



TransformAr

Accelerating and upscaling transformational adaptation in
Europe: demonstration of water-related innovation
packages

Data Management Plan

Deliverable 8.6

(Epsilon Malta Ltd)



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EXECUTIVE SUMMARY

Focus of this Deliverable

The D8.6 – Data Management Plan (DMP) is the first update of a living document, intended to describe the data management life cycle for all datasets that will be collected, processed or generated by TransformAr.

Deliverable contents

TransformAr deals with many types of data and datasets generated or aggregated throughout its various activities. These types of data and datasets will be made available, in line with the guidelines for the Extended Pilot on Open Research Data in Horizon 2020 (European Commission, Directorate-General for Research & Innovation, 2016). The DMP also includes the dataset metadata specification that will be used in the data registry, following the above-mentioned appropriate relevant standard. It specifies the recommended licensing schemes as suggested by H2020. In this first updated version of the DMP, both existing and planned data sets are described.

Conclusions and recommendations

The TransformAr DMP as depicted in D8.6 constitutes the basic tool that is going to manage data in the TransformAr project until M36, when it will be updated for the last time (D8.7) to be used until the project's completion.

1.0 Introduction

TransformAr participates in the EU Extended Open Research Data Pilot and as such it follows a Data Management Plan (DMP) which is updated as scheduled. This is the first update (D8.6) as a result of the work invested from the partners from March 2022 (M6) to March 2023 (M18). Open access to research data refers to the right to access and re-use digital research data under the terms and conditions set out in the Grant Agreement. Openly accessible research data can typically be accessed, mined, exploited, reproduced and disseminated under defined and clearly specified terms and conditions (either free of charge or at a cost for the user).

The DMP is a living document; it evolves and gains more precision and substance during the lifespan of the project.

This first update of the DMP (D8.6) is delivered at month M18 of the project. As the project evolves, a second update (D8.7) is planned at M36.

2.0 Data summary

2.1 Purpose of the data collected and generated

The overall objective of TransformAr is to demonstrate solutions and pathways, deemed essential for climate and social resilience, to achieve rapid and far-reaching Transformational Adaptation (TA). Innovation Packages (IPs), as the combination of Transformational Adaptation Blocks (TABs) and actionable adaptive solutions, are co-developed and demonstrated. Region-Specific Portfolios (RSPs) include Nature-Based Solutions, innovative technologies, financing, insurance and governance models, awareness, and behavioral change solutions.

The project objectives associated with data collection/generation are depicted in the following table:

Table 2.1: Project Objectives (PO) with related dataset collection/generation

Project Objectives	Dataset collection/generation
<p>PO1. To demonstrate the potential of co-innovation processes for Transformational Adaptation (TA) at sub-national demonstrator sites and at EU scale. The demonstration of an innovation ecosystem in demonstrators and a Community of Practice at EU scale, aims to create shared ownership of solutions and to increase joint decision-making towards systemic change.</p>	<p>The data is collected through literature review for all the demonstrators and can be used by all the TransformAr partners to understand the characteristics of the selected demonstrators. The data is going to be retrieved through a desktop review of policy and workshops with key local stakeholders.</p>
<p>PO2. To deliver user-friendly, accessible, and comprehensive multi-sector dynamics data services relevant to Transformational Adaptation (TA) and its water-related challenges, and fit to the needs of public and private investors, including citizens in TA in the EU Green Deal context.</p>	<p>Weather and climate simulation data are produced for different scenarios and the data conclude with hydrological, weather, hydrodynamic model outputs, post-processed climate model outputs, and environmental data from public repositories. The usable data on the impacts of the transformational adaption on the labor market, activity growth, and inter-industrial spillovers are accessible and prioritize the EU vulnerable regions, sectors, and communities.</p>
<p>PO3. To develop sub-national transformational pathways that maximize environmental and multi-sector socio-economic benefits and minimize climate-risk losses, in view of co-defined quantitative targets on Climate Change Adaptation (CCA).</p>	<p>The data is collected through a literature review shedding the light on current and emerging best adaption technologies and practices in Knowledge-Centered-Support (KCS), addressed by existing practices in Europe and worldwide. The data could be used by TransformAr partners to determine adaption solutions. The development of a shared vision and socio-economic pathways of a climate-resilient future is presented in the form of a playbook tool and a report presenting adaptation pathways, guidance, methods, and processes considering critical thresholds.</p>
<p>PO4. To test the potential of specific innovations to enable rapid and far-reaching change in the resilience of demonstrators.</p>	<p>Objective P04 aims to generate quantitative tabular data with extensive metadata. Raw and published data (water quality, landcover, crop type, and pollution incidents) are collected. Covered solutions are Nature-Based Solutions, innovative technologies, financing, insurance and governance models, awareness, and behavioral change.</p>
<p>PO5. To accelerate investment for TA across the EU, by means of demonstrating bankability and innovative financial schemes.</p>	<p>The data derived from the University of Antwerp for WP5 is dependent on the demonstrators and once collected they are processed. The report covers sustainability profiles, reporting, and ex-post assessment of the solutions report and is going to be reproduced by data mining from other WPs.</p>
<p>PO6. To consolidate a catalogue of solutions and Innovation Packages (IPs), associated guidance documents, and an understanding of the acceptance and preference of citizens, of solutions for transformational adaptation.</p>	<p>The data is based on the discrete choice experiments which are conducted in the demonstrator sites. Field experiments are also conducted, and the raw data is analyzed, for the project to also transfer the analysis of costs and benefits of adaptive solutions where necessary. Innovation Packages (IPs) are exploited for a large upscaling and feeding of the growing adaptation market.</p>

2.2 Types and formats of data the project generates/collects

Table 2.2: Datasets collected/generated through TransformAr

Work Package	Datasets	Type	Format
WP1	Literature reviews for geographic, demographic, economic, climate vulnerabilities, impacts, projections, governance system, adaptation response measures, key stakeholders	Qualitative text, quantitative tabular	Word doc./PDF, SPSS,.xlsx,.csv, JPEG
WP2	Observation & Simulation Hydrological, weather, Hydrodynamic model output, climate model output, environmental, water consumption, biophysical, socio-economic	Quantitative, socio-economic	netcdf, tiff/ESRI, Word doc./PDF, HTML, xml,.mdb,.csv,.tab, .xlsx,.dbf,.shp,.tif, JPEG,.csv,
WP3	Literature review, socio-economic, Return on Assets (ROA) approach development for project prioritization of TA solutions for socio-economic impact assessment	Socio-economic, Text	SPSS, Word doc./PDF, ppt, .html,.csv,.tab, .xlsx, .dbf, .shp, .png, netcdf or .tiff, JPEG
WP4	Numerical, digital image, and geospatial data both observational (oceanographic and biophysical for the mussel culture) and from simulations (Delft3d model),	Quantitative tabular, Qualitative text, Geospatial, Digital image/audio/video data, Documentation & scripts, Socio-economic, vector & raster, api, Biophysical.	SPSS, STATA, SAS,ddi, .xml, .mdb, .csv, .tab, xls/.xlsx, .dbf, .ods, .shp, .shx, .prj,.sbx, .sbn, .tiff, .dwg, .odt .rtf, .txt, .doc/.docx, .htm/.html, JPEG/JPEG2000, .pdf, ppt, json,
WP5	UA & existing data & collected from other WPs and demonstrators	Quantitative tabular, Qualitative text	.csv, .xlsx, .shp, .tif, Word doc., PDF, PPT, JPEG
WP6	Experimental data (9000 observations)	Quantitative tabular, Text	SPSS, .csv, .tab, .xlsx, .rtf, doc., .html, JPEG, PDF
WP7	Retrieve data through a review of policy, literature, and workshops Data for dissemination (digital video, image)	Qualitative text	.csv, .xlsx, Word doc., .html, JPEG, PPT, PDF, .mp3, .mp4
WP8	Data from UA	Qualitative text	.csv, Word doc., JPEG, PDF, PPT

2.3 Reuse of any existing data and how

TransformAr uses and reuses existing data where needed throughout the project life. Existing data is used in various tasks and can be integrated with new data where appropriate. In such cases references to authors and institutions are made available. Table 2.3 below shows datasets (including literature/journals) used or intended to be used:

Table 2.3: Datasets collected/generated through TransformAr

WP (Task)	Type
WP1 (T1.1)	Literature review and data collected
WP2	Raw data from model/observation /20- 30 GB generated in first 24 months, public/commercial datasets/depending on the number of demonstrators that are not covered by Copernicus data the size may surpass 1TB

WP3 (T3.1)	Literature review (scientific & grey), public/commercial datasets
WP3 (T3.2)	Site specific data retrieved from workshops with key stakeholders
WP3 (T3.5)	Retrieved from workshops
WP3 (T3.6)	Retrieved from workshops & Literature review
WP4	Raw, processed analysed and published data (water quality & quantity, soil quality, landcover, crop type, pollution incidents) / data generated will not be large (7GB/month) /measurement data and information from technical sensors, written reports (inc. graphs & photos)
WP5	Raw, processed analysed and published data of demonstrators
WP6	Raw and published data/9000 individual responses for 50 to 100 variables in 6 demonstration sites. Lesson learnt management tool development by ADEME to classify the difficulties encountered (legal, organizational, technical, financial, environmental) during the project
WP7 (T7.1)	Literature review (technical & grey) and collected data (200-500 entries), workshops with key stakeholders
WP8	UA data

- What is the origin of the data?
- What is the expected size of the data?
- To whom might it be useful (“data utility”)?

Answers to the above questions are integrated in [Table 2.4](#):

Table 2.4: Origin, size, data utility of datasets generated

Dataset	Origin	Expected size	Data utility
WP1(T1.1)	Reuse of existing data	Word doc. 18 MB	Researchers, decision makers, other actors, public
WP2	EUROSTAT, National Statistics, GTAP database, EU Copernicus Service, ESA, Weather and climate simulation data Hydrological, environmental	May surpass 1 TB netcdf, tiff/ESRI 20-30 GB	Researchers performing socio-economic analysis, technical personnel supporting policymakers
WP3 (T3.1)	Reuse of existing data	a few MB	TransformAr partners, policy makers, performing organization, public, researchers
WP3 (T3.2)	EUROSTAT, National Statistics, GTAP database, Site-specific data	a few MB	Decision makers, TransformAr partners, parties working on resilience of systems to climate events
WP3 (T3.5)	Data retrieved from workshops	a few MB	Decision makers, local authorities
WP3 (T3.6)	Data retrieved from workshops and literature review	a few MB	Decision makers, governments, parties working on resilience of systems to climate events
WP4	Observational biophysical dataset for the mussel	a few MB up to 7 GB/month per experiment	Researchers, TransformAr partners,

	culture, sediment dynamin simulations, data retrieved from IoT sensors		parties working on resilience of systems to climate events & Decision Makers
WP5	Data from UA	a few MB	Decision makers, governments, parties working on resilience of systems to climate events
WP6	1500 members of the public in each of 6 sites will participate in these generating choice and public acceptance data	a few MB	Discrete Choice Experiment (DCE) to develop IPR strategy & business model of solutions for decision makers
WP7 (T7.1)	Retrieve data through a desktop review of policy, technical and grey literature, and workshops with key stakeholders	5-10 MB	Decision makers, governments, parties working on resilience of systems to climate events
WP8	Data from UA	a few MB	N/A

3.0 FAIR Data

3.1 Making data findable, including provisions for metadata

The project is a core contributor to the European Open Science Cloud. As such TransformAr not only provides FAIR data where applicable (data is “as open as possible and as close as necessary”) but also supports the community in the uptake of research data sharing and practices, in alignment with FAIR principles. The following table provides information for making TransformAr data findable, including provisions for metadata to promote reuse.

Table 3.1: Findable data including provisions for metadata

Is the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g., persistent and unique identifiers such as Digital Object Identifiers (DOI))?	YES – DOI, unique and persistent URL. Collected services' information is available at the dedicated portfolio/catalogue system URL. Other aspects of the persistent identifiers can be implemented by periodical snapshots of the database that contains the data.
What naming conventions do you follow?	TransformAr-[WP]-[Deliverable]-[title]-[ver]-[day]-[month]-[year].[ext]
Are search keywords going to be provided that optimize possibilities for reuse?	YES - No report to the contrary so far.
Do you provide clear version numbers?	YES – accessed with unique and persistent URL
What metadata is created? In case metadata standards do not exist in your discipline, please outline what type of metadata are created and how.	Metadata for General Research Data will follow the Dublin Core and Data-Cite Metadata Schema. e.g., For WP3 the following metadata is provided: title, subtitles, executive summary, graphs (adaptation pathways), figures, tables, references.

3.2 Making data openly accessible

By default, TransformAr openly provides data produced following the principle “as open as possible, as closed as necessary”, to comply with ethical or security requirements and avoid related conflicting issues. The following table summarizes current considerations.

Table 3.2: Provisions for openly accessible data

Which data produced and/or used in the project is made openly available as the default? If certain datasets cannot be shared (or need to be shared under restrictions), explain why, clearly separating legal and contractual reasons from voluntary restrictions.	Anonymized WP6 survey data and WP1 Stakeholders data. Anonymized WP3 Training Capacity data tool repository, IPR tool repository, TransformAr datasets: A predefined portion of all available metadata is openly accessible, while authorization is needed for full access.
How is the data made accessible (e.g., by deposition in a repository)?	Zenodo for all other datasets. TransformAr data is made available for human and machine access through the projects' service portfolio/catalogue system.
What methods or software tools are needed to access the data?	WP1 – Survey dataset can be accessed with Microsoft Excel or similar open office tools. Other TransformAr Datasets: The project deploys and hosts a service portfolio/catalogue system that provides full human and machine access to the database that stores information about regional services. Datasets for the software tools require text editors and pdf viewers.
Is documentation about the software needed to access the data included?	NO, unless an open-source alternative is not provided – many software choices are available online.
Where is the data and associated metadata, documentation and code be deposited?	Dedicated repository is Zenodo. Temporary repositories used to date are: MS TEAMS/365/OneDrive/SharePoint, INVESTIGO).
Have you explored appropriate arrangements with the identified repository?	Pending is the final decision for Zenodo, if all partners agree, because the repositories used so far are not sufficiently interoperable.
If there are restrictions on use, how is access going to be provided?	So far, no partner has reported any problem associated with GDPR issues which are the most sensitive.
Are there well described conditions for access (i.e., a machine-readable license)?	Conditions for access are going to be described once the access policies are finalized.
How is the identity of the person accessing the data ascertained?	Project's AAI integrated with the edu GAIN federation.

3.3 Making data interoperable

Table 3.3: TransformAr provisions for making data interoperable

Are the data produced in the project interoperable, allowing data exchange and reuse between researchers, institutions, organizations, countries, etc. (i.e., adhering to standards for formats, as much as possible compliant with available (open) software applications, and in particular facilitating re-combinations with different datasets from different origins)?	Yes, metadata interoperability is ensured by following metadata standards. Widely used standard formats and protocols such as OAI-PMH and .odf, ensure datasets exchange and reusability between researchers.
What data and metadata vocabularies, standards or methodologies do you follow to make your data interoperable?	Standard vocabularies are used, such as the ASIS&T Thesaurus of Information Science, Technology, & Librarianship.

	For Stakeholders datasets, the standardized vocabulary EU Country Named Authority List (https://data.europa.eu/euodp/en/data/data/aset/country) is used.
Are you using standard vocabularies for all data types present in your data set, to allow inter-disciplinary interoperability?	Yes, although it may evolve dynamically during the project lifetime to ensure an ontology alignment within the EOSC.
In case it is unavoidable that you use uncommon or generate project specific ontologies or vocabularies, are you providing mappings to more commonly used ontologies?	YES, if uncommon or project-specific ontologies or vocabularies are used.

3.4 Increase data re-use (through clarifying licences)

Table 3.4: TransformAr data licenses and provisions for data re-use.

How the data is going to be licensed to permit the widest re-use possible?	Probably one of the Creative Commons license options, but this will be decided when a full picture of the data is available. The license for each dataset will be one providing the widest re-use possible. For software, Apache, or GNU. More information will be specified in the following DMP version.
When the data is going to be made available for re-use? If an embargo is sought to give time to publish or seek patents, specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.	The data will be made available for re-use as soon as the final/publishable version of the data is available.
Is the data produced and/or used in the project useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why.	This will also be made clear as soon as there is a good view of the datasets achieved.
How long is it intended that the data remains re-usable?	Data is intended to remain reusable for as long as it is allowed by project resources and infrastructure. This is going to be reviewed as the project progresses. TransformAr services data is going to be integrated into the EOSC portfolio system, which is going to ensure the reuse of collected information.
Are data quality assurance processes described?	Processes are not described, but effort is put into providing quality data. The following data quality is provided for metadata: accuracy, relevance, and consistency for the Stakeholders and Survey datasets.

4.0 Allocation of resources

Table 4.1: Resources for data management under FAIR

What are the costs for making data FAIR in your project?	Minimal as reported to date by most partners.
How are these costs going to be covered? Note that costs related to open access to research data are eligible as part of the Horizon 2020 grant (if compliant with the Grant Agreement conditions).	Expected to be covered by the project budget itself as some Person Months (PMs) have been allocated to UA, EPSILON and EQY for this purpose.

Who is responsible for the data management in the project?	Project Coordinator and EPSILON for drafting and updating the DMP.
Are the resources for long term preservation discussed (costs and potential value, who decides and how what data is kept and for how long)?	Resources for long-term preservation must now be discussed. Need to consider the articulation with the Mission Implementation Platform, Climate-ADAPT, or another platform identified by REGILIENCE.

5.0 Data security

Table 5.1: Data security provisions in TransformAr

What provisions are in place for data security (including data recovery as well as secure storage and transfer of sensitive data)?	Data collected/generated are stored in a TransformAr cloud workspace such as TEAMS, where every file stored is maintained and encrypted using AES 256-bit encryption in geographically diverse areas. HTTPS protocol is used for secure communication between endpoints as a standard. It is the usual HTTP that runs on top of encrypted sockets (SSL/TLS) on the transport layer of the network stack (TCP/IP). However, data must be moved to Zenodo repositories to maximize interoperability and for long-term preservation and curation,
Is the data safely stored in certified repositories for long term preservation and curation?	YES – For the Zenodo repositories all files uploaded to Zendon are stored in CERN’s EOS service in an 18 petabytes disk cluster. Each file copy has two replicas located on different disk servers. For each file, they store two independent MD5 checksums. One checksum is stored by Invenio, used to detect changes to files made from outside of Invenio. The other checksum stored by EOS, is used for the automatic detection and recovery of file corruption on disks. For TransformAr services data periodical database snapshots are made and stored independently.

6.0 Ethical aspects

Table 6.1: Ethical aspects related to data sharing in TransformAr

Are there any ethical or legal issues that can have an impact on data sharing? These can also be discussed in the context of the ethics review. If relevant, include references to ethics deliverables and ethics chapter in the Description of the Action (DoA).	No ethical or legal issues foreseen or reported so far from partners for any of the generated datasets.
Is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data?	YES – TransformAr is requesting compliance for collection and reuse of data. WP6 surveys include a full Privacy Policy for the protection of natural persons, concerning the processing of personal data and on the free movement of such data (GDPR). This Privacy Policy describes the procedures in place by TransformAr to protect the privacy of users, how the confidentiality of such information is ensured, laws, rights of data subjects and a communication path for further clarifications, should there be needed.

7.0 Other issues

Do you make use of other national/funder/sectorial/ departmental procedures for data management? If yes, which ones?

- No Partner so far reported any use of these categories of funds.

8.0 Conclusion/Recommendation

This deliverable is the first update of the TransformAr Data Management Plan (DMP) - D8.6 and contains the initial and updated descriptions of datasets collected/generated so far (M18) for the project. The described datasets of value for the project, are going to be exploited by the different tasks through the course of the project. The current document is updated as the list of datasets is enriched with new information or datasets concerning datasets use, sharing, preservation and dissemination aspects, which must be specified in all cases. Similar updated information is going to be included in the final version of the DMP (D8.7) at M36.

It is strongly recommended to use the Zenodo repository for the storage of all work created so far, along with what is still expected, to avoid the multiple use of repositories used by the partners up to date and to safeguard storage in a highly certified repository for maximum interoperability and long-term preservation and curation.

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RDA | Metadata Directory. (2021, December 01). Retrieved from CERIF (Common European Research Information Format): <http://rd-alliance.github.io/metadata-directory/standards/cerif.html>

Regulation (EU)2016/679 of the European Parliament and of the Council dated 27 April 2016

Repealing Directive 95/46/EC (General Data Protection Regulation)



Climate change impacts are here and now. The impacts on people, prosperity and planet are already pervasive but unevenly distributed, as stated in the new EU Blueprint strategy (European Commission-EC, 2019). To reduce climate-related risks, the EC and the IPCC agree that transformational adaptation is essential. The TransformAr project aims to develop and demonstrate products and services to launch and accelerate large-scale and disruptive adaptive process for transformational adaptation in vulnerable regions and communities across Europe.

The six (6) TransformAr lighthouse demonstrators face a common challenge: water-related risks and impacts of climate change. Based on existing successful initiatives, the project aims to develop, test and demonstrate solutions and pathways, integrated in Innovation Packages, in six (6) territories.

Transformational pathways, including an integrated risk assessment approach are co-developed by means of nine (9) Transformational Adaptive Blocks. A set of twenty-two (22) tested actionable adaptive solutions are tested and demonstrated, ranging from nature-based solutions, innovative technologies, financing, insurance and governance models, awareness and behavioral change solutions.



TransformAr



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