

ReCiPSS

D8.6 – Open data repository report

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List of abbreviations

<i>Abbreviation</i>	<i>Explanation</i>
CERN	Conseil Européen pour la Recherche Nucléaire (French: European Laboratory for Particle Physics; Geneva, Switzerland)
DOI	Digital Object Identifier
EC	European Commission
EU	European Union
FTP	File Transfer Protocol
NOAD	National Open Access Desk
OAI-PMH	Open Archives Initiative Protocol for Metadata Harvesting
ODMP	Open Data Management Plan
OpenAIRE	Open Access Infrastructure for Research in Europe
ORCID	Open Researcher Contributor Identification
ReCiPSS	Resource-Efficient Circular Product-Service-Systems

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1. Executive Summary

The project “Ressource-efficient Circular Product Service Systems” (ReCiPSS) is dedicated to following the open access policy as part of the European Horizon 2020 program. For this purpose, all publications like articles, conference contributions, and research data related to the project’s outcomes that do not fall under confidentiality must be deposited in an open access repository. To achieve widespread dissemination, the results will be available on the ReCiPSS-website, linked to the open data repository *Zenodo* and distributed at scientific platforms linked via the individual partners’ *ORCID* iDs.

In ReCiPSS, research data will be stored on the *Zenodo* platform, which is integrated with *ORCID* and easily usable with *OpenAIRE*. Reports, Journal publications, conference contributions, and other written documents must be published with open accessibility. To ease the accessibility after publishing under a suitable license, documents may be uploaded via the institutional repositories of the ReCiPSS partners and can be linked to the *OpenAIRE* representation of the project, either from the publishers’ open access repository or from the institutional repository. In *OpenAIRE*; both research data and written documents are centrally collected and linked among each other and to the responsible researchers.

To make sure the extent of information and collection of publications is consistent through different research/citation platforms such as *Mendeley*, *MyScienceWork* or *ResearchGate*, project partners create and use their *ORCID* iD (central, independent identifier) to store, export, and import information on their scientific work, especially in the context of the project ReCiPSS.

This document summarizes the setup and structure of the open access repository and the integration of research/citation networks. The basics of the services used are described first, followed by their interrelationship. Finally, the entry process in the open data repository *Zenodo* is explained using an example.

2. Introduction

This document results from the task of managing open data and open access publications in ReCiPSS (Task 8.4). It describes the setup of the open data repository used in the ReCiPSS project for the two main types of data:

- Written documents, such as reports, journal articles, conference contributions, etc.
- Research data that underlie the written documents and deliverables that result from the project, independent of a specific publication

The process for handling those two kinds of results to fulfill the demand for publicly accessible and reusable publication of results was already defined in the Deliverable D8.5 “Open data management plan”.¹

2.1. Document Scope

The role of this deliverable report is to document the setup and structure of the open access repository and its integration with supporting research and citation networks like ResearchGate. The aim is to ensure that different types of data and documents resulting from the project can be made available to the European Commission and the general public in an open and reliable repository and that these research results are preserved in the long term.

This requires that confidentiality clauses are not violated when publishing data and that content quality standard are met. Therefore, this report assumes that all relevant consortium-internal coordination and agreements have taken place and all necessary conditions for publication of research data or documents are met.

2.2. Methodology

This report is based on the results of D8.5 “Open data management plan”, which explored different options for hosting research data and written documents and the possibilities and integration between them, as well as compatibility with OpenAIRE as chosen central hub for relevant information about the project. Use cases presented in D8.5 “Open Data Management Plan” for different outcomes were analyzed, resulting in using Zenodo, OpenAIRE, and ORCID.

Zenodo is used as a publicly accessible publication repository for public deliverables and written documents, as well as research data like spreadsheets or source codes. The publications from and on external providers and the research data are linked to OpenAIRE. ORCID enables the identification of authors and contributors and serves as a central source of information to enable data export and import. This eases the actuality of data on different platforms and supports the scientific exchange on external platforms such as ResearchGate.

¹ Christoph J. Velte (2019)

3. Brief description of services used

In this section, external services are listed, such as research networks, hosting services, and repositories that are used to fulfill the open access policy as part of the European Horizon 2020 program within the ReCiPSS project.

3.1. OpenAIRE

OpenAIRE (Open Access Infrastructure for Research in Europe) is a pan-European research information system. The aim is to present and link research results to aggregate metadata from repositories, archives, scientific journals, and other infrastructures. The beforehand described research data repository Zenodo is a product of OpenAIRE. OpenAIRE provides 139M deduplicated publications from 97K content providers, 88K research software that is interlinked with publications, 2M datasets interlinked with publications, persistent identifiers and registries like ORCID, and in addition, 24 funders and 3M funded grants. OpenAIRE operates as a network that is called National Open Access Desk (NOADs). The NOAD aims to act as a learning environment that supports the European Commission and national Open Science mandates across Europe.² An executive board organizes OpenAIRE, four standing committees with 104 experts, several working groups to provide hands-on guidance and results for implementing Open Science, and an office team to carry out all daily activities.

3.2. Zenodo

Zenodo is an open research data repository funded by the *European Commission (EC)*, *OpenAire*, and *CERN* to store any type of research data and datasets. It uses persistent identifiers (DOIs) for every upload. Thereby, it makes scientific outputs of all kinds citable, shareable, and discoverable for the long term. Furthermore, Zenodo is open to all research outputs regardless of the funding source and to all individual researchers, research institutions, and scientific communities.³

Moreover, Zenodo supports versioning which means users can support all different file versions via a top-level DOI. In addition, Zenodo is trusted, reliable and safe as the data is stored at CERN, which has considerable knowledge and experience operating large-scale digital repositories. Besides, data files and metadata are kept in multiple online and offline copies. In addition, Zenodo allows users to share research materials with reviewers or no one if the materials are embargoed.⁴

3.3. DOI

DOI stands for Digital Object Identifier with an operating and governing organization called International DOI Foundation (IDF). Currently, over 5,000 assigners use the DOI system, for example, publishers, science data centers, etc. To date, there are approximately 275 million DOI names assigned. The DOI is a digital identifier of an object. In this context, an object is defined as any entity. It can be physical, digital, or abstract, e.g., resources, parties, licenses, etc. The

² Kaiser et al. (2018)

³ The Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) is a low-barrier mechanism for repository interoperability. <https://www.openarchives.org/pmh/>

⁴ zenodo (2022)

system's initial focus was on documents or media like articles or data sets. Now the system is expanding to other sectors and moving into parties and licenses. The DOI provides an actionable, interoperable, and persistent link. The link is actionable using identifier syntax as well as a network resolution mechanism. Interoperability is guaranteed because the used data model provides semantic interoperability and grouping mechanisms. In addition, the persistency of the DOI system is enhanced by combining improved handling infrastructure (e.g., registry database, proxy support, etc.) with social infrastructure (obligations by Registration Agencies).⁵

3.4. Institutional Repositories

Research organizations and universities usually have their institutional repository to store research data (apart from open repositories such as *Zenodo*). For *TU Delft*, *Masaryk University*, *KTH Stockholm*, and *Fraunhofer*, the links are provided in Table 1 below. Those repositories are used in ReCiPSS to store individual publications, e.g., in journals, and afterward, link them to *OpenAIRE*.

Table 1: Institutional repositories

Partner	Link to repository
FHG	https://publica.fraunhofer.de/home
KTH	http://kth.diva-portal.org/smash/search.jsf?dswid=-8339
MU	https://is.muni.cz/repozitar/?lang=en
TUD	https://repository.tudelft.nl/

3.5. ORCID

ORCID stands for Open Researcher and Contributor ID. It is a global, non-profit organization sustained by fees from member organizations. ORCID is community-built and managed by a Board of Directors. ORCID provides services for researchers and members like ORCID iD, a unique and persistent identifier free of charge for all researchers and connected to an ORCID record.

Moreover, it provides a set of Application Programming Interfaces (APIs), as well as the services and support of communities of practice. They enable interoperability between an ORCID record and member organizations. Therefore, researchers can choose to allow the connection of their ID with their affiliations and contributions.⁶

ORCID's resources are of a wide variety. They include researchers, research institutions like universities, publishers or repositories, and information management organizations. Furthermore, publishers like Elsevier (Scopus) or Springer are part of ORCID's organizational members, commercial companies, funding bodies, and academic societies.⁷ In June 2022, the number of live accounts reported by ORCID was 14,293,631.⁸

⁵ DOI (2021)

⁶ ORCID (2022a)

⁷ ORCID (2022b)

⁸ ORCID (2022c)

3.6. ResearchGate

ResearchGate is a platform to connect science and make research open to all. It enables 20 million researchers from over 190 countries and various sectors to connect, collaborate, and share their work. ResearchGate gains 6,400 new members daily with ideas, publications, questions, and collaborations. ResearchGate has partnerships with four different publishers. As of now, there are 1.3 million articles available on ResearchGate. According to the platform, the number of available articles will increase. Furthermore, researchers have access to 2,400 different journals on ResearchGate with a growing number as journals make their content more accessible because of the publisher partnerships.⁹

3.7. MyScienceWork

MyScienceWork is a global platform for publishers, researchers, and institutions. The platform aims to map, structure, manage, measure, analyze and promote research content. Therefore, individual platform members can search, access, and share their research. The use of MyScienceWork is accompanied by access to 70 million scientific publications covering all scientific disciplines and countries. Furthermore, the platform has over 12 million patents from thousands of institutional repositories and publishers' databases and an average of a million monthly visitors.¹⁰

Publishers, academic and governmental research institutions, and R&D industries can benefit from using MyScienceWork. The platform allows an easy setup through API or FTP server. Furthermore, it enables multilingual research because of a multilingual semantic search engine. In addition, MyScienceWork gives out quarter reports on statistics that can help monitor its content.¹¹

3.8. Scopus

Scopus is a source-neutral abstract and citation database enriched with data and linked to scholarly literature across various disciplines. It provides researchers, librarians, research managers, and funders with discovery and analytic tools to promote ideas, people, and institutions. Furthermore, Scopus quickly finds relevant research, identifies experts, and provides access to reliable data, metrics, and analytical tools to analyze publications. By December 2021, Scopus includes over 1.8 billion cited references dating back to 1970, over 84 million records, 27.1 thousand active serial titles, over 249.0 thousand books, 17.6+ million author profiles, over 94.8 thousand affiliation profiles, and over 7 thousand publishers. The major subject areas of Scopus' publications are social sciences (35%), physical sciences (27%), health sciences (23%), and life sciences (15%).¹²

⁹ ResearchGate (2021)

¹⁰ MyScienceWork (2022a)

¹¹ MyScienceWork (2022b)

¹² Elsevier (2022b)

4. Relationship of Zenodo, OpenAIRE and ORCID

By using Zenodo, OpenAIRE, and ORCID, it is possible to cover the various use cases described in D8.5 that require an open data management plan. These include, for example, the publication of a deliverable, scientific articles, research data or additional documents, scientific exchange between researchers, or the search for information about the project by third parties.

Figure 1 shows a summarizing chart depicting the different services used and how they interact with each other. The starting point is disseminating results as a publication, deliverable, or research data. OpenAIRE grants access to all publications from institutional repositories and data and deliverable reports hosted on Zenodo that are correctly linked to the ReCiPSS project.¹³

To make sure that besides the project results, the discussion in the peer groups via supporting research and citation networks, e.g., ResearchGate, MyScienceWork, Mendeley, and Scopus, is kept up-to-date, project partners use their ORCID iD to synchronize the information on all of those platforms (see section 3.5 for a brief description of ORCID).

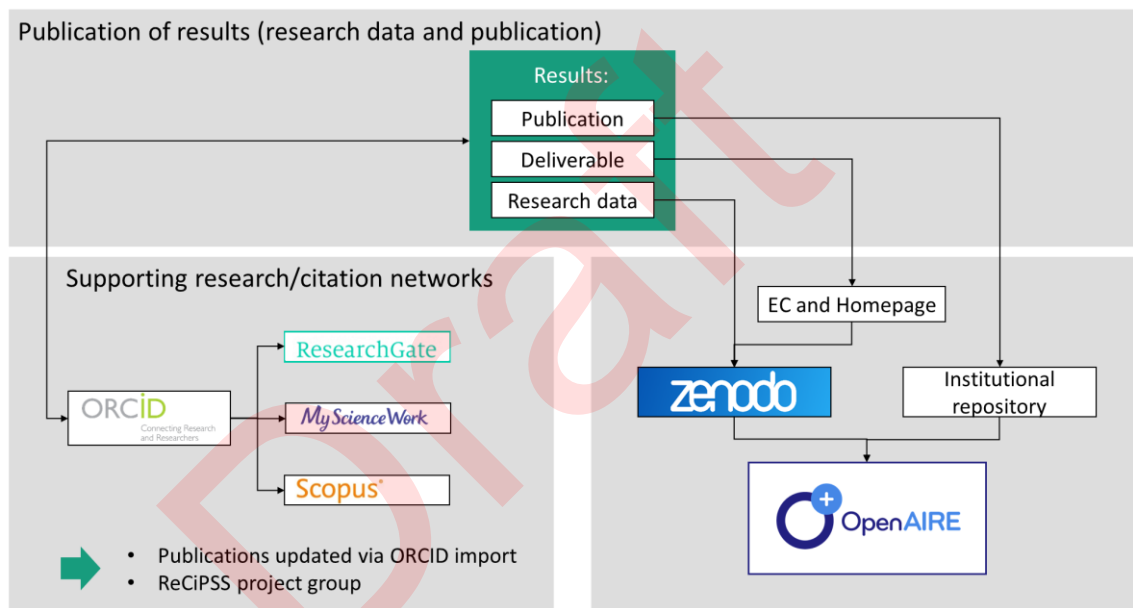


Figure 1: Overview of different data representations and use of services according to the Open data management plan (see D8.5)

¹³ ReCiPSS Project on OpenAIRE:

https://explore.openaire.eu/search/project?projectId=corda__h2020::f6ab820f22a8e2efd2a7aee3532e3dd1

Zenodo assigns each uploaded deliverable or research data a DOI, which is a globally unique and persistent identifier. This enables cross-platform dissemination using various research and citation networks. For example, the publications on the ResearchGate platform are collected in a project folder created for this purpose. Figure 2 shows an example of cross-platform dissemination.

ResearchGate

Technical Report Full-text available

MENDELEY

D9.5 Standardization and interoperability report

ORCID

D9.5 Standardization and interoperability report

2022-04-08 | Report
DOI: [10.5281/ZENODO.6425400](https://doi.org/10.5281/ZENODO.6425400) [Show less detail](#)

Language
English

URL
<https://zenodo.org/record/6425400>

Citation (bibtex)
[Show citation](#)

Description
The deliverable report D9.5 "Standardization and interoperability report" reflects the consistency of developments and adoptions of the project towards existing remanufacturing standards and related terminologies. Therefore, KTH Royal Institute of Technology (KTH) monitored the evolution of BS 8887-220:2010 and reported changes in the standard, and Bosch interacted with the Automotive Parts Remanufacturer Association (APRA) to review its remanufacturing terminology for automotive parts. The report also includes the contribution made by the ReCiPSS project in the development of the Circular Economy standard through the involvement in the ISO Technical Committee, ISO/ TC 323 by KTH. Furthermore, as a member of Home Appliance Europe (APPLIA), Gorenje has been involved in defining the future position and direction of the white goods industry regarding the circular economy. Last, the Circular Economy Solutions GmbH (C-ECO) has examined the potential to integrate two data exchange formats, PIES, and TecDoc, into the automotive demonstrator.

Figure 2: Example of cross-platform dissemination using the example of D9.5

5. Using open data repository - Zenodo

Besides the purpose of being a place to host large datasets, *Zenodo* also supports the upload of other scientific publications, presentations, videos, or other kinds of data related to research. Figure 3 shows an overview of different upload types on Zenodo. These uploaded data are endowed with a DOI and thus citeable and can be licensed with a cc license or different models.¹⁴

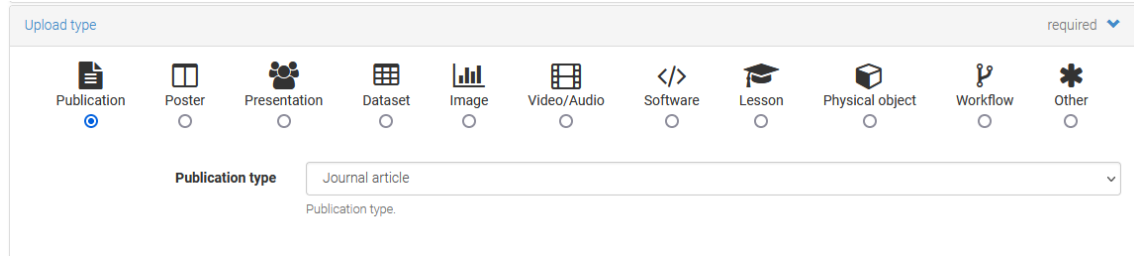


Figure 3: Upload types on Zenodo

Data uploaded to Zenodo can be directly linked to the ReCiPSS project. In order to link a file, it must first be checked and approved to prevent incorrect assignment to the project. FHG curates the ReCiPSS Project community. Figure 4 shows a screenshot of the ReCiPSS community on Zenodo.

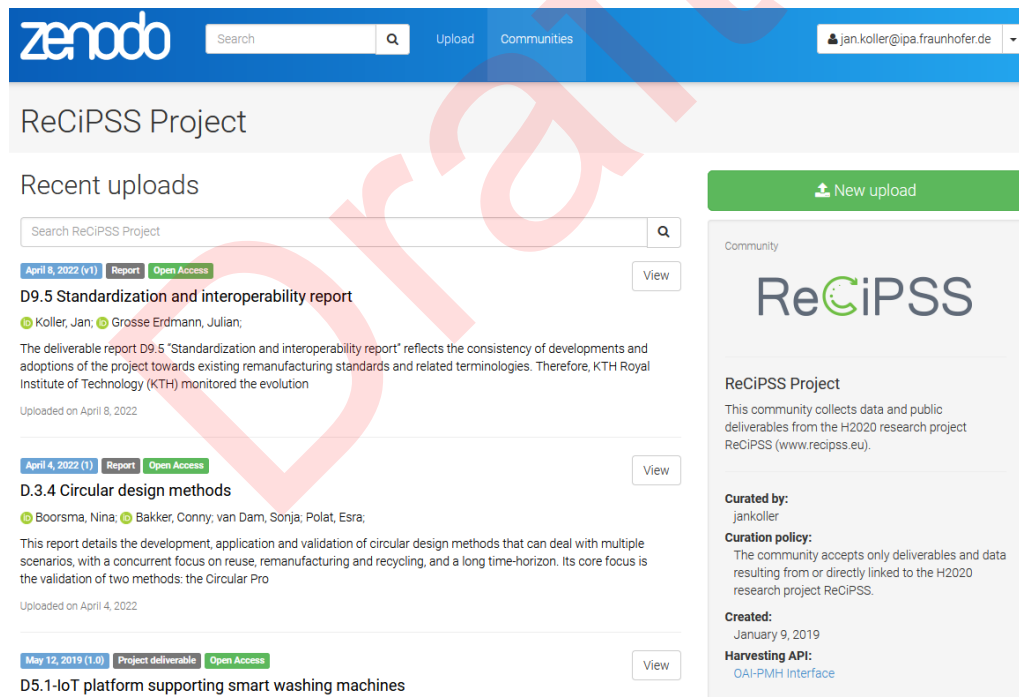


Figure 4: Screenshot of the ReCiPSS Project community on Zenodo

¹⁴ A guide on Creative Commons and different licences possible for open publication in European research is given at <https://www.openaire.eu/how-do-i-license-my-research-data>

The repository is linked to the European Horizon 2020 projects. Thus, all results are directly linked to OpenAIRE and the EC (European Commission) portal. Zenodo can share and link research to datasets or funding information, and third parties can use all open content via OAI-PMH.

Zenodo is aligned with the “**FAIR** Guiding Principles for scientific data management and stewardship”.¹⁵ This includes the following principles:

- To be **Findable**, e. g., by assigning a globally unique and persistent DOI to every published record on Zenodo.
- To be **Accessible**, e.g., by using the OAI-PMH protocol.
- To be **Interoperable**, e. g. by using the JSON Schema as an internal metadata representation.
- To be **Reusable**, e.g., by describing metadata with accurate and relevant attributes.

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¹⁵ Wilkinson, M. D., Dumontier et al. (2016).

6. Conclusions

This document outlines the setup and structure of the open access repository and integration with ResearchGate, Mendeley, and MyScienceWork to ensure that the ReCiPSS project publishes according to the open-access strategy of the *EU Framework Programme for Research and Innovation Horizon 2020*. All project-related publications, e.g., scientific articles, pre-prints, patents or conference publications, presentations, etc., are centralized in the open-access repository and fully integrated with OpenAIRE. Furthermore, a workflow is established to administrate publication import, metadata, and license information to maximize data dissemination and results from the ReCiPSS project.

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