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ONTO-DESIDE

DELIVERABLE

D7.4: Exploitation and Data Management plan - v.1

Deliverable number	D7.4
Deliverable name	Exploitation and Data Management Plan - v.1
Work package	WP7
Lead partner	LIU
Contributing partners	RS All partners contributing own exploitation plans
Deadline	30 November 2022
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PROJECT INFORMATION

Project summary

Circular economy aims at reducing value loss and avoiding waste, by circulating materials or product parts before they become waste. Today, lack of support for sharing data in a secure, quality assured, and automated way is one of the main obstacles that industry actors point to when creating new circular value networks. Together with using different terminologies and not having explicit definitions of the concepts that appear in data, this makes it very difficult to create new ecosystems of actors in Europe today. This project will address the core challenges of making decentralized data and information understandable and usable for humans as well as machines. The project will leverage open standards for semantic data interoperability in establishing a shared vocabulary (ontology network) for data documentation, as well as a decentralized digital platform that enables collaboration in a secure and privacy-preserving manner.

The project addresses a number of open research problems, including the development of ontologies that need to model a wide range of different materials and products, not only providing vertical interoperability but also horizontal interoperability, for cross-industry value networks. As well as transdisciplinary research on methods to find, analyse and assess new circular value chain configurations opened up by considering resource, information, value and energy flows as an integral part of the same complex system. Three industry use cases, from radically different industry domains, act as drivers for the research and development activities, as well as test beds and demonstrators for the cross-industry applicability of the results. The developed solutions will allow for automation of planning, management, and execution of circular value networks, at a European scale, and beyond. The project thereby supports acceleration of the digital and green transitions, automating the discovery and formation of new collaborations in the circular economy.

Project start date and duration

1st of June 2022, 36 months

Project consortium

No	Partner	Abbreviation	Country
1	Linköping University	LiU	Sweden
2	Interuniversitair Micro-Electronica Centrum	IMEC	Belgium
3	Concular Ug Haftungsbeschrankt	CON	Germany
4	+Impakt Luxembourg Sarl	POS	Luxembourg
5	Circularise Bv	CIRC	The Netherlands
6	Universitaet Hamburg	UHAM	Germany
7	Circular.Fashion Ug (Haftungsbeschrankt)	FAS	Germany
8	Lindner Group Kg	LIN	Germany
9	Ragn-Sells Recycling Ab	RS	Sweden
10	Texon Italia Srl	TEXON	Italy
11	Rare Earths Industry Association	REIA	Belgium

Document reference

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0.2		Exploitation plan first complete draft	A. Sivard	All partners
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Document approval

Version	Date	Name	Role in the project	Beneficiary
0.4	22 November	Thibaut Wautelet	Internal reviewer	POS
1.0	29 November	Svjetlana Stekovic	Project manager	LIU

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List of abbreviations

CA	Consortium Agreement
CE	Circular Economy
CEN	European Committee for Standardization
CKIC	Climate KIC
DCAT	Data Catalog Vocabulary
DMP	Data Management Plan
EA	Ethical Advisor
EC	European Commission
EEAB	External Expert Advisory Board
EIT	European Institute of Innovation and Technology
FAIR	Findability, Accessibility, Interoperability, and Reuse
GA	Grant Agreement
HE	Horizon Europe
ISO	International Organization for Standardization
KIC	Knowledge and Innovation Community
MFM	Multi-flow Metabolism
OA	Open Access
ODP	Ontology Design Pattern
OWL	Web Ontology Language
PC	Project Coordinator
PCDS	Product Circularity Data Sheet
PM	Project Manager
PO	Project Officer
RDF	Resource Description Framework
RIA	Research and Innovation Action
RML	RDF Mapping Language
SME	Small and Medium-sized Enterprise
URI	Uniform Resource Identifier
W3C	World Wide Web Consortium
WP	Work Package

1. Summary

The Onto-DESIDE project is a Research and Innovation Action (RIA) under the Horizon Europe programme, Cluster 4 Digital, Industry and Space, from the European Health and Digital Executive Agency. The main goal of the project is to develop a technology for allowing secure decentralized data sharing about materials and products at a global scale by developing a shared vocabulary, an open circularity platform and methods to analyse and assess new circular value chain configurations validated by 3 industrial use cases. The project is divided into eight work packages:

- WP1: Project coordination
- WP2: Requirements, integration and standardisation
- WP3: Ontology modelling
- WP4: Ontology-based data sharing platform
- WP5: Multi flow circular value network design & development method
- WP6: Industry use cases
- WP7: Communication, dissemination, training and exploitation
- WP8: Ethics requirements

Exploitation of project results and data management are integral part of the European research and innovation funding and are an obligation for every beneficiary in projects funded by Horizon Europe (Article 16 of the Grant Agreement). Exploitation is different from dissemination as exploitation focuses solely on utilisation of the project results and continuing development while dissemination is more about publication and exposing the project results to various stakeholders and public. As data is actually a value produced in the project, data management will outline what and how data is collected, stored and shared. As such a plan for these activities is necessary to produce and maintain in the project. Therefore, an exploitation plan together with data management plan is one of the key outputs of the WP7 in addition to the focus on dissemination, and training.

WP7, Communication, dissemination, training and exploitation, is led by LIU with the aims to (i) establish communication channels and increase the awareness of the project, (ii) disseminate the project in various events, congresses, conferences, workshops, seminars etc., (iii) publish the project outcomes in high impact conferences and journals, (iv) **define and update the data management plan**, (v) design, create and deliver an online training package as a set of Onto-DESIDE e-learning modules and (vi) **define and update the exploitation plan including IP and innovation**. WP7 consists of four tasks related to communication (Task 7.1), dissemination (Task 7.2), training (Task 7.3) and exploitation (Task 7.4). The exploitation task is led by RS while data management activities are led by LIU.

The purpose of this initial exploitation and data management plan (D7.4) is to define activities to be carried out in the project, to detail exploitation opportunities and strategies and to ensure open accessibility of project data as well as security for data that is proprietary. It will also propose data documentation conventions and make provision for archiving the data beyond the life of the project. As the project is in an initial state of producing results, the full plan of how to exploit the results will have to be revisited. The ambition is to engage the whole consortia in a workshop to detail the exploitation plan during the first half of 2023.

This initial version of the document focuses on the first year of the project, and the plans will be further detailed and developed in the second and third version of the deliverable.

Key points of the initial exploitation plan include to arrange a workshop in 2023, for outlining further activities, to create concrete lists of stakeholders to interact with, and to further discuss the exploitation opportunities listed in this report. Additionally, we have identified both academic and commercial exploitation venues for several of the planned results, such as the ontologies and open source code of the platform, as well as standardisation opportunities. The latter will also be further explored in a specific task of WP2, dealing with standardisation of the project results.

Key points of the initial data management plan is the decision to use DCAT for documentation of project data, as well as a template table (based on DCAT attributes) to document datasets in our reports, such as this DMP. In addition, the FAIR principles have been discussed in relation to our data, and we have concretely listed and described 11 project datasets, including everything from meeting minutes with action points, to contact lists, research data, and ontologies and source code. The details of each dataset, to the extent known so far is in Appendix B.

2. Introduction

This deliverable covers two distinct topics: exploitation plans and data management plans of the project. First we introduce the aims and scope of the project exploitation and then the data management plan.

2.1 Exploitation

This document provides an initial exploitation plan for the project, which will be further detailed during the project lifetime, and reported in the coming versions of this deliverable. It takes into account the template provided by the European Commission, which can be found on the EC website[1] and on the server.

Exploitation means the use of results in further research and innovation activities other than those covered by the action concerned, including inter alia, commercial exploitation such as developing, creating, manufacturing, and marketing a product or process, creating, and providing a service, or in standardisation activities.

Detailed exploitation plans will be established during the project within the dedicated task in WP7. This has started at an early stage and will carry on until the end of the project. From the start, we will at a project level establish the work and outcomes of Onto-DESIDE as input to the currently ongoing standardisation efforts within the ISO technical committee 323, aimed at standardisation in the field of Circular Economy. Several project partners are already involved in that ISO committee and will bring the project results into that committee. Additional standardisation efforts will also be explored in a dedicated task of the project (in WP2) and reported in a separate deliverable.

We also foresee that the open circularity platform that will be developed in the project will act as an interface for discovery and integration of the services defined by the shared vocabulary. As such, this will provide a standardised interface for other organisations to innovate upon the results of the project, both while it is ongoing and after. To ensure the sustainability of the technical platform and ontologies after the project lifetime, we will investigate the establishment of an independent organisation for maintaining the open results after the end of the project. In addition, to increase the community around the technical solutions, a W3C community group will be proposed for further discussing, developing, and maintaining the technical solutions.

As mentioned in the template provided by the European Commission, there are some limitations of the exploitation activities. Regarding IPR, project partners are free to exploit the results of the project in both commercial and non-commercial activities with the following limitations:

1. In the case where the exploitation make use of or includes some previous work done by a partner, the one that seeks to do the exploitation needs to receive a formal approval from the other part.

[1] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

2. In the case where the exploitation makes use of or builds upon work done in the context of the project and are affected by any licensing setup by the project, the one doing the exploitation needs to acknowledge and adhere to the applicable license in the exploitation.
3. Any work produced by the project that is not affected by either case 1 or 2 will be considered free to use without cost.

With that in mind, this first version of the Onto-DESIDE exploitation plan further outlines the exploitation strategies and activities already envisioned at this early stage.

2.2. Data management

This document also provides a data management plan for the data generated and collected in the project. It takes into account the template provided by the European Commission, which can be found on the EC website[2] and on the server.

The data management plan includes information on how research data will be handled during and after the end of the project, what data will be collected, processed and/or generated, which methodology and standards will be used, whether data will be made open access and how data will be curated and preserved during and also after the end of the project. The plan will be updated over the course of the project, and further detailed in the next version of this deliverable. Hence, the main target at this stage is on data that will be collected and managed in the first year of the project.

3. Exploitation plan

As the project is in an initial state of producing results the full plan of how to exploit the results will have to be revisited. The ambition is to engage the whole consortia in a workshop to detail the exploitation plan during the first half of 2023. This plan will detail the actions taken by individual project partners as well as listing what external stakeholders that are relevant to work with in extending exploitation reach. Results from the project form these actions will feed into consecutive versions of the exploitation plan so that the plan is constantly updated with relevant actions. At the end of the project a concluding exploitation analysis and recommendation for further actions will be done. In addition to this, following actions will be worked on continuously to accelerate exploitation:

- Communication activities launched and followed-up on a regular basis to keep target groups informed
- Active participation in EU stakeholder and advisory groups
- Promotion of project findings through open access scientific journal publications and presentations in conferences
- Active dialogues with standardisation bodies, good practice and related policies
- Active knowledge-sharing through consortia partner industry networks

The exploitation plan is divided into three parts: (i) the target groups for exploitation, (ii) the exploitation strategy, and (iii) measures for success. Initially, each section begins by defining

[2] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

the important aspects that apply to all partners and is followed by specific contributions defined by each project partner.

3.1 Target groups

General

Actors who are considered as target groups for all partners involved in the project are stakeholders within the research community, industry and civil society. These groups will indirectly or directly use and be affected by the results of the project. Furthermore, other important target groups are decision-makers within the EU as well as national decision-makers and interest groups. Lastly, standardisation bodies are relevant because the results of Onto-DESIDE will be used as input for ongoing standardisation work within ISO's technical committee, as well as potential starting points for other standardisation efforts.

Partner specific

Some partners have specified target groups for their exploitation in addition to those already mentioned. These are described below.

RS
Actors involved in business development and partnerships will serve as target groups for Ragn-Sell's exploitation. The partnerships build up working together by using the model. When it comes to strategic positioning, it is beneficial to work and be seen within the framework of this project.

POS
Actors within the footwear industry are considered target groups. These actors are, for example, industries such as suppliers of raw materials, manufacturers of components (Texon) and manufacturers of finished products (brands). Furthermore, other important target groups within the footwear industry are resellers, users, collectors, sorters and recyclers.

3.2 Strategy

General

Partners within this project will exploit and make use of the Open Circularity Platform and ontology-based data documentation to enable automatic and authenticated data exchanges between actors' data. In addition, the partners will work to establish an independent entity that will maintain and develop the open platform after the project. This platform will act as an interface for the discovery and integration of services defined by the shared vocabulary and will provide a standardised interface for other organisations to innovate upon. Furthermore, the individual exploitation strategies defined by the partners are presented below.

Partner specific

LIU
Linköping University will exploit ontology and data-sharing components developed as part of WP3 and WP4 in further research and scientific publications, and in future applications for research and innovation projects. In addition, these components will be published as open-source software/models to facilitate further exploitation by others.

RS
Ragn-Sells intends to exploit the projects results in executing the group wide R&D strategy. As an effect of this, Ragn-Sells intends to make use of the project platform and methods in creating new circular collaboration projects with selected partners.

IMEC
IMEC will exploit the data sharing platform, as part of the results of WP4, in further research and scientific publications, as well as for future applications for research and innovation projects. In addition, these components will be published as open-source software, either new or extending established open-source projects.

UHAM
MFM, as one of the results of the project, will be included as part of the Circularity Thinking toolkit and be made freely available under the same license (Creative Commons – attribution, non-derivates, non-commercial). For other applications licences are available. A website and tutorials are in development for Circularity Thinking, in which MFM – when sufficiently mature – will be included. MFM will furthermore continue to be used in future research at the chair of Circular Economy and Systems innovation. The current version of the Circularity Thinking toolkit is being used in trainings within EIT Climate KIC - reaching a multitude of organisations across Europe and supporting the deliverables of the EIT C-KIC (in the last quarter of 2021 +-100 people joined various editions of the training, consisting of industry practitioners, consultants, public good organisations and public bodies). It is intended that the MFM will further enrich this toolkit and be included in future versions of these trainings or as an extension module to this training leveraging the existing C-KIC network – both through the trainer network and the project partners working with C-KIC on CE projects across Europe, as well as exploring other EIT networks and beyond.

CON
Concular will exploit the specialised ontology as defined based on the construction use case, and acquired know-how during the project, in future development of the Concular and Restado platforms.

CIRC
Circularise builds on a section of its block-chain based system, which focuses on the communication of bill material data based on the ontology and communication standard for interoperability designed in the project. After the project the extension will be exploited alongside the other services of Circularise based on a Software as a Service business model. The existing customer base in the EEE and automotive sector will serve as an entry point to also exploit the here developed services with existing customers and then expand.

TEX
Texon wants to enable more sustainable material flows for the products that they produce. One dimension of this is sustainability claims that are connected to the supply chain. The possibility to automate the verification of these claims towards different certification schemes is interesting to Texon.

LIND
Lindner-Group is constantly seeking to improve in the area of sustainability. Thus, it is important to find new innovative solutions to increase the level of reuse of products and components, as well as to increase the level of recycled materials used in products. Lindner sees this project as one way to explore the possibility to define universal capabilities that enable the creation of circular value flows.

FAS
circular.fashion will exploit parts of this project to upgrade the circularity.ID system for the textile industry. The developed ontology within this project will be used for the system to improve interoperability also with non-textile business. Furthermore, the own circularity.ID platform should be adopted so that it supports the decentralised network approach to publish and retrieve semantically annotated data, behind a layer of authentication and authorisation. Also, the verification method so that collaborating actors can trust the data they are using will be of interest to implement for the circularity.ID.

REIA
REIA are working towards a standard for sustainability, quality and compliance along the upstream of the rare earth supply chains. These standards will cover two different types: both ISO certification and additionally the use of a Product Category Rule to ensure harmonisation of methodologies to communicate supply chain data. REIA sees it as a possibility to validate parts of the data model for the standard through this project. It also brings value to explore the case of making REIA data available to a broader context using the ontology developed, this would open up REIAs model and data shared by REIA's members to a larger usage.

POS
+ImpaKT will leverage the learnings of the ontology and data sharing platform (WP 3 & 4) and shared them with the Ministry of the Economy of Luxembourg for the development of the IT architecture of the PCDS. The results of the project will also support the work carried out by +ImpaKT in the context of the ISO/TC 323 Working Group 5 relative to Product Circularity Data Sheet (PCDS). +ImpaKT will also share the learnings of the project with the EU funded project CIRPASS (Grant No 101083432) which is establishing recommendations for the requirements of European Digital Product Passports.

The results will also be used to support the large-scale deployment of the standard PCDS on the market. By promoting the Open Circularity Platform designed to use and share PCDS's, we aim to support the dissemination of this standard and expand its use as widely as possible within industry in the upcoming context of the EU DPP.

Moreover, once the project is completed, it will be interesting to monitor and analyse the interactions between industrials to continuously update their needs. This work will help to modernise and constantly evolve the PCDS in terms of both content and form.

3.3 Measures

General

On a general project level, all partners agree on a set of exploitation measures, these are:

- Number of active dialogues with standardisation bodies.
- Number of actors using and extending the Onto-DESIDE ontology using the methods developed within the project.
- Number of actors making their data and capabilities available through the Onto-DESIDE platform.

Partner specific

Some partners have individually described their measures as stated below.

RS
One measure of successful exploitation is the number of initiated projects based upon the results of Onto-DESIDE.

POS
For +ImpaKT the adoption rate of PCDS within the European industrial sector is considered as a measure of successful exploitation.

4. Data management plan

The Horizon Europe Grant Agreement requires a data management plan at the start of the project. A template has been provided by the European Commission, and which forms a base for the Onto-DESIDE data management plan (DMP). DMP includes information on how research data will be handled during and after the end of the project, what data will be collected, processed and/or generated, which methodology and standards will be used, whether data will be made open access and how data will be curated and preserved, also after the end of the project. This plan will be updated during the project meetings.

4.1 Data summary

The Horizon Europe Work Programme has further focused on the Data Management Plan (DMP), which explains management and handling of research data. It also specifies whether research data will be made open access and how it will be handled during the project.

The DMP includes information on how research data will be handled during and after the end of the project, what data will be collected, processed and/or generated, which methodology and standards will be used, whether data will be made open access and how data will be curated and preserve, and also after the end of the project.

This DMP is a live document and will be updated over the course of the project during the project meetings and earlier when needed. It also covers the current status of reflection within the consortium about the data that will be produced.

Onto-DESIDE project will potentially generate/collect the following types and formats of data:

- Reports
- Publications
- Websites
- Patents
- Research data files
- Ontology files
- Source code files
- Mapping files
- Demonstrators (object code)
- Experimental data/study results, including interview transcripts, recordings etc.

The beneficiaries of the Onto-DESIDE project plan to deposit the research data, which is not IP protected and/or approved to be open by the industrial partners, in a repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate the following:

a) The data, including associated metadata, needed to validate the results presented in scientific publications as soon as possible, and
b) Other data, including associated metadata, as specified and within the deadlines laid down in the DMP.

The access to the metadata and data will be useful to the consortium, other researchers and the end users such as organisations that will reuse the platform and ontologies, e.g. for verifying the project results, extending them etc. At the start of the project, it was agreed to deposit all the data initially on a NextCloud server provided by LIU. The server is password protected and not open for any users outside the consortium. However, open data will then be shared through a) the project website (ontodeside.eu), b) open GitHub projects to be set up by each partner providing data, and c) research data repositories of each University partner.

A more detailed specification of the data expected to be generated until M18 is listed in Appendix B, with details on how it will be stored, shared, etc. The template used for describing data in the project is provided in Appendix A.

4.2 FAIR Data

FAIR data means to follow a set of guidelines and principles to make data findable, accessible, interoperable and re-usable.

4.2.1 Making data findable, including provisions for metadata

The DMP will identify the different items that are relevant to the correct identification and management of the data produced during Onto-DESIDE. The data identification must consist of a Data set reference and a Data set name. The dataset reference (identifier) shall primarily be a persistent URI, e.g. by using services for persistent URIs such as the w3id service or similar services, but may if needed be in another form. The data set description

should if possible be expressed using standard metadata, such as DCAT descriptions in RDF, and must include following:

- Data Description
- Type (Collected/Processed/Generated)
- Origin (if Collected/Processed)
- Format
- Nature
- Scale
- Useful to Whom
- Does it underpin a scientific publication?
- Information on existing similar data
- Possibility for integration and reuse
- Storage and Backup
- Persistent URI or other way to access the dataset

Keywords will be generated and provided along the project progress that optimise possibilities for the findability and re-use. For more details on the template for data description, see Appendix A.

A naming convention document will be developed and identify the version numbers, standards used or, if these do not exist, an outline on how and what metadata will be created. This is to be developed as an internal project document, as part of the WP2 project methodology task.

4.2.2 Making data openly accessible

Before making the data openly accessible, steps will be taken to protect privacy, security, confidentiality, IPR and embargo periods. However, the goal of the Onto-DESIDE project is to make data open by default. Hence, if no pressing need to protect privacy, security, confidentiality, IPR etc of the data is identified, the data will be published with an open license by default.

Before such potential publishing takes place the NextCloud server, provided by LiU, will be the main platforms internally used by the consortium for sharing and storing the project results, including datasets, the project deliverables and other reports during the project duration. The other main platforms are the project website, which will be kept online for a minimum of 5 years after the end of the project, as well as GitHub repositories for code and other technical source material. So far, the website will include public deliverables and reports. In addition, open datasets, ontologies, source and object code, will be made available through GitHub projects maintained by the respective partners. In the coming period, until the second version of this deliverable, the consortium will also identify other platforms that can ensure the access to the project results and data for a longer period, i.e., after the duration of the project, one of which is the Swedish National Data Service (https://snd.gu.se/en).

To access the data internally in the consortium, NextCloud will be used during the project. This server/repository is to store and share all data between the project partners, but not

outside the consortium. The platform is secure and access is granted on an individual basis for the participants of each partner, who then need a user name and a password to access the data. The server employs several security measures, such as two-factor authentication. LIU (the project coordinator) gives access to the server on a per-case basic, to researchers only involved in the project.

When the data are stored on NextCloud, the data is not public, i.e., not Open Access (OA). Public deliverables will also be made Open Access, by the EC, and on the project website, and everything that we publish (scientific papers) will be either Green or Gold OA. In case of the Green OA, pre-prints will be published on the project website and available internally at the project server. When there are restrictions on use, the access will be provided by LIU.

The project website will also be used to give OA to other data than reports, e.g. datasets, which will be published there with a machine readable metadata record (according to DCAT) and a license statement. Some research datasets, e.g deliverables from WP6, will not be OA, and may therefore only be shared internally through NextCloud and with the EC directly in the continuous reporting portal.

4.2.3 Making data interoperable

By default, open standards will be used for representing data, such as the W3C standards RDF, for data files, and URIs for identifiers. The project partners will in addition use as much as possible standard vocabularies for all data types present in the data set, and metadata, to allow inter-disciplinary interoperability. In case it is unavoidable to use uncommon or generate project specific ontologies or vocabularies, mappings to more commonly used ontologies will be provided. For sharing metadata about the project data, the W3C standard DCAT will be used, as described in Appendix A.

4.2.4 Increase data re-use

As stated in the various agreements we have agreed to a non-disclosure of information for maximum up to 5 years for the data to be made open. However, the ambition of the project is to make as much as possible available for reuse as soon as possible, by publishing OA and with open licenses. The research publications will be created as soon as possible, published in well-known journals and conferences, to increase the awareness and indexing of the results. Much of the research data, such as program source code, ontology files, experimental measurements and study results, will be made open, but the project will seek the industrial approval first before publishing the data to ensure that no breach of confidentiality is made. Only the research data originating with our industry partners will not be openly published, since this data may include sensitive information about business relations, product details, etc.

By publishing source code, ontologies etc., on GitHub, this data will also be searchable through Web search engines such as Google, and the use of a service such as GitHub will ensure the long-term preservation of URIs, e.g. used in publications for pointing at data and source code.

The project will ensure that the data will remain re-useable 5 years after the project ends. The data will also be stored with an archiving service, such as the Swedish National Data

Service, for free and a non-limited period. The details of this archiving, and exactly what service to use is to be agreed with the project consortium by the next version of this deliverable.

One of the main means for increasing reuse of project results and data is to provide clear licensing information for all outputs. By default an open license will be used, e.g. Creative Commons or similar licenses. However, in some cases outputs will be shared under a different license, which will then be clearly stated when the resource is shared.

4.3 Other research outputs

The Onto-DESIDE project will not produce any physical research outputs. All other research outputs will be digital, such as ontologies and software, and have already been covered in the previous sections. Know-how and methods etc. will be described in the deliverable reports and the scientific publications, hence, this is also captured by the previous sections.

4.4 Allocation of resources

Costs associated with open access to research data, can be claimed as eligible costs of any Horizon Europe grant. Costs related to open access to research data in Horizon Europe are eligible for reimbursement during the duration of the project under the conditions defined in the HE Grant Agreement, in particular Article 6 and Article 6.2, but also other articles relevant for the cost category chosen. These costs will be reported as other direct costs during the project period reporting.

The long-term preservation, how long should the data be preserved, associated costs and how these are planned to be covered will be also discussed at the next project meeting. Use of NextCloud via the project coordinator (LIU) during the project is free for the project partners, and the members of the EEAB and the Ethical Advisor.

All the project partners will be responsible for data management in the project. Specific responsibilities for each data source is given in the tables of Appendix B (to be updated continuously).

4.5 Data security

NextCloud is a secure, password-protected place to store the data, where LIU has got its own servers. For long term preservations and curation, the project will utilise external services for research data archiving, which will be identified in the next period.

4.6 Ethics

The ethical aspects of the project are treated separately in WP8, assessed and reported in the yearly reports by the project Ethical Advisor.

In D8.1 the following ethical aspects of the project were identified:

Security (computer security, cybersecurity) is needed to protect the users' data from unauthorised access for viewing, misusing, or altering it. This aspect has been discussed

above, regarding project-internal data stored in NextCloud. Other data held by each partner falls under the responsibility of each partner and their respective IT security of their organisation.

Privacy of the individuals using systems needs to be secured. Systems used internally by the project are secured and approved by the LIU IT services policies and data protection officer, hence, the privacy of project participants is ensured. However, privacy of research data in the project needs to be ensured when such data is produced in WP6, as well as through user evaluations in other WPs. The main principle is to collect a minimal amount of data about users and study participants, and such data will be securely stored on the internal project server. If needed, a server space with increased security, at LIU called a File Vault, will be requested for the project, which provides certified secure storage even for sensitive personal data. However, at the time of writing we do not foresee the need for such measures.

Confidentiality of data within a system needs to be protected, as at least some data about organisations can fall under trade secrets or be used as strategic advantage for the organisation. Such confidentiality mainly applies to the research data produced by industry partners and used in WP6. By default, such data will be kept by the organisations themselves. However, if sharing is needed, e.g. for the purpose of developing and evaluating project results, the data will be shared only with the organisations involved in the relevant project activity, and security will be ensured in the same manner as explained for privacy above.

Bias which favours certain users or user groups, and disfavours others can occur in any system that is complex enough and handles large amounts of data. With respect to bias in data, each dataset produced by the project will be screened for potential biases, and each project deliverable including data will specifically discuss potential biases in the data.

4.7 Other issues

In addition to what is described here, the university partners have their own internal data management policies and infrastructure. This allows both for using services for storage of sensitive data in a secure manner, as well as for archiving of data beyond the project.

5. Conclusion

The purpose of this initial plan (D7.4) is to define initial activities and strategies for exploitation and data management. Exploitation plans were described using the three sections, (i) target groups for exploitation, (ii) exploitation strategy, and (iii) measures for success, but for the project as a whole and for individual partners. Main directions include to exploit results in terms of supporting existing standardisation, as well as investigating new standards opportunities, as well as directly reusing ontologies and the open circularity platforms in various software products and directly for setting up new circular value networks. These plans will be further detailed in the next version of this deliverable.

Regarding data management, the types of data the project will manage have been listed, and FAIR data access has been discussed. It is worth noting that a large part of the project results, including ontologies and software, will be made open access. Only research data

that is confidential, originating from our industry partners, will be kept as project internal data. Also, data management plans will be further detailed in the next version of the report.

Appendix A

The template for data descriptions that will be used in the project is shown below. The template entries, with a few exceptions, correspond to the DCAT standard entries for dcat:Resource and the more specific dcat:Dataset. When data is published publicly online, and actual DCAT description file, expressed in RDF, will also be published alongside the resource.

Data identification	
Title	A name given to the item.
Identifier (URI)	A unique identifier of the item, preferably a URI.
Landing page/website	A Web page that can be navigated to in a Web browser to gain access to the data and/or additional information.
Data Description	
Type of data	The kind of data, e.g. its form, such as data tables, source code, ontology files etc.
Theme/category	A main category of the resource.
Keywords	Keywords describing the resource.
Description	A free-text account of the item.
Language	A language of the textual content in the item.
Size/scale of the data	
Relation to other data (including referenced by/references)	Specifying the relation to other data, e.g. other versions, or related/similar datasets, documents etc., as well as any documents referencing it, such as scientific publications.
Useful to whom	A description of who the data is intended for, and who might reuse it in the future
Data Provenance	
Origin	The source of this data.
Creator	The entity responsible for producing the resource.
Publisher	The entity responsible for making the item available.
Release date	Date of formal issuance (e.g., publication) of the item.
Version number	A version number, if applicable.
Update/modification date	Most recent date on which the item was changed, updated or modified.
Responsibilities	
Contact point	Relevant contact information for the cataloged resource.
Responsible partner(s)	Partner in the project responsible for releasing, updating, maintaining, and/or archiving the resource.
Data Access and Sharing	

Access rights	Information about who can access the resource or an indication of its security status.
License	A legal document under which the resource is made available.
Rights	A statement that concerns all rights not addressed with the license or access rights, such as copyright statements.
Distribution	The forms in which this data is made available, e.g. file formats.
Data Interoperability	
Conforms to standard	An established standard to which the described resource conforms.
Archiving and Preservation	
Preservation	Where and how the data will be archived at the end of the project

Appendix B

This appendix consists of an initial set of foreseen data that will be developed, treated, maintained and/or delivered by the project. The list contains mainly data that will be produced or managed before M18. The appendix will be updated continuously, and a new version will be included in the following update of the deliverable.

The list focuses on results and data other than reports and research publications, since these are (a) rather self-contained in terms of metadata, e.g. by design contains information about authors, content, topics etc, and (b) have already well-defined processes for publication and sharing. Hence, this appendix focuses on other kinds of results, and in particular datasets.

B1 - Onto-DESIDE Contact List	
Data identification	
Title	ONTO_DESIDE contact list table Sept 2022
Identifier (URI)	https://nextcloud.liu.se/f/8908
Landing page/website	N/A
Data Description	
Type of data	Contact information to all the researchers and administrators involved in the project.
Theme/category	Project administration
Keywords	Contact list
Description	A document listing the main contacts of each partner, with e-mail and phone numbers, as well as additional information on e-mail lists and administrative staff contacts.
Language	English.
Size/scale of the data	3 pages
Relation to other data (including referenced by/references)	Some contact information was also included in D1.1, and the e-mail lists are administered in a mailman system hosted at LIU.
Useful to whom	Intended for internal project use only.
Data Provenance	
Origin	Collected from each partner.
Creator	Svjetlana Stekovic (LIU).
Publisher	LIU
Release date	September 2022
Version number	N/A
Update/modification date	September 27 2022
Responsibilities	
Contact point	Svjetlana Stekovic <svjetlana.stekovic@liu.se>
Responsible partner(s)	LIU
Data Access and Sharing	
Access rights	Confirmed project participants, and EEAB and EA, with access to the NextCloud instance.
License	N/A
Rights	Confidential, not to be shared outside the consortium, including EEAB and EA.
Distribution	Word document (.docx)
Data Interoperability	
Conforms to standard	N/A

Archiving and Preservation Preservation	Not to be archived, maintained as long as the NextCloud instance is online.

B2 – Ontology modules	
Data identification	
Title	Onto-DESIDE ontologies
Identifier (URI)	Each ontology module will have its own URI.
Landing page/website	Each ontology will have a GitHub page with automatically generated documentation.
Data Description	
Type of data	OWL models.
Theme/category	Each ontology will be related to a specific domain.
Keywords	Specific to each module.
Description	Ontologies developed based on the use case descriptions and the user stories in D2.1. Including general ODPs, domain ontologies, as well as use case specific modules for evaluation in the project
Language	Labels and identifiers will be in English, additional labels may be provided in other languages.
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	Based on D2.1 user stories, and to be described and reported in WP3 deliverables and publications (TBD).
Useful to whom	Internally for the integration task of WP2, and evaluation in WP6. Externally for reusing the project platform and results for exploitation and extension in further research.
Data Provenance	
Origin	Built by developers in WP3.
Creator	Partners involved in WP3.
Publisher	LIU
Release date	TBC
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	Eva Blomqvist <eva.blomqvist@liu.se>
Responsible partner(s)	LIU
Data Access and Sharing	
Access rights	Open Access resource.
License	Open license, TBD.
Rights	No additional restrictions
Distribution	Turtle files.

Data Interoperability	
Conforms to standard	Expressed using W3C standard OWL. To be aligned with additional standard ontologies and other standards (TBC).
Archiving and Preservation	
Preservation	Ontologies will be made available through GitHub also after the project ends, and a w3id stable URI will be requested. Files will also be archived with the LIU research data archive.

B3 – Platform source code	
Data identification	
Title	Onto-DESIDE platform.
Identifier (URI)	Each source code repository will have its own URI in the GitHub project where it resides.
Landing page/website	Each source code repository will have a landing page with some overview of the code available there.
Data Description	
Type of data	Software source code.
Theme/category	Source code of the platform.
Keywords	Solid platform, digital twin, source code.
Description	The source code, including configuration files and extensions to existing open source code, representing the platform developed as well as related protocols etc.
Language	Comments and documentation in English.
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	Based on D2.1 user stories, and described in WP4 deliverable documents, and publications.
Useful to whom	Internally for the WP2 integration, and WP6 evaluation tasks. Externally for exploitation and usage, extension, and further research by other researchers.
Data Provenance	
Origin	Research and development in WP4.
Creator	TBD
Publisher	IMEC and LIU.
Release date	TBD
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	TBD
Responsible partner(s)	IMEC and LIU.
Data Access and Sharing	
Access rights	Open Access resources.
License	Open source license (TBD).
Rights	No additional restrictions
Distribution	TBD
Data Interoperability	

Conforms to standard	TBD
Archiving and Preservation	
Preservation	GitHub repositories will be available also after the project ends. Additional archiving will be identified during the development.

B4 – Research data - Textile	
Data identification	
Title	Textile domain research data.
Identifier (URI)	TBD
Landing page/website	Replaced by an internal document in NextCloud, since data is not public.
Data Description	
Type of data	Data about materials, processes and resources in the circular value network mapped in D6.1.
Theme/category	Textile fibre and material recycling.
Keywords	Textile, fibre, recycling, footwear.
Description	The dataset will contain the data that allows to evaluate and "execute" the textile use case value network, i.e. the information flows, needed to evaluate the ontologies and the platform in the first project iteration.
Language	English
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	TBD
Useful to whom	Researchers in the project for technical research and development, as well as evaluation activities in WP6.
Data Provenance	
Origin	TEXON internal data and data from partners, as well as synthetic data examples.
Creator	TEXON, POS, FAS.
Publisher	TEXON, POS, FAS.
Release date	TBC
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	TBC
Responsible partner(s)	TEXON, POS, FAS.
Data Access and Sharing	
Access rights	Internal to the project consortium.
License	N/A
Rights	Usage rights will be determined and described by the publishing organisations.
Distribution	TBD (mainly tabular data is foreseen).

Data Interoperability	
Conforms to standard	PCDS and Circularity.ID (https://github.com/circularfashion/cf-circularity-id-standard)
Archiving and Preservation	
Preservation	Data will reside within the organisations producing the data.

B5 – Research data - Construction	
Data identification	
Title	Construction domain research data.
Identifier (URI)	TBD
Landing page/website	Replaced by an internal document in NextCloud, since data is not public.
Data Description	
Type of data	Data about materials, processes and resources in the circular value network mapped in D6.1.
Theme/category	Recycling of floor material.
Keywords	Construction, buildings, recycling, floors.
Description	The dataset will contain the data that allows to evaluate and "execute" the construction use case value network, i.e. the information flows, needed to evaluate the ontologies and the platform in the first project iteration.
Language	English and German
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	TBD
Useful to whom	Researchers in the project for technical research and development, as well as evaluation activities in WP6.
Data Provenance	
Origin	CON, RS and LIN internal data and data from partners, as well as synthetic data examples.
Creator	CON, RS, LIN.
Publisher	CON, RS, LIN.
Release date	TBC
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	TBC
Responsible partner(s)	CON, RS, LIN.
Data Access and Sharing	
Access rights	Internal to the project consortium.
License	N/A
Rights	Usage rights will be determined and described by the publishing organisations.

Distribution	TBD (mainly tabular data is foreseen)
Data Interoperability	
Conforms to standard	TBD
Archiving and Preservation	
Preservation	Data will reside with the organisations producing the data.

B6 – Research data - Electronics	
Data identification	
Title	Electronics (magnets) domain research data.
Identifier (URI)	TBD
Landing page/website	Replaced by an internal document in NextCloud, since data is not public.
Data Description	
Type of data	Data about materials, processes and resources in the circular value network mapped in D6.1.
Theme/category	Magnet recycling in the electronics industry.
Keywords	Electronics, rare earths, recycling, magnets.
Description	The dataset will contain the data that allows to evaluate and "execute" the textile use case value network, i.e. the information flows, needed to evaluate the ontologies and the platform in the first project iteration.
Language	English and potentially other European languages.
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	TBD
Useful to whom	Researchers in the project for technical research and development, as well as evaluation activities in WP6.
Data Provenance	
Origin	CIRC and REIA internal data and data from partners, as well as synthetic data examples.
Creator	CIRC, REIA.
Publisher	CIRC, REIA.
Release date	TBC
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	TBC
Responsible partner(s)	CIRC, REIA.
Data Access and Sharing	
Access rights	Internal to the project consortium.
License	N/A

Rights	Usage rights will be determined and described by the publishing organisations.
Distribution	TBD (mainly tabular data is foreseen).
Data Interoperability	
Conforms to standard	TBD
Archiving and Preservation	
Preservation	Data will reside with the organisations producing the data.

B7 – Mapping files	
Data identification	
Title	Mapping files.
Identifier (URI)	URIs TBD for each mapping file.
Landing page/website	Described internally in NextCloud.
Data Description	
Type of data	Mapping files described in RML or related specifications (e.g., YARRRML).
Theme/category	Mappings for all use case domains.
Keywords	Mapping, data transformation, RML.
Description	A set of files describing mappings from the three research datasets (B4-6 above) of the use cases into the ontologies (B2) and RDF.
Language	Comments and documentation in English.
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	Describes mappings from the three research datasets (B4-6 above) into the ontologies (B2).
Useful to whom	Internal usage for technical development and evaluation in the use cases in WP6.
Data Provenance	
Origin	Developed in WP4 based on ontologies of WP3 and research datasets of WP6.
Creator	IMEC
Publisher	IMEC
Release date	TBD
Version number	TBD
Update/modification date	TBD
Responsibilities	
Contact point	TBD
Responsible partner(s)	IMEC
Data Access and Sharing	
Access rights	Internal access within the project. Sample mapping files (without links to companies' internal data structures) will be publicly available for demonstration purposes as Open Access Resources
License	Sample mappings under Open Source license (TBD), others N/A

Rights	Sample mappings without restrictions, others usage rights within the project.
Distribution	RML files.
Data Interoperability	
Conforms to standard	W3C standard RML and RDF.
Archiving and Preservation	
Preservation	Project internal data that will be kept in NextCloud as long as the server is maintained. Sample mapping files will be published in GitHub repositories, available also after the project ends. Additional archiving will be identified during the development

B8 – Project management files	
Data identification	
Title	Risk, dissemination and communication tables.
Identifier (URI)	Internal in NextCloud.
Landing page/website	Described internally in NextCloud.
Data Description	
Type of data	Tables for collecting and following up activities and risks in the project.
Theme/category	Project management.
Keywords	Risks, communication, dissemination.
Description	A set of files collecting updates from the project partners regarding risk monitoring and management, as well as communication and dissemination activities.
Language	English
Size/scale of the data	One Excel sheet per category (risks, communication, dissemination).
Relation to other data (including referenced by/references)	Content is also reflected in EC continuous reporting portal, and described in deliverables (e.g. D1.1 and D7.1).
Useful to whom	All project partners.
Data Provenance	
Origin	Project management and all partners.
Creator	LIU
Publisher	LIU
Release date	September 2022.
Version number	N/A (continuous updates).
Update/modification date	October 27 2022.
Responsibilities	
Contact point	Svjetlana Stekovic <svjetlana.stekovic@liu.se>.
Responsible partner(s)	LIU
Data Access and Sharing	
Access rights	Internal access within the project.
License	N/A
Rights	Content will be published when transferred to the EC reporting portal.
Distribution	Excel files.
Data Interoperability	
Conforms to standard	N/A
Archiving and Preservation	

Preservation	Content is preserved when reported to the EC continuous reporting portal.

B9 – Meeting minutes	
Data identification	
Title	Meeting minutes.
Identifier (URI)	Internal in NextCloud.
Landing page/website	Described internally in NextCloud.
Data Description	
Type of data	Word documents for collecting minutes and following up actions and decisions from project-internal meetings.
Theme/category	Project management.
Keywords	Meeting minutes, decisions, actions.
Description	A set of documents containing meeting minutes, participant lists, and lists of decisions and actions, with deadlines for the project partners.
Language	English.
Size/scale of the data	One word document per meeting.
Relation to other data (including referenced by/references)	Template provided in D1.1. Some content will also be reflected in reporting and deliverables.
Useful to whom	All project partners.
Data Provenance	
Origin	Project management and all partners.
Creator	LIU
Publisher	LIU
Release date	After each meeting.
Version number	N/A (continuous updates).
Update/modification date	After each meeting.
Responsibilities	
Contact point	Svjetlana Stekovic <svjetlana.stekovic@liu.se>.
Responsible partner(s)	LIU/chair of each meeting.
Data Access and Sharing	
Access rights	Internal access within the project.
License	N/A
Rights	Some content will be public when transferred to deliverables or the EC reporting portal.
Distribution	Word files.
Data Interoperability	
Conforms to standard	N/A
Archiving and Preservation	

Preservation	Content is preserved when reported to the EC continuous reporting portal, and will be stored a minimum of 5 years after the project at LIU servers.

B10 – Experimental results	
Data identification	
Title	Experimental and study results.
Identifier (URI)	Partly internal in NextCloud, once related to research publication will receive a URI in the respective GitHub repository.
Landing page/website	GitHub page for each dataset.
Data Description	
Type of data	Results of technical evaluations, as well as use case evaluations in WP6. May include statistics tables, survey responses and observation notes, for instance.
Theme/category	Evaluation results.
Keywords	Evaluation, statistics, survey.
Description	In WPs 3, 4 and 2 technical evaluations will be performed to assess the effectiveness and efficiency, and other quality criteria, of the produced solutions (e.g. algorithms, software, ontologies, methodologies etc). Such evaluations result in data, such as measurement data, statistics, survey responses, and other types of data. In addition, the overall integrated prototype will then be evaluated in the three use cases in WP6, where additional such data will be collected.
Language	English
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	Produced when using technical solutions (source code, ontologies, mapping files etc) together with research datasets. Will be described and partially published in both deliverables and research publications.
Useful to whom	All project partners when assessing the success of the solutions, as well as by other researchers and practitioners when assessing the published project results.
Data Provenance	
Origin	All partners involved in technical or use case evaluations.

Creator	All partners.
Publisher	All partners.
Release date	After each evaluation effort.
Version number	N/A
Update/modification date	TBD
Responsibilities	
Contact point	Each partner.
Responsible partner(s)	All partners.
Data Access and Sharing	
Access rights	Internal access within the project to sensitive data, such as personal data from user studies, and data connected to the use case's research data. Non-sensitive data, related to research publications, will be published open access together with the research publication, using permanent URIs (e.g. pointing to GitHub).
License	TBD – primarily open licenses.
Rights	Sensitive (e.g. personal) data cannot be made open, and will only be available within the consortium.
Distribution	RDF is possible, otherwise primarily tables (e.g. CSV and similar formats).
Data Interoperability	
Conforms to standard	Primarily RDF.
Archiving and Preservation	
Preservation	GitHub repositories will be available also after the project ends. Additional archiving will be identified during the development

B11 – Interview transcripts	
Data identification	
Title	WP5 interview records and observations.
Identifier (URI)	Internal in NextCloud, or on secure server at UHAM.
Landing page/website	Internal in NextCloud.
Data Description	
Type of data	Interview transcripts, recordings, codings and analysis data.
Theme/category	Circular value flow analysis and method development.
Keywords	Interviews, observation, circularity thinking, MFM.
Description	In WP5 interviews and observations will be the main method for data collection for the method development activities. Interviews may be recorded, as well as observations, and notes and transcripts may be produced. In addition this data will be further analysed to produce codings, and aggregated data.
Language	English
Size/scale of the data	TBD
Relation to other data (including referenced by/references)	Partially reported in WP5 deliverables and research publications.
Useful to whom	WP5 researchers, and external to the project by researchers building on or verifying project results.
Data Provenance	
Origin	Interviews and observations done by UHAM in WP5.
Creator	UHAM
Publisher	UHAM
Release date	TBD
Version number	N/A
Update/modification date	TBD
Responsibilities	
Contact point	Charis Luedtke <charis.luedtke@uni-hamburg.de>
Responsible partner(s)	UHAM
Data Access and Sharing	

Access rights	Internal access among UHAM project researchers to sensitive data, such as personal data from interviews and observations. Non-sensitive data, such as aggregated data, coded data, etc., related to research publications, will if possible be published open access together with the research publication, using permanent URIs.
License	TBD – primarily open licenses.
Rights	Sensitive (e.g. personal) data cannot be made open, and will only be available to UHAM.
Distribution	Video and audio recordings, textual documents, statistics files.
Data Interoperability	
Conforms to standard	TBD
Archiving and Preservation	
Preservation	Archived by UHAM according to internal policies for research data preservation. Additional archiving possibilities will be identified during the project.