Data Management Plan

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Contents

EXECUTIVE SUMMARY

The Data Management Plan (DMP) is a deliverable of the R2PI project, which is funded by Horizon 2020 Programme with Grant Agreement number 730378.

The Transition from Linear 2 Circular: Policy and Innovation (R2PI) project is participating in the Horizon 2020 pilot action on Open Access to Research Data. Following the Guidelines on FAIR Data Management in Horizon 2020[1], this Data Management Plan (DMP) describes the data management life cycle of the R2PI project.
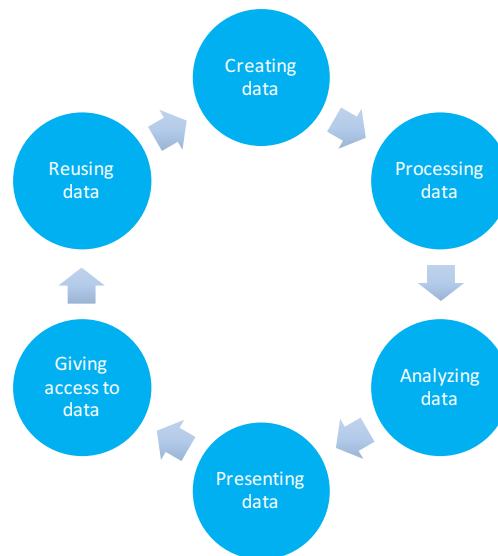
Figure 1 [Data Management Lifecycle]

The DMP includes an overview of the datasets to be generated by R2PI and specific conditions attached to them. Specifically, the DMP outlines the handling of research data during and after the the project, including

- types of data to be collected and/or generated and processed
- methodology and standards to be applied
- if data will be shared/made openly accessible and
- how data will be curated and preserved (including after the end of the project)

In combination with Deliverables 10.1 & 10.2 Ethical Requirements, the DMP specifies measures to ensure data are properly shared while ensuring the privacy of informants and respondents. This DMP first describes the R2PI project and overall principle of data collection and access. It then introduces the R2PI dataset overview. The DMP closes with the introduction of specific datasets to be collected, following the template in the the Guidelines on FAIR Data Management in Horizon 2020.

This is the 1st version of the DMP. The DMP is a living document, which will be elaborated or updated along with the project progress or when significant changes occur.

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

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INTRODUCTION OF R2PI AND ITS RESEARCH METHODOLOGY

R2PI is a EU-funded project under the Horizon 2020 programme, which examines the shift from the broad concept of a Circular Economy (CE) to one of a Circular Economy Business Models (CEBM), by tackling both market failure (business, consumers) and policy failure (conflicts, assumptions, unintended consequence). The goal of the R2PI project is to develop sustainable business models that would facilitate the circular economy and to propose policy packages and business guidelines that will support implementation of these business models.

To achieve the concept's ambitions, the research design employs mixed-methods, with a strong emphasis on case studies but also including desktop research, feasibility assessments (including surveys where applicable), policy formulation & stakeholder involvement. The ultimate goal of the project is to see the widespread implementation of the CE based on successful Business Models to ensure sustained economic development, to minimize environmental impact and to maximize social welfare.

GENERAL DATA MANAGEMENT PRINCIPLES

The DMP of R2PI will follow the principle "as open as possible, as closed as necessary", as suggested in EC Open Research Data (ORD) pilot. Meanwhile, considering the ethical requirements, the open data plan should not represent risks for compromising the privacy of informants participating in the different interviews, surveys or case studies. The DMP will therefore assess when, what and how data can be shared within a sound research ethical framework.

The figure below illustrates the policy to ensure the R2PI project has open access to research data and publications.
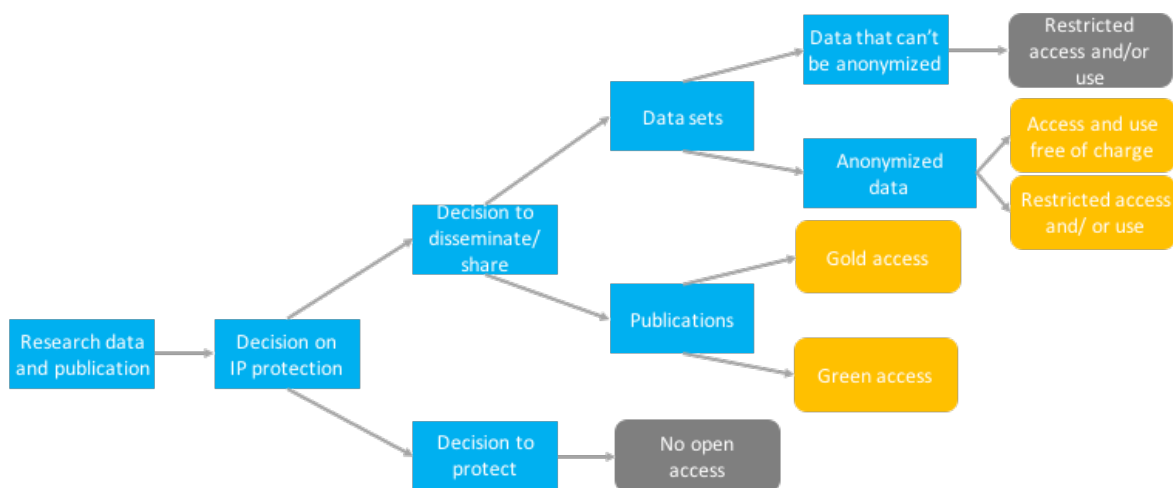

Figure 2 [R2PI research data and publication]

R2PI DATASET SUMMARY

Overview

R2PI seeks to combine the formal analysis of business models for circularity with on-going commercial practice. Specifically, it draws on case-studies of real enterprises in a breadth of sectors to illustrate, and in some cases refute or correct, those elements considered to be important for successful Circular Economy business models. To achieve the concept's ambitions, the project will focus on case-studies as the core of its work. Particularly, R2PI will generate data designed to study the success factors of circular business model transition through 15 in-depth case studies and policy analysis.

R2PI hybrid methodology framework is built upon a combination of

(1) **scientific methods and tools**, based on a broad understanding of systems innovation approaches, including technological and non-technological innovation, such as business models' evaluation for circularity, behavioural economics and consumer behaviour analysis, rigorous environmental measurements and ex-post policy and regulation analysis and policy formation (policy packages methodology), and

(2) **on-going "on the ground"** work through interactive case studies, to investigate and foster circular business model good practices.

Research data in R2PI

Research data refers to information, in particular facts or numbers, collected to be examined and considered as a basis for reasoning, discussion, or calculation. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form (European Commission 2017).

R2PI has 3 main stages to collect research data:

(1) General conceptualization and scoping

To achieve the project ambitions and objectives, R2PI will focus on case-studies as the core of its work. A preliminary phase (Work Package 2 – WP2) will set the scene it terms of a conceptual framework and the policy context, through desktop research methodology, intended to ground further research in time-space context. While defining the elements of Business Models for Circular Economy and thereby selection criteria for the case-studies, it will determine the boundaries of the scope. This conceptual and contextual framework will therefore further support the consortium in identifying and selecting relevant case-studies (WP3).

(2) Case study selection and analysis

R2PI will select 15 case studies (WP3) and conduct in-depth analysis, including on-going (from WP4) and piloted (from WP5) circular business models. The individual analysis will take into account the value-chain of each specific case: suppliers, customers, stakeholders, regulators and where the initiative lay (e.g. entrepreneurial, corporate, municipal, etc.), intended and unintended consequences of the wider policy package, as well as any nudges that may have been in place – whether by design or by default. The project shall inventory the case-studies and their results, extracting commonalities, differences and key factors of success (WP6).

(3) Policy packages and business guidelines development

The ex-post policy analysis is conducted in Task 2.4 to evaluate the extent to which policy measures to promote circular economy both induce economic, environmental and social impacts, and facilitate the uptake and functioning of these business models. This task promotes two of the project's objectives. First, the evaluation of individual policy instruments is part of building systematic understanding of the role of policy, the way it may incentivize and/or hinder the road to success. Second, it is a necessary first step in building policy packages to promote circular economy business model (CEBM). This evaluation will be carried out in the context of WP2 using qualitative methods.

Further, WP7 will develop policy packages for enabling policymakers and business guidelines for enabling businesses to implement effective measures to facilitate the shift to circular economy and benefit from its advantages. The policy packages methodology is based on a mix of tools complementing one another, including policy instruments' relation matrix, causal mapping technique, actors' relation analysis and more.

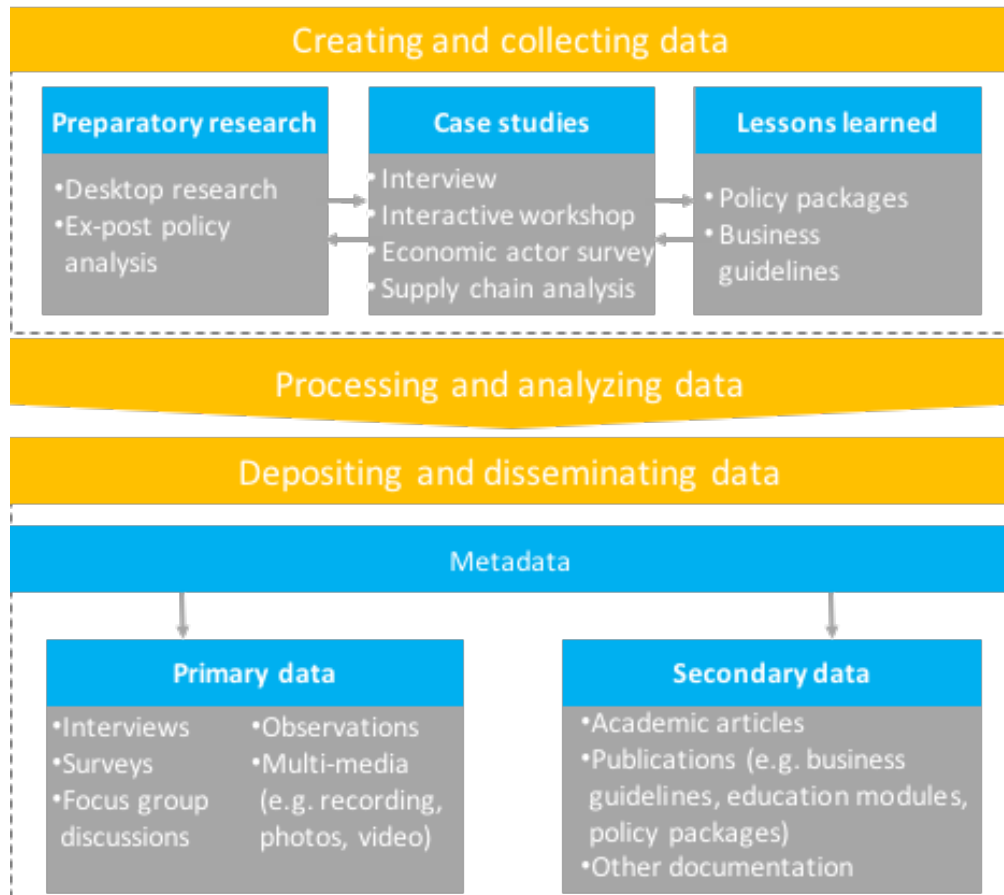The data management overview, including data collection and deposition summaries, is summarized as below.

Figure 3 [R2PI research data management method]

Based on the 3 stages, the key R2PI datasets to be collected and processed are listed in the table below. The descriptions of each dataset, following the FAIR principle, are provided in the following sections.

This list is indicative and may be adapted in the next versions of the DMP, taking into consideration project developments.

No.	Dataset name	Brief introduction	Responsible partners	Related work package(s)
1	Economic Actor Survey	Investigating the drivers, success factors and impacts of CEBM	• University of Malta • Sapir Academic College	WP4
2	CEBM Case Study	Investigating the drivers, success factors and impacts of CEBM	• University of Malta • University of Santiago de Compostela • Carbon Trust • Business Models Inc. • CSCP	WP4

SPECIFIC R2PI DATASETS DESCRIPTION

The DMP template suggested in the Guidelines on FAIR Data Management in Horizon 2020 is used to describe the key datasets and specific conditions attached, according to the current plans for gathering and analysis of data as well as the methods and processes foreseen to be applied to ensure compliance with ethics requirements.

Economic Actor Survey

DMP component	Issues to be addressed

1. Data summary	• **Purpose and relation to the project objective**: The Economic Actor Survey will seek to gauge the extent to which firms engage in circular economy practices and measure their degree of circularity, as well as to understand the key motivators, barriers and policies that influence firms' level of circularity. The ultimate aim is to assist businesses in their route to circularity and the adoption of new circular economy business models, and inform policies both at the national and EU-level.
	• **Data formats:**
	  - Data will be collected via an online survey, and will consist of three key sections, namely questions related to business's circular economy activities and/or policies (e.g. waste minimisation initiatives, environmental auditing, etc.), the motives, barriers and policies that influence the uptake of circular activities, and basic business characteristics (e.g. firm size, industry). No personal information regarding company or respondent name, address or contact details will be collected;
	  - Where possible, we will use online and/or electronic archives. This will involve extracting and processing quantitative and qualitative data, including participants, objectives and outcomes;
	  - Data will be input and stored in a spreadsheet format (e.g. Excel), to ensure accessibility to partners and researchers;
	  - No personal information will be stored in the project database, and any final reports or publications based on this survey will present information only in terms of averages or ranges.
	  - **Origin of the data and if existing datasets is being reused:** The University of Malta and Sapir Academic College with collaboration from the partners will form the survey questions. The project partners will conduct the survey with the economic actors of circular economy. The targets of the survey are businesses operating in Europe. The businesses already form part of existing business directories and databases which are held by the project consortium partners.
	• WP4 will include the identification and re-use of existing databases for addressing all the relevant issues and stakeholders. The survey will not however build on existing databases.
	• **Data utility:** The data might be useful for the research community (academics) on investigating circular economy, especially on business models and their market uptake. The data will also be useful for policymakers in order to analyse different barriers and policies that influence circularity.

2. FAIR Data	R2PI will develop metadata that is compliant with the Data Documentation Initiative (DDI), the most relevant international standard for describing the data produced by

2.1. Making data findable, including provisions for metadata	surveys and other observational methods in the social, behavioural, economic, and health sciences. The Guidelines on FAIR Data Management in Horizon 2020 has listed suggestions on further support for developing the DMP. Following the listed support, the Consortium has chosen ZENODO[2] as the scientific publication and data repository for the project outcomes. All metadata will be stored on ZENODO in JSON-format according to a defined JSON schema. Metadata can be exported in several standard formats such as MARCXML, Dublin Core, and DataCite Metadata Schema (according to the OpenAIRE Guidelines). These types of metadata will be produced and archived through ZENODO: • Data Citation with Digital Object Identifier (DOI) • Keywords to facilitate search and optimize possibilities for re-use
2.2 Making data openly accessible	• R2PI will make selected data available on the project website. • The R2PI survey data and metadata will be deposited in ZENODO, providing open access to data files and metadata over standard protocols such as HTTP and OAI-PMH.
2.3. Making data interoperable	• The data will be made available on ZENODO under a CC-BY licence. A 24-month embargo period following the completion of the project will be applied to allow research findings to be written up.
2.4. Increase data re-use (through clarifying licences)	• Data objects will be deposited in ZENODO under open access to data files and metadata, permitting its use and reuse, as well as protecting privacy of its users. • The aggregated dataset will be disseminated as soon as possible through the project website and other R2PI dissemination activities (WP9). In the case of the underlying data of a publication, this might imply an embargo period for green open access publications.
3. Allocation of resources	• Overall, the project coordinator (CSCP) will direct the data management process, with the Executive Management Board of the project responsible for ensuring that metadata production, cross-checks, back-up and other quality control activities are maintained. The lead researchers of the respective tasks will be responsible for routine supervision of the dataset development. • In principle, all partners are responsible for survey data generation, metadata production and data quality, coordinated by the task leaders (UoM and Sapir). • Dataset storage, backup, archiving and sharing will be in the majority of cases the responsibility of the partners who own the data and/or the servers in which they will be stored.
4. Data security	The data will be backed up regularly, including • sharing data through ZENODO, where data files and metadata are backed up nightly and replicated into multiple copies in the online system; • uploading research data to Freedcamp[3], the project management system used

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[2] https://zenodo.org
[3] https://freedcamp.com

	by R2PI consortium;
	• regular email sharing with the partners to ensure up-to-date versions are stored on partners' server; • requesting the task leaders to back up qualitative data on a regular basis and include clear labelling of versions and dates in metadata
5. Ethical aspects	• **Informed consent**: Prior to the survey, informants will be given enough information about their involvement and what it means for them to be able to make an informed decision as to whether they wish to participate. The principle of informed consent will also apply to the storage of their data and the use of their data in any analyses or reports/publications. • **Confidentiality**: throughout all stages of the survey process (including all stages of data sharing, analysis, report-writing etc.) the identity of participants will be concealed. • All research and all data storage will be closely monitored for compliance with the appropriate ethical guidelines. Each researcher will be responsible for reviewing the ethical concerns that could be raised in relation to each and every element of their research. In doing so they will have regard to the ethical guidelines of their professional organisation, their institution, and pan-European guidelines. In all cases, where there are a number of different guidelines, all research will conform to the more stringent of the available criteria. • As it is impossible to predict with 100% certainty the ethical issues that will arise, the Executive Board will encourage debate within and between work packages on ethical standards in research and what they require in this project.
6. Other	N/A

Circular Economy Business Model Case Studies

DMP component	Issues to be addressed

1. Data summary	• **Purpose and relation to the project objective**: R2PI combines the formal analysis of business models for circularity with on-going commercial practice. 15 case-studies of circular economy business models form the core of the project work. Specifically, the case studies will contribute to the following objectives:
	    - To collect empirical data to understand the factors driving (hindering) the success of Circular Economy Business Models (CEBM);
	    - To collect empirical data that would support and contribute to the definition and categorisation of CEBM;
	    - To analyse success in terms of environmental assessment, social and economic parameters;
	    - To understand the interests and roles played by different actors along the value chain;
	    - To identify the role of innovation and the knowledge infrastructure in the implementation of CEBM;
	    - To understand the role of Information and Communication Technology (ICT) in supporting the development of CEBM;

	- To quantify the economic, social and environmental effects of specific CEBM and to estimate its expanding impact; - To identify potential policies to support the transition to a Circular Economy • **Data formats:** The case studies will generate various datasets from diverse research methods combined, such as desk research, interviews, surveys, and interactive workshops, etc. Where possible, we will use online and/or electronic archives. Data will be recorded in various format, such as - Microsoft Word 2007 for text based documents (e.g. transcript of interviews); - MP3 or WAV for audio files; - Quicktime or Windows Media Video for video files (e.g. video of workshops and interviews); - SAV files for storing quantitative data analysis; These file formats have been chosen because they are accepted formats in widespread use. Files will be converted to open file formats where possible for ensuring long term storage. • **Origin of the data and if existing datasets are being reused:** 15 cases will be selected based on defined criteria, which should be sufficient to allow making generic recommendations in terms of policy making and business models transferability at the level of the EU. After defining the list of cases, desk research, in-depth interviews, dynamic group discussions and surveys, etc. will be conducted. Data will also be collected by the core team of R2PI through on-site visits and in-depth stakeholder interviews for those cases demonstrating particular innovation or circularity. After the data collection, a case study inventory database will be developed, incorporating the case studies analysed. The categorical attributes of each case study will be documented in this inventory to enhance the transparency of the findings and strengthen the repeatability and upscale-ability of the research and best practices identified. • **Data utility**: the data might be useful for researchers on investigating circular economy, especially on business model drivers, success factors and impacts.
2. FAIR Data 2.1. Making data findable, including provisions for metadata	R2PI will develop metadata that is compliant with the Data Documentation Initiative (DDI), which is the most relevant international standard for describing the data produced by surveys and other observational methods in the social, behavioural, economic, and health sciences. The Guidelines on FAIR Data Management in Horizon 2020 has listed suggestions on further support for developing DMP. Following the listed support, the Consortium has chosen ZENODO as the scientific publication and data repository for the project outcomes. All metadata is stored on ZENODO in JSON-format according to a defined JSON schema. Metadata can be exported in several standard formats such as MARCXML, Dublin Core, and DataCite Metadata Schema (according to the OpenAIRE Guidelines). These types of metadata will be produced and archived through ZENODO: • Data Citation with Digital Object Identifier (DOI) • Keywords to facilitate search and optimize possibilities for re-use

2.2 Making data openly accessible	• An inventory of cases will be developed. This inventory will consist of a tabular collection of the main attributes/context of each case study. It will synthesize the characteristics of the CEBM selection, with respect to features including size, impact level, composition, industrial sector, impact on environment, society and the economy and upscale-ability. • Full data access policy will be restricted to WP4 participants, in order to protect the sensitive information of the companies. Access to the audio and video recordings of interviews will only be provided to bona fide researchers under a data sharing agreement. • Besides, the R2PI survey data and metadata will be deposited in ZENODO, providing open access to data files and metadata over standard protocols such as HTTP and OAI-PMH.
2.3. Making data interoperable	• The data will be stored in widely applied formats to allow long-term and wide use. • The data will be made available on ZENODO under a CC-BY licence. A 24-month embargo period will be applied to allow research findings to be written up.
2.4. Increase data re-use (through clarifying licences)	• Data objects will be deposited in ZENODO under open access to data files and metadata, permitting its use and reuse, as well as protecting privacy of its users. • The aggregated dataset will be disseminated as soon as possible through the project website and other R2PI dissemination activities (WP9). In the case of the underlying data of a publication, this might imply an embargo period for green open access publications.
3. Allocation of resources	• Overall, the project coordinator (CSCP) will direct the data management process, with the Executive Management Board of the project responsible for ensuring that metadata production, cross-checks, back-up and other quality control activities are maintained. The lead researchers of the respective tasks will be responsible for routine supervision of the dataset development. • In principle, all partners are responsible for research data generation, metadata production and data quality, coordinated by the task leader (Carbon Trust). • Dataset storage, backup, archiving and sharing will be in the majority of cases the responsibility of the partners who own the data and/or the servers in which they will be stored.
4. Data security	The data will be backed up regularly, including • sharing data through ZENODO, where data files and metadata are backed up nightly and replicated into multiple copies in the online system; • uploading research data to Freedcamp[4], the project management system used by R2PI consortium; • regular email sharing with the partners to ensure up-to-date versions are stored on partners' server; • requesting the task leaders to back up qualitative data on a regular basis and include clear labelling of versions and dates in metadata Extra resources, such as physical storage media and cloud, are needed to

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[4] https://freedcamp.com

	accomplish the storage and maintenance activities described above.
5. Ethical aspects	• **Informed consent**: Prior to the interviews, survey and workshops, informants will be given enough information about their involvement and what it means for them to be able to make an informed decision as to whether they wish to participate. The principle of informed consent will also apply to the storage of their data and the use of their data in any analyses or reports/publications. • **Confidentiality**: throughout all stages of the research process (including all stages of data sharing, analysis, report-writing etc.) the identity of participants will be concealed, unless prior consent to reveal these names is granted beforehand by participating firms. • All research and all data storage will be closely monitored for compliance with the appropriate ethical guidelines. Each researcher will be responsible for reviewing the ethical concerns that could be raised in relation to each and every element of their research. In doing so they will have regard to the ethical guidelines of their professional organisation, their institution, and pan-European guidelines. In all cases, where there a number of different guidelines, all research will conform to the more stringent of the available criteria. • As it is impossible to predict with 100% certainty the ethical issues that will arise, the Executive Board will encourage debate within and between work packages on ethical standards in research and what they require in this project.
6. Other	• N/A