (POLITO)	Mauro Paschetta: mauro.paschetta@polito.it
8. Technische Universitaet Graz (TU GRAZ)	Hermann Schranzhofer: hermann.schranzhofer@tugraz.at
9. Technische Universität Darmstadt (TUDa)	Konrad Loebcke: konrad.loebcke@tu-darmstadt.de For general information: tudata@tu-darmstadt.de
10. Institut Polytechnique De Grenoble (Grenoble INP)	
10.1. Universite Grenoble Alpes (UGA) Affiliated entity linked to Grenoble INP	
11. Universitat Politècnica De Catalunya (UPC)	Anna Rovira Fernandez: anna.rovira@upc.edu
12. Aalto Korkeakoulusäätiö Sr (AALTO)	
13. Kungliga Tekniska Högskolan (KTH)	DPO – dataskyddsombud@kth.se Research data management – researchdata@kth.se

Annexes

Annex I – Guidelines and definitions for the DMP

FAIR data management, in general terms, your research data should be 'FAIR', that is findability, accessibility, interoperability, and reusability. These principles precede implementation choices and do not necessarily suggest any specific technology, standard, or implementation-solution. For further reading: https://www.go-fair.org/fair-principles/

Research data management (RDM) is the process within the research lifecycle that includes the data collection or acquisition, organisation, curation, storage, (long-term) preservation, security, quality assurance, allocation of persistent identifiers (PIDs), provision of metadata in line with disciplinary requirements, licencing, and rules and procedures for sharing of data. RDM is an essential element in any project that generates, collects or re-uses data. Planning ahead to data needs that proposers are likely to encounter during the project is a best practice. For example, provisions need to be in place to ensure that data is managed responsibly (e.g. the right venue is chosen for deposition, adequate are issued, legal provisions such as General Data Protection Regulation (GDPR) are respected, etc). Further, data management should be in line with the FAIR principles22, to ensure that researchers can find, access and re-use each other's data, maximising the effectiveness and reproducibility of the research undertaken. RDM, in line with the FAIR principles, is a requirement that should be carried out regardless of whether the data generated and re-used in the project is intended to be openly accessible, or if access restrictions are foreseen. FAIR data is not equivalent to open data (publicly available to everyone to access and reuse). Data can, and should be FAIR even when access is restricted. RDM and the FAIR principles can be applied to research outputs other than data (i.e. workflows, protocols, software, samples, etc). Proposers are recommended to consider robust management practices for data and other research outputs as early as the proposal stage of their project. Below are important elements and resources for RDM useful already at the proposal stage.

Persistent identifiers (PIDs) are key in ensuring the findability of research outputs, including data. They are globally unique and long-lasting references to digital objects (such as data, publications and other research outputs) or non-digital objects such as researchers, research institutions, grants, etc. Frequently used persistent identifiers include digital object identifiers (DOIs), Handles, and others. For further reading on PID types, please refer to https://www.dpconline.org/handbook/technical-solutions-andtools/persistent-identifiers .

To enhance the findability of research outputs, and their potential reuse, **standardised metadata frameworks** are essential, ensuring that data and other research outputs are accompanied by rich metadata that provides them with context. To enhance the re-usability of research data, they must be licensed. For more information on the licences required for data under Horizon Europe, please refer to the AGA (article 17).

Trusted repositories assume a central role in the Horizon Europe for the deposition of and access to publications and research data. For a definition of trusted repositories in Horizon Europe please refer to the AGA (article 17). Proposers, with the help of data and research support staff (e.g. data stewards, data librarians, etc), should check whether the repositories that they plan to deposit their data have the features of trusted repositories, and justify this accordingly in their Data Management Plans.

Data management plans (DMPs) are a cornerstone for responsible management of research outputs, notably data and are mandatory in Horizon Europe for projects generating and/or reusing data (on requirements and the frequency of DMPs as deliverables consult the AGA article 17). A template for a DMP is provided under the reporting templates in the reference documents of the Funding and Tenders portal of the European Commission. Its use is recommended but not mandatory. DMPs are formal documents that outline from the start of the project all aspects of the research data lifecycle, which includes its organisation and curation, and adequate provisions for its access, preservation, sharing, and eventual deletion, both during and after a project. Writing a DMP is part of the methodology of the project, since good data management makes the work more efficient, saves time, contributes to safeguarding information and to increasing the value of the data among the beneficiaries themselves and others, during and after the research. DMPs are thus a key means of support when planning and conducting a research project, and, ideally, filling in a DMP should be started prior to the beginning of the project. DMPs play a key role in helping researchers to adequately manage research outputs other than data and publications, also in line with the FAIR principles. Such research outputs may be physical or digital, and include original software created during the project, workflows, protocols, new materials such as samples, cell-lines, antibodies, among many others. DMPs should reflect an adequate management strategy for such outputs as well. A DMP should be a living document, which is updated and enriched as the project evolves. Such updates might occur after attaining milestones related e.g. to the generation of new data or to reflect changes related to the original planning, changes in data/output access provisions or curation policies, changes in consortium practices (e.g. new innovation potential, decision to file for a patent), changes in consortium composition, etc. A good practice regarding DMPs is to register them as non-restricted public deliverables to make them openly accessible, unless legitimate reasons exist to keep them confidential. An additional good practice is to publish the DMP in specialised journals or publishing platforms such as RIO https://riojournal.com/ etc., or to deposit them in DMP-specific public repositories such as DMPOnline https://dmponline.dcc.ac.uk/ and others.

As practices with regard to data management, storage, and sharing differ widely across disciplines, the DMPs should reflect common disciplinary practices. In addition to domain specificities, DMPs across the board should address an overarching set of data related requirements including those aspects related to making the data FAIR. Common aspects that need to be addressed in all DMPs include23:

- **Data set description:** a sufficiently detailed description of the data generated or re-used, including the scientific focus and technical approach to allow association of their data sets with specific research as well as information on data types and an estimate of the data set's size.
- **Standards and metadata:** the protocols and standards used to structure the data (i.e. fully reference the metadata) so that other scientists can make an assessment and reproduce the dataset. If available, a reference to the community data standards with which their data conform and that make them interoperable with other data sets of similar type.
- **Name and persistent identifier for the data-sets:** a unique and persistent identification (an identifier) of the data sets and a stable resolvable link to where the data sets can be directly accessed. Submission to a public repository normally provides this; many institutional repositories provide similar services.
- **Curation and preservation methodology:** information on the standards that will be used to ensure the integrity of the data sets and the period during which they will be maintained,

as well as how they will be preserved and kept accessible in the longer term. A reference to the public data repository in which the data will be/is deposited with relevant consideration on whether the chosen repository meets the requirements of a trusted repository.

- **Data sharing methodology:** information on how the data sets can be accessed, including the terms-of-use or the licence under which they can be accessed and re-used, and information on any restrictions that may apply or relevant security and privacy considerations. It is also important to specify and justify the timing of data sharing. On open access to research data see below relevant section on open access.
- **Output management, for research outputs other than data and publications:** The section on output management should show efforts to manage outputs in line with the FAIR principles, including a detailed description of the output, consider relevant metadata standards and the provision of PIDs when depositing the output, or its digital representation if it is physical. The plan should further detail the deposition, curation and preservation methodology foreseen, identifying the right home for the output, and it should set out an approach likely to maximise the re-use and adoption of the output by the wider research community. If the output is physical, the plan should indicate how it would be made available to potential users.
- **Costs and personnel related to RDM:** An estimation of costs related to RDM such as costs for data collection, data documentation, data storage, data access and security, data preservation, data availability and reuse as well as the person/team responsible for data management and quality assurance processes.

Early and open sharing: Provide specific information on whether and how you will implement early and open sharing and for which part of your expected output. For example, you may mention what type of early and open sharing is appropriate for your discipline and project, such as preprints or preregistration/registration reports, and which platforms you plan to use.

Research data management (RDM): RDM is mandatory in Horizon Europe for projects generating or reusing data. If you expect to generate or reuse data and/or other research outputs (except for publications), you are required to outline in a maximum of one page how these will be managed. Further details on this are provided in the proposal template in the relevant section on open science. A full data management plan (**DMP**) is not required at the submission stage. For those work programmes that require the use of the European Open Science Cloud (EOSC) federated repositories, proposers should explicitly discuss the use of such repositories in their proposals. By exception, in cases of a public emergency and if the work programme requires so, you should submit a full DMP already with submission of proposals or at the latest by the signature of the grant agreement. A template for a DMP is provided under the reporting templates in the Funding & Tenders Portal Reference Documents page.

Reproducibility of research outputs: you should outline the measures planned in the project that tend to increase reproducibility. Such measures may already be interweaved in other parts of the methodology of a proposal (such as transparent research design, the robustness of statistical analyses, addressing negative results, etc) or in mandatory/non-mandatory open science practices (e.g. the DMP, early sharing through preregistration and preprints, open access to software, workflows, tools, etc) to be implemented. More detailed suggestions on good practices for enhancing reproducibility and resources in the relevant section below. Horizon Europe requires

information via the repository where publications and data have been deposited on any research output or any other tools and instruments - data, software, algorithms, protocols, models, workflows, electronic notebooks and others - needed for the re-use or validation of the conclusions of scientific publications and the validation and reuse of research data. Further, beneficiaries must provide digital or physical access to data or other results needed for the validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded. More details on these requirements for reproducibility and guidance on how to meet them are provided in the AGA (article 17).

Open access: Offer specific information on how you will meet the open access requirements, that is deposition and immediate open access to publications and open access to data (the latter with some exceptions and within the deadlines set in the DMP) through a trusted repository, and under open licences. You may elaborate on the (subscription-based or open access) publishing venues that you will use. You may also elaborate on the trusted repository/repositories through which open access to publications and research data will be provided (article 17). Open access to research data and other research outputs should be addressed in the section on research data management of your proposal. Research data should be open as a default, unless there are legitimate reasons for keeping them closed. On open access to data and the legitimate reasons for restricting access, consult the AGA (article 17). As a general rule, open access to other research outputs such as software, models, algorithms, workflows, protocols, simulations, electronic notebooks and others is not required but strongly recommended. Access to 'physical' results like cell lines, biospecimens, compounds, materials, etc. is also strongly encouraged.

Open peer review: Anytime it is possible, you are invited to prefer open peer review for your publications over traditional ('blind' or 'closed') peer review. When the case, you should provide specific information regarding the publishing venues you envisage to make use of, and highlight the venues that would qualify as providing open peer review.

Citizen, civil society and end-user engagement: Provide clear and succinct information on how citizen, civil society and end-user engagement will be implemented in your project, where/if appropriate. The kinds of engagement activities will depend on the type of R&I activity envisaged and on the disciplines and sectors implicated. This may include: co-design activities (such as workshops, focus groups or other means to develop R&I agendas, roadmaps and policies) often including deep discussion on the implications, the ethics, the benefits and the challenges related to R&I courses of action or technology development; co-creation activities (involving citizens and/or end-users directly in the development of new knowledge or innovation, for instance through citizen science and user-led innovation); and co-assessment activities (such as assisting in the monitoring, evaluation and feedback to governance of a project, projects, policies or programmes on an iterative or even continual basis). The extent of engagement in the proposal could range from one-off activities alongside other methodological approaches to being the primary focus or methodological approach of the project itself. Engagement will require resources and expertise and is therefore often conducted by dedicated interlocutor organisations or staff with relevant expertise. More detailed information on these activities and useful resources developed over the course of Horizon 2020 can be found in the relevant section below.

Open science practices and relevant resources

Early and open sharing of research

'Early and open sharing' means making research work, methodologies, outputs, such as data and software, among others, and findings available as soon as possible in the research process. Examples of such early sharing include pre registration, registered reports and pre-prints. Early-sharing practices support reproducibility in the research and helps researchers secure precedence over their findings and/or conclusions.

Preregistration of the research plan in a public repository makes available the research hypothesis, study design and planned analysis before data is collected. Preregistration is assisted by dedicated platforms; it increases the transparency, credibility and reproducibility of the results and helps address publication bias toward positive findings.

Registered reports are research articles that are peer-reviewed and published in two stages. The study design and analysis plan including hypothesis and methodology undergo peer-review of the quality and suitability of the research question and protocol. If accepted, research protocols are pre registered (see preregistration) and the final research article is provisionally accepted for publication. After the research is conducted, an article containing the results and discussion as well as any changes is submitted and undergoes a second round of peer-reviewing. Registered reports reduce publishing bias for positive results as the acceptance for publication is based on the quality of the research, regardless of the outcome.

Preprints are scientific manuscripts that are publicly shared prior to peer-review and journal publication via preprint platforms. An increasing number of journals accept sharing of preprints prior to publication, but there are exceptions. Beneficiaries have to check the policy of their target journal to make clear that a preprint will not pre-empt its publication.

Resources

ORION open science factsheets on preregistration, preprints and crowd science: https://www.orion-openscience.eu/public/2019-02/201810-VA-Orion-FactSheets-V5.pdf

The Centre for open science offers a wealth of resources on Registered Reports, including a list of journals that support them: https://www.cos.io/initiatives/registeredreports

Sherpa Romeo can be used to check the journal submission policy and if the posting of a preprint is considered as prior publication: https://v2.sherpa.ac.uk/romeo/

Preregistration repositories (examples) • OSF (domain-general pre registration repository service with multiple formats for pre registration) • AsPredicted (domain-general registry service providing standardised pre registration template) • Preclinicaltrials.eu (preclinical animal study protocols) • PROSPERO (health and social care) • Evidence in Governance and Politics (EGAP) (political sciences) • Registry for International Development Impact Evaluations (RIDIE) (social sciences)

Preprint servers (examples) • Zenodo – multidisciplinary; • Preprints - multidisciplinary • bioRxiv - Life sciences; • medRxiv – Medicine and health sciences; • PsyArxiv - Behavioural sciences; • SocArXiv - Social sciences and humanities; • LawArXiv – Law; • ArXiv - o.a. physics, mathematics, computer science;

The European Open Science Cloud

The European Open Science Cloud (EOSC) aims to deploy and consolidate an open, trusted virtual environment to enable circa 2 million European researchers to store, share, process, analyse, and reuse research digital objects including data, publications and software across disciplines and borders. A European co-programmed Partnership approach for EOSC has been proposed for the period 2021-2030 (https://eosc.eu/). It will bring together institutional, national and European initiatives and engage all relevant stakeholders to deploy a European Research Data Commons where data are Findable, Accessible, Interoperable, Reusable (FAIR). This European contribution to a Web of FAIR Data and Related Services for Science will support open science in a deepened European Research Area and provide the basis for the research and innovation data space foreseen in the European Strategy for Data. Certain work programmes may require the use of trusted repositories that are federated in EOSC for depositing research data. In that case, data must be deposited in repositories which are registered to the EOSC and support (implicitly or explicitly) the FAIR principles. An initial offering of EOSC resources and services can be found from the EOSC Portal. This offering is expected to continue growing in function of the EOSC rules of participation https://op.europa.eu/en/publication-detail/-/publication/a96d6233-554e-11eb-b59f-01aa75ed71a1/language-en/format-PDF/source-184432576 .