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ONTO-DESIDE

DELIVERABLE

D7.6: Exploitation and Data Management plan - v.3

Deliverable number	D7.6
Deliverable name	Exploitation and Data Management Plan - v.3
Work package	WP7
Lead partner	LiU
Contributing partners	RS
Deadline	31 May 2025
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Date	30 May 2025

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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
12	Prague University of Economics and Business	VSE	Czech Republic

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Document approval

Version	Date	Name	Role in the project	Beneficiary
Final	30 May 32025	Svjetlana Stekovic	PM	LiU

Table of Contents

List of abbreviations

CA	Consortium Agreement
CE	Circular Economy
CEN	European Committee for Standardization
CKIC	Climate KIC
DCAT	Data Catalogue 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
IP	Intellectual Property
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 parts 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 D7.6, Exploitation and Data Management Plan - v.3, is to update the initial exploitation plans as well as the data managements plan as outlined in D7.5 that was submitted at the end of November 2023 and to add, if needed, additional activities that were not planned at the earlier stage. In this third version the focus is mostly on reporting the results of activities carried out, and steps taken for ensuring suitable exploitation, although the descriptions of the plans from previous versions are kept for completeness.

Key points of the initial exploitation plan included a workshop for outlining further activities, concrete lists of stakeholders to interact with, and further discussing the exploitation opportunities listed in D7.4-5. Additionally, we 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 was also explored in a specific task of WP2, dealing with standardisation of the project results, and reported in D2.8.

Key points of the initial data management plan were the decision to use the Data Catalogue Vocabulary (DCAT)1 for documentation of project data, as well as a template table (based on the DCAT attributes) to document datasets in our reports, such as this data management plan (DMP). In addition, the FAIR principles are discussed in relation to our data, and we have concretely listed and described 12 project datasets (one added since D7.4), including everything from meeting minutes with action points, to contact lists, research data, and ontologies and source code. The details of each dataset, are in Appendix B.

1 https://www.w3.org/TR/vocab-dcat-3/

2. Introduction

This deliverable covers updates until M36 for both exploitation and data management activities while the main content remains the same from v2 of the deliverable (D7.5).

2.1 Exploitation

This document presents the final update of the exploitation plan, which has been extended to cover the period up to M36. It meets the goals set in deliverables D7.4 and D7.5 when the first and second version of this deliverable was written and submitted. However, this final version includes the following updates and additions:

- Update of the partner specific target groups.
- Update of the partner specific exploitation strategy.
- Update of the partner specific exploitation measures.
- Update of the standardisation activities from WP2.
- Achieved exploitation results.

During the project we have so far identified a number of key exploitable results, and in this report we further discuss the types of actors and exploitation avenues envisioned for these results.

2.2. Data management

This document also provides the data management plan for the data generated and collected in the project, with updates on how data have been treated in this final version. It takes into account the DMP template provided by the European Commission, which can be found on the EC website[2] and on the project file server.

The data management plan includes information on how research data has been handled during the project, and how it will be maintained after the end of the project, what data was collected, processed and/or generated, which methodology and standards we used, whether data is open access and how data is curated and preserved during and also after the end of the project. The main target in this third version of the plan is to report on the actual data and management beyond the project.

3. Exploitation plan update

The following sections outline target groups, strategies and measures for the exploitation of the project as a whole as well as for each partner involved. This version of the deliverable represents the final update to this plan and will not be subject to further updates.

3.1 Achieved exploitation results

The main exploitable results in Onto-DESIDE until M36 are the following:

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

- LiU: Circular Economy Ontology Network (CEON – D3.3 to D3.6)
- IMEC: Open Circularity Platform (D4.4 to 4.7)
- UHAM: Updated version of the Multi-flow Method (D5.2 and D5.3)

The Circular Economy Ontology Network (CEON) is a shared vocabulary for representing information about circular value networks, strategies, and resources in the form of a network of ontology modules developed by LiU. By providing a shared vocabulary, CEON enables a multitude of stakeholders, in any industry sector, to share and consume data that enables new circular economy solutions.

The network is shared openly via: https://w3id.org/CEON/ (permanent identifier) and is available as open source (https://github.com/LiUSemWeb/CEON). The main avenues of exploitation foreseen for CEON are a) as a means for circular economy value chain actors to annotate and share their data and thus enable new collaborations, b) for software providers in the circular economy area to align their APIs and protocols to a shared vocabulary, so as to increase interoperability and decrease lock-in effects, and c) for standardization bodies and authorities as a starting point for new standards, or an alignment point of existing standards and reporting formats. Onto-DESIDE has participated in the Horizon Results Platform by adding CEON as a key exploitable result (KER) to the platform, Figure 1 and 2. A KER is a main and prioritised result with a high exploitation potential. The platform is used as an advertising place for exploitation purposes.

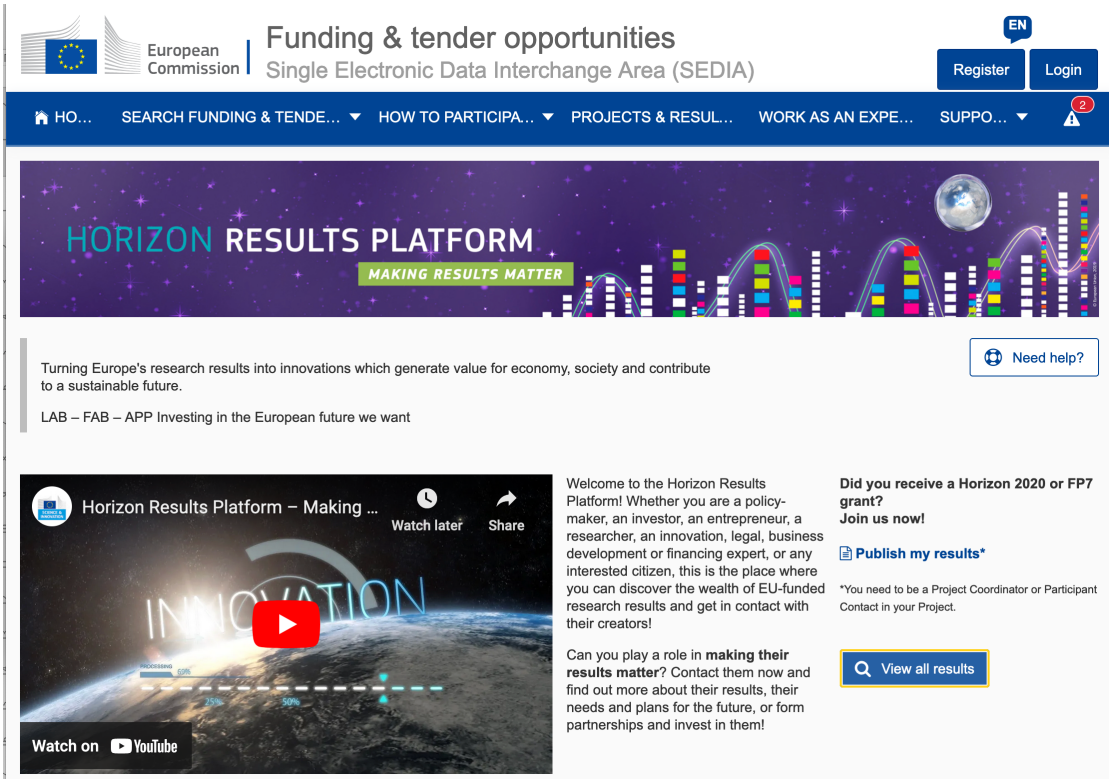

Figure 1: Horizon Results Platform

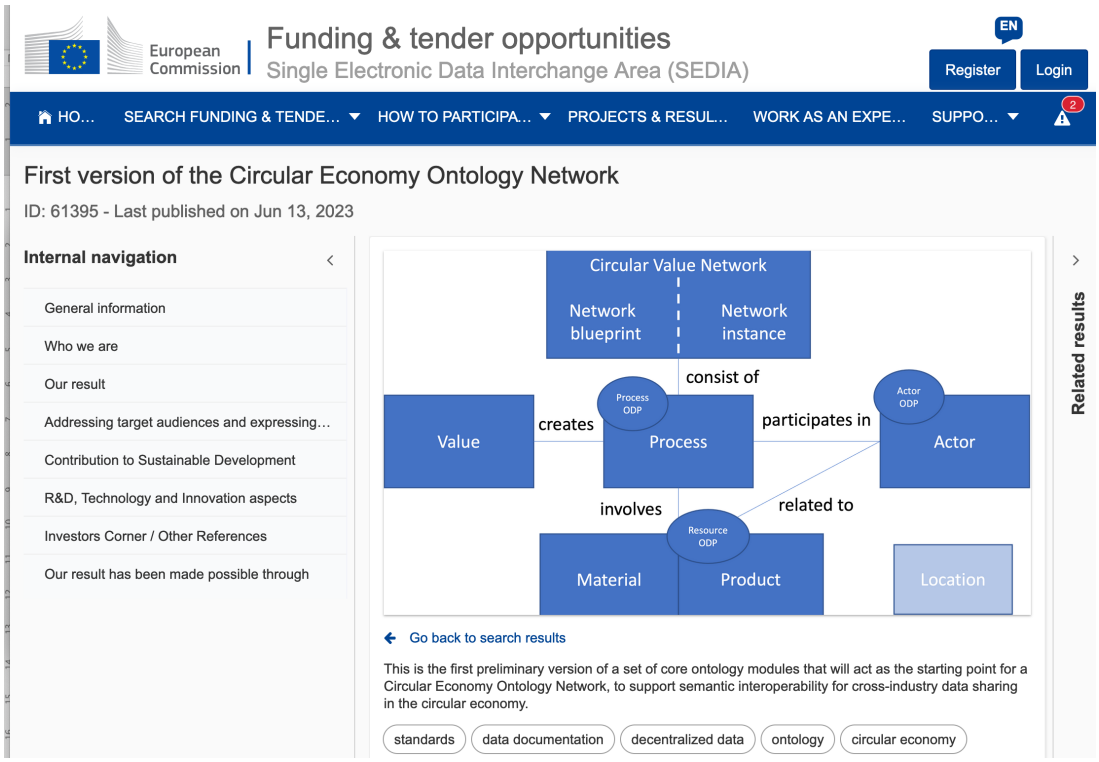

Figure 2: Circular Economy Ontology Network (CEON) shared on the Horizon Results Platform

The main output of WP4 is an open framework for secure and confidentiality-preserving digital and automated data sharing, which enables verifiable, traceable, and decentralized sharing of data expressed and documented using the ontologies from WP3 within, and across, industry domains. The **Open Circularity Platform** has been described in D4.3 and D4.7 and is shared as open source[3] by IMEC. At present, the repository contains an implementation of the platform and a demonstration based on the construction, textile, and electronics use cases, and a cross-domain use case. The Open Circularity Platform will provide businesses and individuals with a secure platform to make their data available over the internet, while preserving confidentiality (and if relevant, privacy) and allow all value chain actors to maintain control of their data. The main avenues of exploitation foreseen for the Open Circularity Platform is a) as a means for circular economy value chain actors to share their data using a shared ontology and standard web protocols, and thus enable new collaborations and increased automation and scalability of the circular economy, b) for circular economy software providers in the circular economy area to align their APIs and protocols to use the platform as an interchange medium to increase interoperability and decrease lock-in effects, and c) for infrastructure software providers to develop new services, e.g. hosting Solid pods specifically for circular economy actors.

[3] https://github.com/KNowledgeOnWebScale/open-circularity-platform

The main exploitable result of WP5 is the **Multi-Flow Method**. The method supports stakeholders to apply a systems perspective and improve their understanding of how the circular value chain can function better as a whole. The method helps to examine the relationships between different points of interaction and how the sum of this creates the behaviour of the value chain. It guides the exploration of what works well and what needs to be improved. The key focus of the method is to understand the flows of resources, value, and information within the system, and to explore complementary areas like energy flows, infrastructure, enabling assets, and the broader system environment. A first version of the method was presented in D5.2, and an updated and final version will be presented in D5.3 (due M42). By outlining a way to explore all of these parts which are critical to the overall functioning of a circular system, WP5 is developing a way to operationalise the Multi-Flow Metabolism (MFM) that is another exploitable result in the project.

Its adjusted version (presented in D5.2) shows the various flows involved in the circular economy, i.e. materials, energy and value. Whereas in the earlier version information was seen as a separate flow, the model is now updated so that both information and infrastructure are two supporting flows that are needed for all three main flows. This aligns with how the rest of the results of Onto-DESIDE fit into the bigger picture of the circular economy. As such, these two results are an essential complement to the technical solutions in order to be able to analyze, design, and set up sustainable circular economy value networks. The result owner is UHAM and the methods will be shared as open access.

The main avenues of exploitation foreseen for the Multi-Flow Method are as a means for circular economy value chain actors to a) analyze their value chain as well as to identify opportunities and design future plans for increasingly circular flows, in turn rendering a more sustainable and resilient European circular Economy, b) analyze the data needs and data sharing opportunities to be further covered by CEON or extensions thereof, and c) for circular economy software and service providers to use with their customers in order to analyze needs and wants, as well as identify how their software or the platform developed by the project can be used.

One **data set** has been openly shared from a published paper as follows:

1. A Survey of General Ontologies for the Cross-Industry Domain of Circular Economy at https://dl.acm.org/doi/pdf/10.1145/3543873.3587613.

The dataset consists of the result of a structured review of ontologies and standards related to the Onto-DESIDE ontologies, use in the process of ontology development in WP3. It has been published on GitHub (https://github.com/LiUSemWeb/Circular-Economy-Ontology-Catalogue) in order to make it openly available and also maintain it throughout the project with updates on emerging ontologies.

All the above results will also be used in future research projects, i.e. exploited by the academic partners of the project. Onto-DESIDE already applied to add a partner from a Widening country through the Hop On facility call at the end of September 2023. However, in addition to this, the CEON is already being exploited in further research on the relation between circular economy data and Digital Product Passports, conducted by LiU in collaboration with partners from the CIRPASS project.

3.1 Target groups

General
The target groups identified for all project partners include stakeholders from 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 relevant interest groups. Lastly, standardization bodies are of particular importance because the results of Onto-DESIDE will be used as input for ongoing standardization work within the W3C and ISO's technical committees, and may also serve as starting points for future standardization efforts.

Partner specific
In addition to the common target groups already identified, some partners have specified target groups for their individual exploitation activities. These are described below.

RS
Actors involved in business development and partnerships will serve as key target groups for Ragn-Sell's exploitation. These partnerships build up on 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

In general, the project exploitation strategy has been to exploit and make use of the Open Circularity Platform and ontology-based data documentation methods as outlined in D7.4 and D7.5. In addition, a group of consortium partners has initiated a W3C Community group dedicated to Digital Product Passports and Circular Economy. A community group is a pre-standardization effort, intended to discuss and develop resources and specification draft that can later on lead to technical standards within the W3C.The long-term ambition of this community group is to facilitate the needed discussions in the intersection between a transition to circular economy, the data required to support it, and digital infrastructure necessary to enable it. The community group was officially formed during Q1 2025 with the

chairs appointed in Q2 2025. The appointed chairs are Jakob Deich from the Wuppertal Institute in Germany and Mikael Lindecrantz from Ragn-Sells Group (project partner RS) in Sweden.

The community group has already attracted noteworthy attention, with 54 people and organizations signing up for participation (May 2025): https://www.w3.org/groups/cg/ce-dpp/.

Partner specific

LIU

Linköping University will exploit the ontology and data-sharing components developed in WP3 and WP4, and the knowledge and know-how on ontologies for CE, for further academic research, scientific publications and future applications for research and innovation projects. In addition, the concrete components are published as open-source software/models to facilitate broader exploitation by research communities, industry stakeholders and other interested parties. Specifically, LiU has published the resources on the project website that will be maintained even after the project is finalized, as well as in a GitHub repository, and using permanent identifiers (through w3id). Thereby, these resources will also be used beyond the project, both for teaching, e.g. as examples and practical tasks for students, as well as concrete starting points for further software and model development.

RS

Ragn-Sells intends to exploit the projects results to advance its group-wide R&D strategy. As an effect of this, Ragn-Sells intends to make use of the project platform and methods to initiate new circular economy collaboration projects with strategically selected partners. The project and future initiatives will strengthen RS' position as a leader in circular solutions. Long-term vision of RS is to act as a key material source hub (supplier of secondary raw materials) in Europe.

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 national and EU 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. Further, IMEC is an active participant in several standardisation efforts at the W3C, i.e. both for Solid and RML for instance, where the project has already contributed extensions to both these technologies. IMEC will continue to exploit both technology, learnings and know-how from the project, to advance these standardization efforts.

UHAM

The Multi-Flow Method developed by WP5 is one of the exploitable results of the project. It will be included as part of the Circularity Thinking toolkit and is made available under the

same license (Creative Commons – attribution, non-derivates, non-commercial). For all uses not covered by this license, other licenses are available. A dedicated website and tutorials are currently under development for Circularity Thinking. The method as well as the Multi-Flow Metabolism (MFM) – the conceptual anchor of the work in WP5 and its developments within Onto-DESIDE – will be used in future research at the Chair of Circular Economy and Systems innovation. Therefore, the results developed in WP5 are expected to be further exploited through future research projects and scientific publications.

The current version of the Circularity Thinking toolkit is being used in trainings within EIT Climate KIC - reaching a multitude of organizations across Europe and supporting the deliverables of the EIT C-KIC. In the last quarter of 2021 approximately 100 participants, consisting of industry practitioners, consultants, public interest organizations and public sector bodies, took part in various editions of the training. The MFM further enriches this toolkit and will be included into future training editions as a core component or as an extension module, with one such training planned to June 2025. This integration will leverage the existing C-KIC network, including both through the trainer network and the project partners working with C-KIC on CE projects across Europe. Opportunities to expand into other EIT networks and beyond are also being explored. To support this ambition, the partnership with C-KIC has recently been renewed to this end. Specifically, Circularity Thinking has been incorporated into the recent Climate Leadership Academy. Initial steps to include the Multi-Flow Method into the Circularity Thinking toolkit and its trainings have been actioned.

CON

As a result of the work done in Onto-DESIDE, Concular wants to explore the possibility of integrating BIM models with the Open Circularity Platform. This could be a practical way forward in integrating circular economy values and process into the planning and maintenance of the built environment.

As a result of working with the circular thinking methodology in WP5 in Onto-DESIDE to describe and document circular value networks, the central role of logistics is evident. This is something that Concular will explore further to better describe the reused materials they manage.

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 and will be investigated further based on the results and learnings from the project.

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. As well as aiming to leverage the insights regarding the required data for diverse stakeholders to further advance the internal Product Information Model system in preparation for future required digital product passports.

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 decentralized network approach to publish and retrieve semantically annotated data, behind a layer of authentication and authorization. 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 harmonization 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 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 CIRPASS2 (Grant No 101158775) 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 analyze 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:

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

The first measure is related to active dialogues with the standardisation bodies and is described in a separate section (3.4) below. The 2nd and 3rd measures are also covered under a separate section (3.5) further down.

Partner specific

Some partners have individually described their measures:

LIU
One measure of successful exploitation is scientific exploitation, particularly through publications and the organization of research activities. LiU has published more than 10 peer-reviewed papers in top conferences related to the Semantic Web, as well as in associated workshops co-organized with these conferences, presenting research outcomes based on the ontology network (e.g., in ESWC, WOP@ISWC, KG4S@ESWC). In addition, a CE track was proposed for the annually organized Ontology Alignment Evaluation Initiative, aiming to evaluate ontology matching tools based on their ability to discover alignments.

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

- SwePass: SwePass is a Swedish platform initiative developed to address traceability and digital product passports (DPPs) for sustainable value chains. This project builds upon the ontologies developed in Onto-DESIDE and extends them for use in a value network related to flatglass.

- ENTER: ENTER is a Swedish project that focus on mapping the wood value chain and the data points needed to enable more circular and sustainable business models.

In this project, the Onto-DESIDE ontology network will be used to extend the value-chain with contextual data.

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

CIRC
Circularise have developed extensions to their own platform as a result of the work in Onto-DESIDE. Today these extensions are within the Electronics value-chain but going forward the intention are to also incorporate these extensions for adjacent industries.

IMEC
IMEC will exploit the Open Circularity Platform and its related novel techniques in new research projects where decentralized data sharing is a core requirement, e.g. within SecuWeb, we demonstrate a food supply chain use case using the same open circularity platform building blocks (i.e., CEON, RML, Solid, Data Viewer). The Data Viewer, being developed within Onto-DESIDE, is currently being demonstrated within the context of Flemish data standards at https://oslo-kg-viewer.knows.idlab.ugent.be/. Considering WP4 research output of Onto-DESIDE, a new research track TrustFlows has been identified: how to keep trust in data when it is decentrally shared and processed across actors. Initial research presentations have been given. Similarly, the MFM will be exploited by UHAM, as a basis for further research on circular economy analysis and implementation.

3.4 Update of the standardisation activities

Onto-DESIDE partners, mainly RS, POS, and IMEC, have participated in activities and meetings with the following standardisation committees:

1. Participation of RS in the SIS/TK 616 - Circular Economy committee at the national level, Swedish Institute of Standards, SIS/TK 616 (To standardize the Circular Economy, adding the learnings of semantic interoperability as a result of Onto-DESIDE, into discussions of vocabulary and working with data)

2. Participation of RS in the ISO/TC 323 - Circular economy committee at the international level, International Organization for Standardization, ISO/TC 323 (To standardize the Circular Economy, adding the learnings of semantic interoperability as a result of Onto-DESIDE, into discussions of vocabulary and working with data)

3. Participation of RS in the CEN/TC 473 - Circular Economy committee at European level, the European Committee for Standardization, CEN/TC 473 (To standardize the Circular Economy, adding the learnings of semantic interoperability as a result of Onto-DESIDE, into discussions of vocabulary and working with data)

4. Participation of IMEC in the W3C Knowledge Construction Community Group (to standardize RML, the mapping language used in Onto-DESIDE)

5. Participation of IMEC in the W3C Solid Community Group and Linked Web Storage Working Group (to standardize the Solid protocols, the data exchange protocols used in Onto-DESIDE).

6. LIU and RS initiating the W3C Circular Economy-Digital Product Passport Community Group (https://www.w3.org/community/ce-dpp/)

For more details on standardisation we refer to the standardization plan deliverables D2.7 and D2.8.

4. Data management (plan)

The Horizon Europe Grant Agreement requires a data management plan at the start of the project. A template provided by the European Commission forms the basis for the Onto-DESIDE data management plan (DMP) initially described in D7.4 and updated in D7.5. The DMP includes information on how research data will be handled during and after the end of the project, what data is collected, processed and/or generated, which methodology and standards are 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 is updated during the project, and this report (D7.6) contains the final version, mainly focusing on the full set of data produced by the project and its management beyond the project scope.

4.1 Data summary

The Horizon Europe Work Programme emphasises the importance of the 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 preserved, and also after the end of the project.

This DMP is updated over the course of the project and covers up to date reflections within the consortium about the data that has been produced and will be produced in the future.

The Onto-DESIDE project has generated/collected the following types and formats of data up to M36:

- Reports
- Publications
- Websites
- Research data files
- Ontology files
- Source code files
- Mapping files
- Demonstrators (object code)

- Experimental data/study results, including survey results, interview transcripts, recordings, notes etc.

The beneficiaries of the Onto-DESIDE project will deposit the research data, which is not IP protected and/or approved to be open access by the industrial partners, in separate open repositories, e.g. on GitHub, 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 to any users outside the consortium. Open-access data is shared through a) the project website (https://ontodeside.eu/), b) public GitHub projects managed by each partner providing data, and c) research data repositories of each university partner.

A specification of the data generated until M36 is listed in Appendix B, consisting of 12 datasets/data categories (1 added since D7.4). The template used for describing data in the project is provided in Appendix A.

4.2 FAIR Data

Publishing FAIR data implies following 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 identifies the items that are relevant to the correct identification and management of the data collected and produced. The data identification must consist of a *Data set reference* and a *Data set name*. The dataset reference (identifier) should primarily be a persistent URI, e.g. by using services for persistent URIs such as the W3ID service (https://w3id.org/) or similar, but may if needed be in another form, e.g. the address of a GitHub repository. Whenever possible, the data set description should be expressed using standard metadata, such as DCAT descriptions in RDF, and must include the following:

- Data description
- Type (collected/processed/generated)
- Origin (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 data set

Keywords are generated and provided to optimise for findability and possibilities for re-use. For more details on the template for data description, see Appendix A. Semantic versioning is adopted for GitHub repositories (as described in D2.4).

4.2.2 Making data openly accessible

Before making data openly accessible, steps to protect privacy, security, confidentiality, Intellectual Property Rights (IPR) and embargo periods are taken. 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, data will be published with an open license by default.

Prior to potential open publishing, the NextCloud server, that has been provided by LiU, is the main platform used internally by the consortium for sharing and storing the project results and data. This includes datasets, project deliverables, and other reports and results created during the project duration. This server provides file hosting services 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 username 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 basis, and limits access to only researchers involved in the project.

When the data is stored on NextCloud, the data is not public, i.e., not Open Access (OA). However, the public deliverables are also made OA on the project website and by the EC, and everything that we publish (e.g., 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, access will be provided by LiU.

The other main platforms are thereby 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 includes public deliverables, reports and scientific publications. In addition, open datasets, ontologies, source and object code, are made available through GitHub repositories maintained by the respective partners.

The project website may also be used to give OA to other data than reports, e.g. datasets, which will be published together with machine-readable metadata records (according to DCAT) and license statements. 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.

The consortium has additionally identified other platforms that can ensure the access to the project results and data for longer periods of time, i.e., after the duration of the project. The main recommended service for depositing data before the end of the project is Zenodo (https://zenodo.org/) which is a service also recommended by the EC. However, partners

may also choose to use national services, e.g. one such platform is the Swedish National Data Service (https://snd.gu.se/en), which aims to support the accessibility, preservation, and reuse of research data and related materials, and forms a national infrastructure for research data in a network of around 40 universities and public research institutes. Each partner responsible for an OA dataset at the end of the project will be responsible for choosing an appropriate service to use for the data.

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 standard vocabularies as much as possible for all data types present in the data set, and metadata, to allow inter-disciplinary interoperability. If uncommon or generated project-specific ontologies or vocabularies are used, 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 by using open licenses. The research publications will be shared 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. However, in addition using services for persistent URIs such as the W3ID service (https://w3id.org/) is strongly encouraged.

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 Zenodo, for free and during a non-limited period. The details of this archiving are determined by each partner responsible for a dataset, as mentioned above, but will be completed by the end of the project.

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. In cases where outputs are shared under a different license this will 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 periodic reporting.

The long-term preservation, how long should the data be preserved, associated costs and how these are planned to be covered has been discussed at project meetings. The decision is that costs and responsibility will remain with the respective partners currently responsible for a dataset. The use of NextCloud via the project coordinator (LiU) during the project duration is free for the project partners, and the members of the EEAB and the Ethical Advisor. However, the NextCloud service will be shut down one year after the successful acceptance of the final report by the EC. However, LIU will keep a secure copy of all data from the NextCloud server for 5 years after the project. In addition, LIU will host and maintain the project website at least 5 years after the project, using internal funds to cover the costs.

All the project partners are responsible for data management in the project. Specific responsibilities for each data source are given in the tables of Appendix B.

4.5 Data security

NextCloud is a secure, password-protected place to store the data, where LiU has got its own servers. The server employs several security measures, such as two-factor authentication. LiU provides access to the server on a per-case basis, and limits access to researchers involved in the project. Data stored through external services, such as GitHub, takes advantage of their security measures. For instance, GitHub also applied 2-factor authentication and SSH access to the repositories, with encryption. For long term preservations and curation, the project will utilise external services for research data archiving, where the agencies responsible for these services also care for their security measures.

4.6 Ethics

The ethical aspects of the project are treated separately in WP8 and are assessed and reported in the yearly reports by the project Ethical Advisor in WP1.

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.

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

This is the third version of the Exploitation and Data Management Plan that was previously published as D7.4 at the start of the project, and updated in M18 to D7.5. This document provides an update of the exploitation and data management plans and practices and lists the achieved exploitation and data management activities. The list of datasets has been discussed regularly and wherever needed by adding information to the file on NextCloud, Appendix C. LIU will maintain the internal data storage NextCloud 1 year after the completion of the final project report, and then archive the data for 5 years. LIU will also maintain and host the project website for 5 years after the project. Until the end of the project each partner that is responsible for an OA dataset will make sure that it is properly annotated with metadata and published in an archiving service, e.g. Zenodo.

The Onto-DESIDE project has identified a broad range of exploitation activities in the consortium, which target research, industry, civil society and public institutions. One of the main exploitation strategies is the use of Open Circularity Platform and ontology-based data documentation methods as outlined in D7.4 and D7.5. A significant initiative supporting the exploitation strategy is the formation of a W3C Community Group on Digital Product Passports and the Circular Economy launched in 2025. Several academic partners are using the project results in their research agendas, for example LiU and IMEC will use the ontology and data-sharing components developed in WP3 and WP4 for future research, scientific publications and funding applications. They will also publish them as open source. UHAM is integrating the Multi-Flow Method and its conceptual foundation, the Multi-Flow Metabolism, into the Circularity Thinking toolkit, which is already in use in EIT Climate-KIC trainings and the Climate Leadership Academy. Industry partners are also actively exploiting project outcomes. RS is incorporating the results into its group-wide R&D strategy and plans to initiate new circular collaboration projects with relevant partners. In the footwear sector, POS targets actors across the value chain, including raw material suppliers, component and product manufacturers, resellers, users, and recyclers. Concular will apply the construction-specific ontology and project expertise to improve its digital platforms. CIRC is integrating ontology-based interoperability into its blockchain system and will offer the resulting services through its Software as a Service model targeting existing clients in the electronics and automotive sectors at the initial stage. Texon is exploring the automation of sustainability claim verification across its supply chains, while Lindner Group is using the project to identify innovative ways to increase reuse and recycled content in construction. Circular.fashion will upgrade its circularity.ID system using the developed ontology to improve interoperability and support secure, decentralized data sharing and verification. REIA is using the project to validate its data model for sustainability and compliance standards in the rare earth supply chain. +ImpaKT will use knowledge from the project to continue development of their Product Circularity Data Sheet (PCDS) IT architecture in collaboration with the Ministry of the Economy of Luxembourg. Thye will also contribute to ISO/TC 323 and the EU-funded CIRPASS project. For the long-term impact, the consortium is also investing in capacity building and knowledge transfer through its standardization activities, OA policies and training materials.

The main updates related to exploitation, compared with D7.4 and D7.5 is the key exploitable results that have so far been developed, and the discussion on how and by whom they might be exploited that was presented in section 3.5. Related to DMP the main updates are in the details of the repositories used, and in the metadata of the datasets of the project. Additionally one new dataset (D12) has been identified and documented in Appendix B.

In the next phase, the exploitation task will focus on understanding potential for exploitation of additional results from the project, i.e. extending the list of key exploitable results, and detailing the methods for exploitation of these. In addition, project partners will attend further meetings with the standardization committees, and make updates of the partners' individual exploitation plans. Regarding the DMP the only remaining work is to make sure all data is properly published and archived, e.g. at Zenodo, by the end of the project.

Appendix A - Template for data descriptions that will be used in the project

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 online, an 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 - A set of published and foreseen data

This appendix consists of the set of published and foreseen data that has or will be developed, treated, maintained and/or delivered by the project. The list contains data that has been produced or managed until M36.

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) already have 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 2023
Identifier (URI)	https://nextcloud.liu.se/f/43377
Landing page/website	N/A
Data Description	
Type of data	Contact information to 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	October 23 2023
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 has its own URI: https://w3id.org/CEON/ontology/
Landing page/website	Each ontology module has its own page with automatically generated documentation
Data Description	
Type of data	OWL models
Theme/category	Each ontology module relates to a specific modeling challenge or domain.
Keywords	Specific to each module.
Description	Ontologies modules developed based on the use case descriptions and the user stories in D2.1-3. Including general ODPs, domain ontologies, as well as use case specific modules for evaluation in the project.
Language	Labels and identifiers are in English, additional labels may be provided in other languages.
Size/scale of the data	21 modules (13 in core network, 1 for integrated version, 3 for use cases, 4 as auxiliary modules)
Relation to other data (including referenced by/references)	Based on D2.1-3 user stories, and to be described and reported in WP3 deliverables. Referred to in publications: https://dl.acm.org/doi/pdf/10.1145/3543873.3587613 https://ceur-ws.org/Vol-3636/paper1.pdf
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	Each ontology module released separately
Version number	Each ontology module versioned separately
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	CC-BY-4.0 (ontology modules), MIT License (source code)
Rights	No additional restrictions
Distribution	Turtle, OWL, and JSON-LD files (ontology modules)
Data Interoperability	
Conforms to standard	Each ontology module has its own persistent URI.
Archiving and Preservation	
Preservation	Each ontology module has its own GitHub page with automatically generated documentation. Metadata at the level of the whole ontology network will be created using DCAT and the final release of the network will also be deposited at Zenodo.

B3 – Platform source code	
Data identification	
Title	Onto-DESIDE platform
Identifier (URI)	https://github.com/KNowledgeOnWebScale/open-circularity-platform
Landing page/website	Same as above (each source code repository will have a landing page with some overview of the code available there, in this case it is the readme of the repository).
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	7.2 MB of source code & documentation when zipped
Relation to other data (including referenced by/references)	Based on D2.1-3 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	IMEC (see contributors in the GitHub repository)
Publisher	IMEC
Release date	Release 1.0 Feb 27th 2025
Version number	1.0
Update/modification date	Continuously updated in the dev branch. Latest release, see above.
Responsibilities	
Contact point	Ben de Meester (ben.demeester@ugent.be)
Responsible partner(s)	IMEC
Data Access and Sharing	

Access rights	Open access resources.
License	Open source license (MIT).
Rights	No additional restrictions
Distribution	Various source code formats available.
Data Interoperability	
Conforms to standard	Solid, RDF, RML
Archiving and Preservation	
Preservation	GitHub repositories will be available also after the project ends. Metadata will be created using DCAT and the final release will be deposited at Zenodo.

B4 – Research data - Textile	
Data identification	
Title	Textile domain research data
Identifier (URI)	https://nextcloud.liu.se/f/47910 (project internal)
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 D6.1-3.
Theme/category	Textile fibre and material recycling.
Keywords	Textile, fibre, recycling, footwear.
Description	The dataset contains 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. Focus is on a filled-in PCDS and PCDS templates.
Language	English
Size/scale of the data	Data template is an Excel sheet with 159 rows and 6 columns.
Relation to other data (including referenced by/references)	Used as the basis for the use case specific ontologies in WP3.
Useful to whom	Researchers in the project for technical research and development, as well as evaluation activities in WP6.
Data Provenance	
Origin	PCDS and Circularity.ID data structures and entries, as well as TEXON internal data and data from partners, as well as synthetic data examples.
Creator	TEXON, POS, FAS.
Publisher	TEXON, POS, FAS.
Release date	2025-02-28
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	Daryna PANASIUK <dpanasiuk@positiveimpakt.eu>
Responsible partner(s)	TEXON, POS, FAS.
Data Access and Sharing	

Access rights	Internal to the project consortium.
License	N/A
Rights	Usage rights are determined and described by the publishing organisations on a per-case basis.
Distribution	Excel sheets.
Data Interoperability	
Conforms to standard	PCDS (ISO 59040:2025) and Circularity.ID (https://github.com/circularfashion/cf-circularity-id-standard)
Archiving and Preservation	
Preservation	Data will reside within the organisations producing the data when NextCloud is no longer available.

B5 – Research data - Construction	
Data identification	
Title	Construction domain research data
Identifier (URI)	https://nextcloud.liu.se/f/47728 (project internal)
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 D6.1-3.
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.
Language	English and German
Size/scale of the data	Excel sheet with 53 rows and 15 columns.
Relation to other data (including referenced by/references)	Used as the basis for the use case specific ontologies in WP3.
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	2025-02-28
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	Theresa Schmidt <theresa.schmidt@lindner-group.com>
Responsible partner(s)	CON, RS, LIN.
Data Access and Sharing	
Access rights	Internal to the project consortium.
License	N/A
Rights	Usage rights are determined and described by the publishing organisations on a per-case basis.
Distribution	Excel sheets.
Data Interoperability	
Conforms to standard	Partly using PCDS (ISO 59040:2025)
Archiving and Preservation	
Preservation	Data will reside with the organisations producing the data when NextCloud is no longer available.

B6 – Research data - Electronics	
Data identification	
Title	Electronics (magnets) domain research data
Identifier (URI)	https://nextcloud.liu.se/f/47908 (project internal)
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 D6.1-3.

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.
Language	English and potentially other European languages.
Size/scale of the data	Excel sheet with 126 rows and 10 columns.
Relation to other data (including referenced by/references)	Used as the basis for the use case specific ontologies in WP3.
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	2025-02-28
Version number	N/A
Update/modification date	N/A
Responsibilities	
Contact point	Teresa Oberhauser (teresa@circularise.com)
Responsible partner(s)	CIRC, REIA.
Data Access and Sharing	
Access rights	Internal to the project consortium.
License	N/A
Rights	Usage rights are determined and described by the publishing organisations on a per case basis.
Distribution	Excel sheets.
Data Interoperability	
Conforms to standard	None
Archiving and Preservation	

Preservation	Data will reside with the organisations producing the data when NextCloud is no longer available.

B7 – Mapping files	
Data identification	
Title	Mapping files
Identifier (URI)	https://github.com/KNowledgeOnWebScale/open-circularity-platform
Landing page/website	Described as part of B3, under path scripts/stuff-pods.
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), or synthetic data for the evaluations of the use cases, into the ontologies (B2) and RDF.
Language	Comments and documentation in English.
Size/scale of the data	Less than 100 files.
Relation to other data (including referenced by/references)	Describes mappings from the three research datasets (B4-6 above), and the synthetic data for the evaluations, into the ontologies (B2).
Useful to whom	Internal usage for technical development and evaluation in the use cases in WP6. Examples from synthetic data for understanding and learning about the platform.
Data Provenance	
Origin	Developed in WP4 based on ontologies of WP3 and research datasets and examples of WP6.
Creator	IMEC
Publisher	IMEC
Release date	Release 1.0 Feb 27th 2025
Version number	1.0
Update/modification date	Continuously updated in the dev branch. Latest release, see above.
Responsibilities	
Contact point	Els de Vleeschauwer <Els.deVleeschauwer@ugent.be>

Responsible partner(s)	IMEC
Data Access and Sharing	
Access rights	Internal access within the project to the full set of files. 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 licenses (TBD), others N/A
Rights	Sample mappings without restrictions, others usage rights within the project.
Distribution	YARRRML files.
Data Interoperability	
Conforms to standard	W3C standard RML and RDF.
Archiving and Preservation	
Preservation	Project dummy data will be kept in the GitHub repository, together with the mapping files, available also after the project ends, as part of the training material of the project, and archived together with other example data in Zenodo.

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 and their following versions).

Useful to whom	All project partners.
Data Provenance	
Origin	Project management and all partners.
Creator	LiU
Publisher	LiU
Release date	September 2022 first release, continuous updates.
Version number	N/A (continuous updates).
Update/modification date	May 2025.
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 document per meeting is organised in a single document by type of 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, notes, and survey responses. In addition, the overall integrated prototype is evaluated in the three use cases in WP6, where additional data was collected.
Language	English
Size/scale of the data	Less than 10 GB.
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, and 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	2025-05-30

Responsibilities	
Contact point	Each partner.
Responsible partner(s)	All partners for the data they collected.
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	Per case – primarily open licenses.
Rights	Sensitive (e.g. personal) data cannot be made open, and will only be available within the consortium.
Distribution	RDF if 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 of any open data related to evaluations on Zenodo.

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	Less than 10 GB.
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	2025-11-30
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	Per case for each paper – 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	-
Archiving and Preservation	
Preservation	Archived by UHAM according to internal policies for research data preservation. Additional archiving on Zenodo will be investigated.

B12 – Ontology Survey Catalogue	
Data identification	
Title	Circular-Economy-Ontology-Catalogue
Identifier (URI)	https://github.com/LiUSemWeb/Circular-Economy-Ontology-Catalogue
Landing page/website	GitHub page for the catalogue at the URI above.
Data Description	
Type of data	Results of the survey on existing CE-related ontologies, with links to each ontology and documentation.
Theme/category	Survey results.
Keywords	Survey, ontology, circular economy.
Description	In WP3 a structured survey was conducted in order to identify related ontologies, to be taken into account when building the Onto-DESIDE ontology network.
Language	English
Size/scale of the data	Currently the catalogue contains 57 ontologies.
Relation to other data (including referenced by/references)	Used as a background for the CEON ontology network.
Useful to whom	Ontology development work in WP3 (internal use), but additionally to anyone interested in ontologies for CE. Can be used as basis for further research, and to verify results presented in the survey paper.
Data Provenance	
Origin	Structured survey, reported in paper.
Creator	LIU
Publisher	LIU
Release date	February 2023
Version number	N/A
Update/modification date	Continuously updated
Responsibilities	
Contact point	Huanyu Li (huanyu.li@liu.se)
Responsible partner(s)	LIU
Data Access and Sharing	

Access rights	Open access.
License	N/A
Rights	Open access, contains links to public ontologies and papers describing them.
Distribution	Can be downloaded as text file.
Data Interoperability	
Conforms to standard	N/A (URIs used for identification)
Archiving and Preservation	
Preservation	GitHub repository.

Appendix C - Exploitation files on NextCloud

No	Name	Result Type	Key results (KER), (does result have a high potential?) (multiple choice)	Description of high potential* (insert description, max 200 characters)	Audience or target group*	Steps undertaken towards exploitation**	Market maturity**
1	Cirular Economy Ontology Network (https://w3id.org/CEON/)	SCI (scientific discovery, model theory, etc.)	High technologic, business or economic potential	Through a shared vocabulary, the CEON ontology enables a multitude of stakeholders to share and consume data that enables new circular economy solutions.	Industry, business partner	Prototyping in laboratory environment	Market creating: not existing but potential for the creation of a new market
2	Open Circularity Platform (https://github.com/KNowledgeOnWebScale/open-circularity-platform)	SCI (scientific discovery, model theory, etc.)	High scientific potential	The Open Circulatiry Platform provides businesses and idividuals with a secure platform to make their data available over the internet while perserving privacy and control of the data.	Industry, business partner	Prototyping in laboratory environment	Emerging: growing demand, scarce supply
3	Activity Cycles - an Circularity Compass extension	SCI (scientific discovery, model theory, etc.)	High societal potential	Activity Cycles enables stakeholders to more granulayr assess and model the activites related to the different phases of the circularity compass.	Industry, business partner	Prototyping in laboratory environment	Emerging: growing demand, scarce supply
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5							
6							
7							
8							
9							
10							

No	Single or joint ownership of results? (Indicate the number of owners)	Result owners [insert owner name(s)] [Entity or Individual] See how to for explanation	Owner country of establish ment [country]	Will the owners exploit the result? Yes or No.	In which form will the result be made available to other consortium members and/or third parties?	Does the exploitation of the results require access to background of one or several consortium members? (If Yes a compulsory question opens below). Yes or No.	Does the exploitation of the results require access to third party IPR? (If Yes, a compulsory question opens below). Yes, No, or Not Known	Exploitation requires access to background of consortium members. [insert measures taken /envisaged to give access to the background required for exploitation]	Exploitation requires access to third party IPR. [insert measures taken /envisaged to get access to the required IPR]
1	1	LIU	Sweden	Yes	Open access	Yes	Not known	Individual agreements with respective stakeholder if not covered by the consortium agreement.	Individual agreements with respective stakeholder if not covered by the consortium agreement.
2	2	IMEC	Belgium	Yes	Open access	Yes	Not known	Individual agreements with respective stakeholder if not covered by the consortium agreement.	Individual agreements with respective stakeholder if not covered by the consortium agreement.
3	3	UHAM	Germany	Yes	Open access	Yes	Not known	Individual agreements with respective stakeholder if not covered by the consortium agreement.	Individual agreements with respective stakeholder if not covered by the consortium agreement.
4									
5									
6									
7									

No	Description of datasets [insert description]	Type of PID	PID of deposited dataset insert PID reference	URL to repository (if required by WP is the repository federated under EOSC?) insert URL	Is this dataset available in open access through the repository? Yes or No.
1	A Survey of General Ontologies for the Cross-Industry Domain of Circular Economy	Other		https://github.com/LiUSemWeb/Circular-Economy-Ontology-Catalogue	Yes
2	CEON ontology network	URL	https://w3id.org/CEON/	https://liusemweb.github.io/CEON/	Yes

No	Standardization activities	Description (max 200 words) [insert short description of activities and reference to the relevant group]	Types of standardization bodies involved (multiple choice)	Names of standardization bodies involved insert name	Standard references (if any) insert reference
1	Participation in a technical committee	SIS/TK 616 - Circular Economy	National	Swedish Institute of Stndards	SIS/TK 616
2	Participation in a technical committee	ISO/TC 323 - Circular economy	International	International Organization for Standardization	ISO/TC 323
3	Participation in a technical committee	CEN/TC 473 - Circular Economy	European	European Committee for Standardization	CEN/TC 473
4					
5					
6					

No	Type of IP Rights	Application Title [insert title of the application]	Application Reference See how to for more information	Application Date [insert dd/mm/yyyy]	IPR Owner [insert owner name(s)]	IPR Status Has protection been awarded? Yes, No or NA	IPR Award Reference ID [insert reference]
1							
2							
3							
4							
5							

No	Type of result	Description [insert description]	If the result is needed to validate the conclusions of a publication, describe the provisions whereby you intend to make your output available, either in digital or physical form? [N/A] [open access given to data] [[other: please describe]]	Type of PID (if available)	PID (if available) [insert PID reference]	URL to repository landing page for the result service/webpage hosting the result (if available) [insert URL]	What license is the result under
1							
2							
3							
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