Data-driven and Dynamic Space and Assets for Physical Internet-led Urban Logistics and Planning

D1.9 Data Management plan v2

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Table of Contents

Abstract

This deliverable consists of the second version of the Data Management Plan (DMP). As the first release (M6, October 2023), it includes the relevant guidelines that need to be followed in order to ensure that the FAIR principles are met when managing data (Chapter 4).
The main objective of this second version is to provide an updated version of the different datasets generated and collected within the scope of the project activities. For this reason, this deliverable contains the guidelines that describe the data management processes for the data generated within the project as well as the methodologies and standards to be followed in order to ensure their protection, security and confidentiality (both aspects already described in the first version of the DMP) but also the updated version of the list of generated dataset. The intention of the DISCO project is to publish public (i.e. non confidential) results under Open Access, regarding all scientific publications produced along the project lifecycle.
The DMP will remain a living document throughout the project with two additional releases (M36, M42). The present version will therefore evolve during the project according to the progress of the project activities.

Summary sheet

Deliverable No.	D1.10
Project Acronym	DISCO
Full Title	DATA-DRIVEN, INTEGRATED, SYNCHROMODAL, COLLABORATIVE AND OPTIMISED URBAN FREIGHT META MODEL FOR A NEW GENERATION OF URBAN LOGISTICS AND PLANNING WITH DATA SHARING AT EUROPEAN LIVING LABS
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Programme	HORIZON Innovation Actions
Coordinator	FIT CONSULTING SRL
Website	https://discoprojecteu.com/
Starting date	01/05/2023
Number of months	42 months

Project partners

Organisation	Country	Abbreviation
FIT CONSULTING SRL IT Coordinator	IT	FIT
RUPPRECHT CONSULT-FORSCHUNG & BERATUNG GMBH	DE	RC
INLECOM INNOVATION ASTIKI MI KERDOSKOPIKI ETAIREIA	EL	INLE
PNO INNOVATION SL	ES	PNO
INTERNATIONAL DATA SPACES EV	DE	IDSA
FM LOGISTIC IBERICA SL	ES	FM
AKKA INDUSTRY CONSULTING GMBH	DE	AKKA
FONDAZIONE ISTITUTO SUI TRASPORTI E LA LOGISTICA	IT	ITL
JLL	UK	JLL
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTY XIS	EL	CERTH
LINDHOLMEN SCIENCE PARK AB	SE	LSP
KUHNE LOGISTICS UNIVERSITY GGMBH	DE	KLU
INSTITUT DE RECHERCHE TECHNOLOGIQUE SYSTEM X	FR	IRTX
STICHTING BREDA UNIVERSITY OF APPLIED SCIENCES	NL	BUAS
POLIS - PROMOTION OF OPERATIONAL LINKS WITH INTEGRATED SERVICES, ASSOCIATION INTERNATIONALE	BE	POLIS
EUROPEAN PARKING ASSOCIATION EPA EV	DE	EPA
ALLIANCE FOR LOGISTICS INNOVATION THROUGH COLLABORATION IN EUROPE	BE	ALICE
ERASMUS CENTRE FOR URBAN,PORT AND TRANSPORT ECONOMICS BV	NL	ERASMUS
INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM	BE	IMEC

VLAAMS INSTITUUT VOOR DE LOGISTIEK VZW	BE	VIL
FUNDACION ZARAGOZA LOGISTICS CENTER	ES	ZLC
BE-MOBILE	BE	BE-MOBILE
STAD GENT	BE	GENT
OPLEIDINGSCENTRUM VOOR HOUT EN BOUW VZW	BE	OHB
CITYLOGIN IBERICA SL	ES	CITYLOGIN
UNIVERSITAT POLITECNICA DE CATALUNYA	ES	UPC
AJUNTAMENT DE BARCELONA	ES	BCN
VENICE INTERNATIONAL UNIVERSITY	IT	VIU
FUNDACION DE LA COMUNIDAD VALENCIANA PARA LA INVESTIGACION, PROMOCION Y ESTUDIOS COMERCIALES DE VALENCIAPORT	ES	VPF
FUNDACION DE LA COMUNITAT VALENCIANA PARA LA PROMOCION ESTRATEGICA EL DESARROLLO Y LA INNOVACION URBANA	ES	LAS NAVES
T-BOX DELIVERY & SOLUTIONS SL	ES	T-BOX
AYUNTAMIENTO DE ZARAGOZA	ES	ZARAGOZA
FUNDACION ZARAGOZA CIUDAD DE CONOCIMIENTO	ES	FZCC
FORUM VIRIUM HELSINKI OY	FI	FVH
KOBENHAVNS KOMMUNE	DK	COPENHAGEN
REGION HOVEDSTADEN DK Partner	DK	REGIONH
COMUNE DI PIACENZA	IT	PIACENZA
MESTSKA CAST PRAHA 6 / District Prague	CZ	PRAHA
REGIONAL MANAGEMENT NORDHESSEN GMBH	DE	RMNH
AARHUS KOMMUNE	DK	AAKS

DIMOS THESSALONIKIS	EL	THESSALONIKI
DIETHNIS EKTHESI THESSALONIKI AE	EL	TIF HELEXPO
ACS TACHIDROMIKES IPIRESIES MONOPROSOPI ANONYM	EL	ACS
ROLAN OY	FI	ROLAN
ASOCIACIÓN LOGÍSTICA INNOVADORA DE ARAGÓN	ES	ALIA
A to B Finland Oy	FI	A2B
GETPLUS srl IT Partner	IT	NEXT
COMUNE DI PADOVA IT	IT	ComPADUA

Document history

Version	Date	Organisation	Main area of changes
0.1	14/08/2024	FIT	Definition of ToC
0.2	23/09/2024	FIT	Chapters updated with WP leaders input
0.3	24/09/2024	FIT	Draft sent for internal review
0.4	08/10/2024	INLE, AKKA	Version approved by the Reviewers
0.5	22/10/2023	FIT	Ready for submission

List of acronyms

D	Deliverable
DMP	Data Management Plan
DoA	Description of Actions
DOI	Digital Object identifier
EU	European Union
FAIR	Findability, Accessibility, Interoperability, and Reusability
GB	Giga Byte
HEU	Horizon Europe
IA	Innovation Action
ICBT	Impact Creation Board for Transformation
LL	Living Lab
LSP	Logistics Service Provider
R&D	Research&Development
SUMP	Sustainable Urban Mobility Plan
SULP	Sustainable Urban Logistic Plan
UF	Urban Freight
WP	Work Package

1. Introduction

The present deliverable has been developed in the framework of WP1 activities under the responsibility of the coordinator (FIT). The goal of the current publication is to provide an updated version of the DMP released in M6 which contained an overview of an early data management strategy for the DISCO project. The management of research data and publication data in scientific journals is also covered. The Grant Agreement as well as the Consortium Agreement will be used to enforce the management policy, which will be clearly specified in accordance with the open access guidelines set by the European Commission.
In line with the rules laid down in the Model Grant Agreement, the beneficiaries will deposit the underlying research data needed to validate the results presented in the deposited scientific publications in a clear and transparent manner.
Compared to the first version of this deliverable, which included a tentative description of the expected datasets generated trying to predict what data could be kept confidential and what data could be instead made available during project development, this release contains more precise information mainly related with WP2, WP3 and WP4.

In details, the present Data Management Plan (DMP) contains information about:

- The handling of research data during the project (Chapter 2)
- Which data will be collected, processed and/or generated (Chapter 2)
- Which formats these data have (Chapter 2)
- Which methodology will be applied in their collection, process or generation (Chapter 4)
- Whether data will be shared/made open access (Chapter 5 and 6)
- How data will be stored and preserved (Chapter 3)
- The role of the different partners within the DISCO Consortium about the DMP responsibilities (Chapter 7)

The DMP is furthermore connected to the following project deliverables:

- D1.3/D1.6 Ethics, Gender, and Inclusivity Guide v1/v2
- D2.4 DISCO-X Enabling Tools
- D3.1/D3.4 DISCO Data Space open software repository v1/v2
- D4.2 Starring LL measures implementation
- D5.2 Twinning LL measures implementation
- D6.1 Stakeholder and market analysis
- D7.1 Dissemination and Communication plan

2. Data Summary

The primary purpose of this section is to define and categorise data processing in DISCO, as well as identifying the main data types being generated during the lifetime of the DISCO project.

The purpose of data collection in DISCO is to contribute towards reaching the project objectives, the WPs development and results. Specifically, this activity will contribute to the project (i) defining all data driven measures supported at local levels in WP2, (ii) developing an UF Data Space where data sharing communities will enable the urban logistics digital transition in WP3, (iii) pioneering the Meta Model Suite and the Data Space for Starring LL digital transition and finally (iv) showing the replication potentials in the Twinning LLs (WP5).

The data being processed in DISCO will be shared with the consortium and/or published without containing personal or commercially sensitive information. No sensitive personal data will be collected. Human participants in collaborative multi-stakeholders' meetings and interviews will neither be selected actively on ethnicity, nor on socio-economic factors (please refer to D1.3 for more details on ethical aspects). Human participants are representatives of geographical groups or local stakeholders' groups in view of logistics' behavioural and flows patterns to maximise the DISCO solutions.

Table 1 presents an updated version of the data that will be generated, including additional information useful in characterising the different datasets. All project outputs (regardless of whether they are labelled as "Public" or "Confidential") will be stored in the DISCO Sharepoint, the project's repository system – described in chapter 3.

Table 1 – Overview of data generated in the project

WP	Generated data	Description	Personal Data Identification (Y/N)	Data origin	Data format	Confidentiality
WP1	Contact details	Partners' contact details collected for internal communication purpose and for the correct project implementation	Y	Project Partners	.Xls	Confidential
WP1	List of risks	A risk register that will be constantly updated. Each partner is responsible for monitoring of	N	Project Partners	.Xls	Confidential

		potential risk to allow prediction, identification, and mitigation of those risks				
WP1	Periodic reports	Project Periodic report and Financial reports (internal and towards EC)	N	Project Partners	.Xls, .doc, .docx	Confidential
WP2	DISCO-X requirements	List of DISCO-X innovations requirements to be presented to the LLs	N	Project Partners	.docx	Confidential
WP2	DISCO-X LL templates	Captured responses of LLs for generalizing the DISCO-X implementation requirements	N	LL partners	.docx	Confidential
WP2	DISCO-X generalised transition paths	DISCO-X generalised transtion paths	Y	Project Partners	.docx	Confidential
WP2	Data requirements per DISCO-X tool	Data requirements per DISCO-X tool	Y	Project Partners	.docx	Confidential
WP2	Data from PI-led Digital Transition and Maturity	Organization details, urban logistics KPI per DISCO LL, Digital Assessment KPIs	Y	Project Partners	.xls	Confidential

	Questionnaire	per DISCO-X per DISCO LL				
WP3	Data Owners/Producers register	A register filled in by data producers, a short description of their dataset(s), rules under which they are providing it (data sovereignty), where the data is store and how it can be accessed, etc.	Y	Project Partners and potentially also externals	.docx, .xlsx	Confidential
WP3	Data Consumers register	A register filled in by data consumers with a list of the datasets used and a short description of their use case for the data	Y	Project Partners and potentially also externals	.docx, .xlsx	Confidential
WP3	Lockers, warehouses, shops locations and identifying information	Datasets available from Thessaloniki Urban Logistics Dataspace REST API	N	Project Partners	.json	Public
WP3	Parking information	Datasets on parking locations and parking stations capacity	N	Project Partners	.json	Public
WP 4	LL Factsheets	about demonstration of measures in Starring cities	Y	ITL	.docx	Public

		aimed at improving environmental parameters.				
WP4	Evaluation dashboard of LL implementation	Requirement specification and description of evaluation dashboard for the implementation of the measures in the starring LLs, including the list of KPIs defined for the evaluation.	N	Project Partners	.docx, .xlsx	Public
WP4	Local Stakeholder list/map	List or map of stakeholders involved in the implementation of the starring LLs, for each LL.	N	Project Partners	.docx, .xlsx	Confidential
WP4	Bootcamp survey results	Results of citizens' survey on implementation measures in LLs carried out during bootcamp in each starring LL.	Y	LL Partners	.xlsx	Confidential
WP4	Rules and regulations of street use in Ghent	List of rules and regulations of the city on street use	N	LL Partners	.docx	Public
WP4	Data for Real Estate Database	Georeferenced data on public real estate in Thessaloniki	N	LL Partners	GeoJSON	Confidential

	Thessaloniki					
WP4	Curb utilization data Helsinki	Data collected via cameras on curb utilization in Helsinki	N	LL Partners	GeoJSON	Confidential
WP4	Delivery data Copenhagen	Georeferenced data on deliveries provided from LSPs for the digital twin	N	LL Partners	GeoJSON	Confidential
WP5	Lessons Learned Forms WP4	Captured lessons as per D4.1. from the starring labs, this will be used to prepare the twinning labs for demonstration and risk management	Y	Starring Labs	Online form (.xls export)	Confidential
WP5	DISCO-X requirements	Refined to fit the scope of WP5 LL demonstrations	N	WP2	.docx	Confidential
WP5	WP5 Evaluation	Results of task 5.4. for the improvement points going forth and advice to Follower cities	N	LL Partners, LSP	.docx	Confidential
WP5	Agile Implementation Roadmap	Implementation roadmap for various DISCO X demonstrations including gap analysis, documentation and implementation frameworks within	Y	Project Partners	.docx	Confidential

		Agile development methodology				
WP5	Replication Plans (4)	Package of data driven urban logistics measures and technologies demonstrated in new settings, based on the results of previous projects (NOVELOG, SULPITER, SPROUT, SENATOR) and paired with Step1 LLs. Refined to include the requirements for replication of 4 DISCO X	Y	RC, POLIS, ALICE, ITL	.docx	Public
WP 5	Interactive Dashboard Updates	Updated Interactive Dashboard for common monitoring and evaluation at Twinning LLs and list of KPIs for cross site evaluation	Y	RC, POLIS, LSP	online	Public
WP5	LL Factsheets	About demonstration of measures in Starring and Twinning cities aimed at improving environmental parameters.	Y	BUAS, LL partners	.docx	Public

WP5	Occupancy data	Loading/unloading zones occupancy data containing license plate information and parking time	Y	UPC	.csv	Confidential
WP5	Data about logistic operations	Data about parcels, routes, etc	N	Citylogin	.csv	Confidential
WP6	Business and Operating models	Questionnaires and data collected from LLs to define the Business Models	N	LL partners	text	Confidential
WP6	Exploitation plans, barriers and value proposition	It will contain the exoploitationexploitation strategies of each partner as well as execution of specific activities aiming at market introduction	N	Project Partners	.Xls, .doc, .docx	Public
WP6	List of stakeholders	List of key international domain experts, to spot, define, and analyse key trends and developments.	Y	External Stakeholders	.Xls	Confidential
WP7	Training participants list	Contact details of participants who take part in trainings within the DISCO project	Y	Project Partners and potentially also externals	.Xls	Confidential

WP7	Knowledge Hub users	Contact details of people who will register and make use of the Knowledge Hub	Y	Project Partners and potentially also externals	.Xls	Confidential
WP7	External newsletter contact details	Contact details of people who subscribed to the project external newsletter	Y	Project Partners and externals	.xls	Confidential

Clarifications on data collected in different WPs:

- Data acquired from individuals from online public forums, including user opinion forums, surveys, tests, and interactive applications, will be anonymized. The collected information will be registered without any association with specific individuals, ensuring that no connections can be drawn between written statements, demographic profiles, user reviews, or scores, and the creators of this data.
- Online formats created for public responses will incorporate notifications informing contributors that their responses and data may be utilized for research purposes. Surveys or tests will only proceed with explicit consent from the users to share the results.
- Researchers will actively seek and obtain explicit permission to employ direct quotations from users' written responses.
- In instances where specific trials or data collection procedures necessitate the retention of identification and contact information of volunteers, the consortium will adhere to the following protocols:
    - no data will be collected or used without informed, written consent from the individual (please refer to D1.3 for the informed consent form).
    - All collected data, in both raw and tabulated formats, will be anonymized. In this process, unique codes will be assigned to each individual data set. Furthermore, the codes connecting data sets with individual study participants will be stored independently (refer to 2.3 for more details) from the data itself, as well as the individuals' personal and contact information.

2.1. Data types, categories and formats

The nature and structure of research data generation are contingent upon the task leaders' definitions of data collection and analysis, aligned with discipline-specific norms and practices. To ensure the long-term utility of DISCO data, it becomes imperative to contemplate the most suitable data types and file formats.

The spectrum of data collected during the research activities within the DISCO project encompasses diverse types and formats, including:

- Data sets: interview recordings, literature reviews, best practices reviews, online surveys, stakeholder platforms, spreadsheets, PDFs, quantitative data, operational data, public data, etc.
- Data exchange of research and trial results: Word documents, Excel spreadsheets, PowerPoint presentations, PDFs, workshops, webinars and online interviews.
- Documentation of results: Word documents (deliverables), PDFs (publications), PowerPoint presentations, videos, awareness raising materials (various formats).
- Personal data: gender, age, socio-economic status, professional activity, residential region, education. Project's internal contact list (internal use only), ICBT contact list (internal use only) and other stakeholders contact list, will be accessible through the Sharepoint.

2.2. Re-use of existing data

The DISCO consortium will make use of existing data in a number of activities (see full list below).

Table 2 – Overview of re-used data

Task	Type of data	Related project (if present)
2.5	How to prepare the ground for PI-driven operation in urban logistics	URBANE, NOVELOG
2.1	PI-Led readiness results of cities	URBANE
2.1	Innovation readiness results of cities	SPROUT
2.2	Digital Maturity Assessment tool for the DISCO cities	SPROUT
5.2	Data needed for Barcelona LL	SENATOR
5.2	Data needed for Valencia LL	SPROUT
5.2	SPRO data for loading/unloading zones registration	B:SM
5.3	Data needed for Padua LL (collected data and tools supporting DISCollection)	SPROUT

The project partners are encouraged to make existing data available for research within the project.

Furthermore, DISCO leverages the most relevant European Union projects and initiatives within the urban logistics and mobility domains, with the aim of harnessing previous efforts to enhance the outcomes attained throughout the project. In the Table below the relationship with the other projects and the partners involved have been summarized.
Compared to the first version, the relationship with SENATOR has been removed for the moment because SENATOR deployment has been delayed and the data from the system suggested in the previous version is unlikely to be available for DISCO. A new assessment will be done in the third release of the DMP.

Table 3 – Projects relationship

Project	Relation with DISCO	Partners involved
SULPITER	DISCO will build on the training path and training sessions for PAs and guide them in the definition of a SULP at FUAs level. Freight quality partnership methodology dealing with specific topics on urban logistics will also be built upon. Guidelines and training sessions were released as SULP Guidelines at FUA level and will be useful in DISCO	ITL
NOVELOG	DISCO Meta Model Suite build upon the online CIVITAS Novelog Toolkit to support LL in their "to-be" status and objectives with a selection of measures to achieve them, while monitoring / evaluating progress and impacts during the LL implementation lifecycle; and upon YELLOW PAGES. It will support DISCO in incorporating UFT solutions in SUMPs by web implementation guidelines and answers to FAQs.	CERTH, ITL
URBANE	DISCO will learn from the URBANE Replication and Scale up Model for the wide and fast replication of successful PI-inspired green last mile solutions.	INLE, ITL, FIT, POLIS, CERTH
T-MAAS	Delivered Traffic Management-as-a-Service concept. The platform automatically monitors traffic & mobility giving operators and end users insight in mobility and notify them on relevant events 24/7. DISCO will rely on a truly	Be-Mobile

	flexible tool to manage traffic and communicate with citizens.	
TOKEN	DISCO will adopt the Dynamic Access Controller (software component) developed in Token, tested in a real-life city environment. In DISCO, the DAC will be elaborated for preplanning visibility of capability of last mile logistics and planned to be adopted by ecosystem in Ghent.	IMEC
FLEXCURB	DISCO will learn from this EIT UM funded project on how cites can adopt digital tools to enhance parking management and how urban vehicle access regulations and freight management can be integrated for smarter planning and improve street safety and land use, while delivery companies optimises L/U operations and better manage networks	FIT, POLIS
PARK4SUMP	DISCO will consider in its DISCO-X (especially in DISCOCURB) learnings on how parking can be integrated in broader urban mobility policy, under the umbrella of SUMP, increasing competences in parking management. DISCO will learn from the ParkPad auditing to review parking policies for consensus to be considered in SUMPs. E.g., DISCOCURB	POLIS, EPA
SPROUT	DISCO will utilize the Innovation Readiness tool developed in the SPROUT Project during Subtask 2.1.1. as knowledge acquisition technique to gather knowledge from the living labs	CERTH
ULaaDS	DISCO will learn from ULaaDS trials mainly in regards to on-demand urban logistics	RC

2.3. Data creation and origin

Data creation pertains to the generation of new data or the acquisition of existing data that is novel to the DISCO project (for instance, obtaining pre-existing datasets for project use). When a consortium partner serves as the originator of data (for example, through data collection, surveys, or studies), the partner bears the responsibility of appropriately storing, processing, and sharing this data. It is imperative to ensure that the data does not contain any personal information before disseminating it to other consortium members.
Existing data will be collected and shared by DISCO partners. Prior to utilization, data sets supplied to the project will undergo evaluation by each respective partner. Only data that is both technically and legally suitable will be incorporated into the DISCO project.
Personal data, or data sets encompassing personal information, retained by a consortium member will remain under the control of that specific consortium member. Such data will not be shared with other consortium members or external parties. In cases where processed data needs to be transferred from one partner to another, this transfer will be executed via secure means, utilizing a secure data channel, encrypted mode, or physical transfer to maintain data integrity and confidentiality.

2.4. Expected size of data

The project data volume will be continuously monitored during the project's lifetime. In specific cases, where several GBs of data can be expected from a single dataset (e.g. videos), only reduced in size and/or relevant data sets will be made available.

2.5. Data utility

A list of categories that could make use of the data extracted and collected throughout the project is presented below:

- City councils, city administrations, city administrators in charge of innovation tracks regarding logistics, city administrators in charge of SUMPs/SULPs.
- DISCO Consortium
- All stakeholders directly or indirectly involved in urban logistics, e.g. LSPs, integrators, express couriers, bike logistics couriers, crowd logistics platforms, transport companies, shippers, retail, local shop owners, construction companies, service companies, consumers, etc.
- European Commission
- The general public including the broader scientific community

3. Data Storage

At the beginning of DISCO, a secure environment to share data and documents has been made available by the Coordination team via Sharepoint which is a web-based collaborative platform that

integrates natively with Microsoft 365. Sharepoint serves as a powerful internal collaboration platform that facilitates seamless communication and knowledge sharing among all project partners. This centralized and secure environment enables real-time access to essential project documents, deliverables, and updates, promoting efficient teamwork and coordination. Project partners can easily collaborate on various tasks, working together on shared documents and files. Sharepoint's version control feature ensures that everyone is on the same page, mitigating the risk of conflicting changes. Furthermore, the platform allows for task assignment, progress tracking, and milestone management, enhancing project transparency and accountability. Additionally, the platform's integrated notification system ensures that relevant stakeholders stay informed about critical updates and developments.
Sharepoint is constantly backed up and secured using state of the art secure processes. Project partners' access to the DISCO shared secure environment has been set up via a 2-step authentication factor process. In the case of IT tool development, the development process might be done using the secure environment of the lead partner of the task, always using their usual high standard for securing access to data. Project partners involved in the respective task will be given access to the information required for the performance of the task with appropriate level of access. In this case, the data required for the development of the software tools might be collected by the respective Task leaders and Tool developers via their respective secure environments.
In any case, access to project documents or data collected and used as part of DISCO will only be granted to users with verified email addresses and belonging to the Consortium.

Sharepoint's user-friendly interface, combined with robust security measures, fosters a productive and secure working environment for all project contributors. Confidential data can be compartmentalized and accessed only by authorized personnel, ensuring data privacy and compliance with applicable regulations.

4. DISCO Data Management Plan (DMP) – FAIR principles

The FAIR Principles encompass a universal and quantifiable set of guidelines and practices applicable to a wide spectrum of scientific data or metadata. These principles place a particular focus on optimizing machine-driven data discovery and utilization while also supporting human reusability. The acronym "FAIR" represents the essential attributes of data or metadata: Findable, Accessible, Interoperable, and Reusable. The FAIR elements are interconnected yet independent, allowing for a gradual and modular implementation of the principles. As a result, they can be readily applied in diverse scenarios. Moreover, the FAIR Principles extend beyond data and are equally relevant for various assets requiring identification, description, discovery, and to be reused. They function as a general framework to assess the "FAIRness" of data within a project. Nonetheless, it is crucial to

emphasize that the FAIR principles do not serve as a strict standard or specification. Instead, they guide data processors in evaluating whether their implementation choices align with the notion of "FAIR". These principles serve as a foundational framework to ensure the long-term preservation of valuable digital assets, allowing research project data to be discovered, accessed, and reused by other researchers. It is essential to distinguish between FAIR data and Open data, as FAIRness does not inherently imply openness. While openness is encouraged by funding instruments like Horizon Europe, there may be valid reasons to limit access to certain data due to intellectual property rights, trade secrets, or other exploitation-related concerns. Nevertheless, the FAIR principles can still be applied to enhance the usability and value of such datasets, even in an organization's internal procedures.

The principle of "as open as possible, as closed as necessary" is recommended, suggesting that research data should default to openness but allow for flexibility based on varying degrees of openness. Embracing greater openness and adherence to "FAIRNESS" yields substantial benefits.

Consequently, research data produced under Horizon Europe or within the broader context of Open Science, as endorsed by Unesco[1], should adhere to the FAIR principles. In the subsequent sections, each of the four FAIR concepts is elaborated upon, along with how DISCO will meet the requirements of these principles.

4.1. Making data discoverable, including provisions for metadata

As per the DISCO Grant Agreement, it is essential to guarantee open access to research data. As a result, the FAIR principle encompasses scientific publications, research results (e.g., from surveys), dissemination materials, and digital research data.

In line with this objective, DISCO aims to achieve data findability by ensuring that all generated data is easily identifiable and readily discoverable. To accomplish this, the project partners will take steps to compile and openly deposit non-confidential data acquired throughout the project. These data sets will be made available in institutional repositories, the project website, and open repositories.

To enhance the discoverability of the datasets, they will be accompanied by comprehensive metadata. Additionally, the project will assign a unique and persistent Digital Object Identifier (DOI) to each dataset, further facilitating access and referencing.

4.2. Making data accessible

According to the DISCO Data Management Plan (DMP) policy, all raw or processed data from the project, along with relevant metadata, must be preserved and archived. Where applicable, this data will be openly accessible. The raw data collected from partners, following predefined specifications such as file format and fields, will be stored in a database facility and/or cloud environment that

[1] Unesco Recommendation on Open Science. 2021. https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en

provides semantically enabled storage. Access to this data will be available until the end of the project. For further details related to the European regulatory framework, please refer to D1.3.
To maintain consistency and flexibility, bibliographic metadata will use the Dublin Core standard (refer to section 6.2).
The consortium has implemented GDPR-compliant procedures to safeguard information over time, ensuring high-quality, long-term management, and maintenance of the datasets mentioned above. These procedures enable easy access, sharing, and interpretation of both active and archived information (refer to D1.3 Ethics, Gender and Inclusivity Guide v1 for full details). The content and format of the data will be regularly updated to ensure accessibility and reusability. In cases where long-term storage is necessary, the partner responsible for the datasets will specify the duration of data preservation.
Data generated and collected within the project that cannot be made publicly available will be stored and shared in a private Sharepoint, with access being restricted to authorized users. The Coordinator will grant access to this space, which will be exclusively accessible to Consortium Partners, serving the day-to-day project coordination and operations monitoring requirements securely and efficiently.
DISCO project deliverables, including project outcomes, will be accessible to partners through the project's common online collaborative tool (Sharepoint). Information related with these deliverables will be available by work package and task in a standardized format. Most of the data generated through the project, such as questionnaires, sensor data, software data, videos, images, audio files, and certain deliverables, will remain confidential and accessible only to Consortium members due to privacy and security concerns. Public project deliverables and executive summaries of non-public deliverables will be accessible on the project's official website and institutional repositories, ensuring the availability of documentation long after the project's completion. As the project progresses, Consortium partners, particularly data owners (LL leaders), will be encouraged to identify datasets suitable for public repositories and other institutional repositories.

4.3. Making data interoperable

Enhancing interoperability relies on the use of effective data exchange formats. Interoperability necessitates both data and metadata to be machine-readable and employ consistent terminology. For this reason, standardizing data exchange formats in extensive research projects becomes vital, especially when diverse research tools and instruments are utilized.
The consortium will ensure the adoption of interoperable standard formats, such as XML-based standards like JSON Schema, Dublin Core or MARCXML. These formats will facilitate data exchange and reusability among researchers, institutions, organizations, and countries. In pursuit of interdisciplinary interoperability, all datasets will adhere to the same data and metadata capture/creation standards. Data that can be openly accessed, like those found in public deliverables, articles, conference papers, etc., will be available in widely used formats, ensuring ease of use for stakeholders. Other types of data will be registered using internal codifications, clearly specified within the file.

Additionally, the DISCO partners will adhere to OpenAIRE guidelines for online interoperability, which can be found at: https://www.openaire.eu/horizon-europe-openaire-guides-for-researchers. DISCO will guarantee that research data produced during the project complies with the required interoperability standards by depositing project datasets in a data repository that aligns with the appropriate interoperability guidelines. Furthermore, sufficient metadata descriptions of these datasets, as mentioned earlier, will be provided. It is also worth mentioning that, as previously indicated in this chapter, metadata vocabularies, standards, and methodologies will be adjusted to foster interoperability.

4.4. Increase data re-use

Data re-use has become a distinctive characteristic of modern scientific practice. Data re-usability refers to the ease with which various research communities (consumer communities) can utilize data produced by other research communities (producer communities) for legitimate scientific research. Enabling data re-usability allows for evidence reanalysis, result verification and reproduction, reduction of duplicated efforts, and building upon others' work.
The DISCO Data Sharing process outlines how data is shared, including access procedures, technical dissemination mechanisms, and required software and tools to enhance re-usability. It also determines whether access is open to a broad audience or restricted to specific groups. Upon depositing datasets to the repository, the principle of “as open as possible, as closed as necessary” will be followed, ensuring data availability for re-use on the project website. The data will also be easily discoverable and reusable through the final depositing repository and OpenAIRE, no later than the project's conclusion. After the project ends, the data will remain re-usable for scientific and research purposes, without any access or time restrictions being imposed.
To adhere to GDPR guidelines, an analysis will be conducted for all shared data to determine the necessity of anonymizing specific fields. The confidentiality and integrity of the shared DISCO data will be safeguarded using secure encryption schemes that align with data governance requirements. An assessment will be made for shareable data sets intended for public use, identifying data suitable for the Open Research Data Pilot (ORDP). The release of data for public use is anticipated towards the project's conclusion. Publicly accessible or institutional repositories will be considered for storing project results and providing access to the scientific community. All public deliverables will be made accessible on the project website and through institutional repositories in a user-friendly manner.
The reusability of data depends on factors such as the level of privacy involved, and Intellectual Property Rights (IPR) associated with the data set or scientific publication. Each data owner will identify and impose specific restrictions, where applicable, considering privacy, intellectual property, or other exploitation-related aspects.

5. Open Science

Open science is a synonym of Open Access, which can be defined as the practice of providing on-line free of charge access to scientific information related to project outcomes, which results in free access to information for everyone. In the context of R&D "scientific information" mainly refers to:

- Peer-reviewed scientific research articles, if project results are going to be disseminated in academic journals
- Scientific research data, which includes any data related to project activities, processed or raw.

"Access" includes the right to read, download, print, copy, distribute, search, link, crawl and mine the former data, as long as obligations towards confidentiality, security and protection of personal data are ensured and the achievements of DISCO objectives, including the future exploitability of results, are not jeopardized.
Open access is not a requirement to publish, but it is seen by the European Commission as an approach to facilitate and improve the circulation of information in the European research area and beyond. Open access to EU funded projects' data is the key to reduce barriers to access publicly funded research, demonstrating and sharing the potential of research activities supported with the help of public funding.

5.1. Open Science in Model Grant Agreement

The European Commission gives importance to the open access issue, which is included in the DISCO Grant Agreement Annex 5 "Open science" paragraph. In the DISCO Grant Agreement, open access is defined as "Online access to research outputs provided free of charge to the end-user", while the "Approach to the scientific process based on open cooperative work, tools and diffusing knowledge" is defined as Open Science.
For the full description of the Open Science rules refer to the Annex 5 of the GA, which identifies the responsibilities of beneficiaries and the actions to be undertaken in order to ensure open access to scientific publications and to research data respectively.

5.2. Open Science Practice in DISCO

To ensure an open cooperative work approach, as well as the exchange of knowledge, methodologies, models and tools developed, the DISCO consortium will carry out different practices, following the HEU guidelines.
In line with the Horizon Europe open science policy, transparent and open practices will be implemented in the DISCO project, encouraging the use of the Open Research Europe (ORE)[2] publishing platform and the open repository for research objects. Moreover, whenever possible and

[2] https://open-research-europe.ec.europa.eu/about

in line with Horizon Europe Open Access guidelines, dissemination material, presentations, publications and research datasets, as well as public project reports will be made available through the project website.
To increase and support DISCO outputs dissemination and reproducibility:

- R&D partners (e.g. CERTH, INLE, KLU, etc.) will be available for interviews, to describe the models used for specific integrations/assessments in project activities;
- Open Day Visits will be organized at the LLs premises (already organized at the Starring LLs premises);
- DISCO will promote citizen and civil society end-usage as well as key stakeholders' engagement.

6. Scientific Publications

As reported in the DoA, a dissemination and communication plan (deliverable D7.1) has been set up in order to raise awareness on the project outcomes among specialized audience. In this framework, the consortium commits itself to perform publications in peer reviewed international journals, in order to make the outcomes available to the scientific community. The partners in charge of dissemination activities are responsible for the scientific publications as well as for the selection of the publishers considered as more relevant for the subject matter.
Fully in line with the rules laid down in the DISCO Grant Agreement and reported in section 2.2, each beneficiary will ensure open access to all peer reviewed scientific publications relating to its results. The project will make use of a mix of the two different possibilities for open access eligible by the project, namely:

- Open access publishing (without author processing charges): partners may opt for publishing directly in open access journals, i.e. journals which provide open access immediately, by default and without any charges;
- Self-archiving/"green" open access publishing: alternatively, beneficiaries may deposit the final peer reviewed article or manuscript in an online disciplinary, institutional or public repository of their choice, ensuring open access to the publication within a maximum of six months.

6.1. Selection of suitable publishers

Each publisher has its own policy on self-archiving (i.e., the act of the authors depositing a free copy of an electronic document online in order to provide open access to it). Since publishing conditions of some publishers might not comply with DISCO's open access requirements on the basis of the Grant Agreement, each partner in charge of dissemination activities will identify the most suitable repository.
Particularly, beneficiaries will not choose a repository which claims rights over deposited publications and precludes access. Thus, each beneficiary will evaluate if the identified journal and its article sharing policy can respect the Consortium Agreement in terms of Open Access.

6.2. Bibliographic metadata

As mentioned in the Grant Agreement, metadata for scientific peer reviewed publications must be provided. The purpose is to maximize the discoverability of publications and to ensure EU funding acknowledgment. The inclusion of information relating to EU funding as part of the bibliographic metadata is necessary also for adequate monitoring, production of statistics and assessment of the impact of Horizon Europe. All the following information must be included in the metadata associated to each DISCO publication. Information about the grant number, name and acronym of the action:

- European Union (EU);
- Horizon Europe (HEU);
- Innovation Action (IA);
- DISCO [Acronym];
- Grant Agreement: GA N. 101103954
- Publication Date
- Persistent identifier, if any, provided by the publisher (for example an ISSN number).

7. Allocation of resources

The expenses associated with FAIR data management have been anticipated and accounted for by the partners as part of their internal procedures. Should there be any supplementary costs related to this process, each respective partner will take responsibility for covering them. As of the submission of this document, no additional costs are anticipated.

Table 4 – Data Management Costs

Cost Type	Cost Allocation according to DoA
Cost for storage, backup, archiving and sharing that is realized mainly through the Sharepoint for project coordination and management	WP1
Costs of storage for data that will be managed during the LL implementation	Appointed to WP2, WP3, WP4, WP5, each partner is responsible for the component to be deployed in real life.
Data management cost for the dissemination and communication activities	WP1, WP7

Costs related to the data management and publication after the end of the project	Covered by the internal processes and own resources of each responsible partner

Furthermore, according to GDRP each partner will allocate a Data Protection Officer for the collection and any action needed for the handling of personal data.
It should be noted that FIT will be the accountable partner for providing guidance on data management policies. Each DISCO consortium partner, however, will be solely responsible for ensuring that the guidelines outlined in the current document are followed.

7.1. Roles and Responsibilities

WP1 *Project Management and Coordination* is the work package in which the process for data management has been created and will be monitored to ensure compliance with data management decisions as they relate to the DMP. The following summarizes the DMP roles and responsibilities in DISCO.

Table 5 – Data Management Roles and Responsibilities

Title	Role	Organisation
WP1 Leader	Responsible for preparing the Data Management Plan and policies and providing guidance as necessary	FIT
Data Controller	Responsible for reviewing the Data Management Plan and policies and should be aware of their responsibilities to comply with the GDPR and other applicable regulations.	Each partner within DISCO that is responsible for processing Personal Data in accordance with the GDPR

7.2. Data security

All processed and shared data will be securely stored in designated environments. If there is a need to transfer processed data from one partner to another, ideally, this will be carried out securely via the DISCO Sharepoint platform. DISCO is committed in taking all essential precautions to safeguard data, products, and services against unauthorized use, while also ensuring secure access to data.
The primary responsibility for ensuring data security lies with each individual partner. Access to secured data and information will be provided through login systems. DISCO will also take the

necessary steps to comply with EU regulations concerning the protection of personal data, including GDPR, and will promote openness and data sharing, as well as good practices, whenever possible.

8. Conclusions

This DMP provides an overview of the data that will be produced and treated in DISCO during its project lifetime. The related legal and ethical data processes and requirements that need to be taken in consideration are included in *D1.3 Ethics, Gender and Inclusivity Guide v1* submitted at M4 (an additional release is foreseen at M40).

Additionally, the DMP provides an overview of the types of datasets that will be produced, along with defining a set of attributes to describe each dataset. These descriptions encompass methodologies, sharing, and storage procedures. The most sensitive datasets are anticipated to be generated in WP2, WP3, WP4, and WP5. Measures will be implemented to ensure that data deemed sensitive and confidential remain secure and are exclusively used to draw conclusions in an iterative process (WP2 and WP3) and assess their impact (WP4 and WP5). This is essential to maximize the integration of DISCO into the existing SULP processes of participating cities (WP2, WP4, WP5) and to foster public awareness, dissemination, and exploitation of DISCO in other cities across Europe (WP6 and WP7).

To facilitate the efficient management and exchange of data, the DISCO Sharepoint was selected as the central repository for storing project data. This Sharepoint serves as the anchor point for data exchange and storage. The system's performance is ensured by clear instructions on naming, storage, and metadata provided in this document, as well as in *D1.1 Quality assurance & risk management v1* and *D1.2 Project Management Handbook*. FIT will conduct maintenance tasks to further enhance the repository's functionality. This approach contributes to making data within the project FAIR, as described in Chapter 4.