

D7.2 – First version of the Data Management Plan

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D7.2 – First version of the Data Management Plan (DMP)

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Glossary:

Acronym	Full name
DMP	Data Management Plan
PQMP	Project Quality Management Plan
IP	Intellectual property
DPO	Data Project officer
EC	European Commission

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Executive Summary

The "Data Management Plan" (D7.2) presents the strategy for managing data within the INITIATE project, developed under Work Package 7 focusing on project management. Its primary goal is to establish effective mechanisms for handling research data throughout and beyond the project's duration. It outlines a preliminary strategy for managing data generated and utilized within INITIATE, covering procedures for research data management, dataset descriptions, and scientific publication data management.

Moreover, the plan emphasizes ensuring stakeholders privacy throughout the project by securing data, especially personal data, from inadvertent release or publication, thereby promoting compliance with legal requirements for data protection. The consortium expects all involved parties to implement secure practices in data collection and usage processes, fostering transparency in all research activities within INITIATE.

The data management policy adheres fully to open access principles established by the European Commission through the Grant Agreement, ensuring that project data is handled and shared in a manner that promotes openness and accessibility.

It is important to note that this Data Management Plan is a living document, subject to updates and changes. Any future updates or modifications to the INITIATE data management policy will be included in the periodic reports or specified in deliverables related to specific project tasks. This deliverable, D7.2, will be continuously updated and improved throughout the project's duration. In M21, a Mid-Term version of the Data Management Plan (D7.3) will be prepared, providing an updated overview and any necessary revisions. In M42, a Final version of the Data Management Plan (D7.4) will be prepared, which will extend and enhance the information provided in this document. It may also include new datasets that were not identified in the present version.

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1. Introduction

1.1. Objectives

The Data Management Plan (DMP) outlines the project's comprehensive plan regarding data requirements and an ethic handling of data. Its goal is to ensure that all consortium partners involved in collecting and utilizing data from external sources can implement the correct procedures to safeguard data integrity and comply with any legal requirements, such as the GDPR. Additionally, it emphasizes handling data in line with the FAIR (Findability, Accessibility, Interoperability, Reusability) principles following ethical approach and considers the importance of open access to research data.

1.2. Structure of the document

The deliverable is split in the different stages of handling the data collected in the pilot sites, namely the generation, use, processing, curation, and preservation of data. All stages are defined in accordance with EU regulation and are followed by the consortium during the project lifetime.
The deliverable is structured in the following chapters:

- Chapter 2 – Data Management Plan – Details all the information required to ensure the privacy and confidentiality of the data collected and used in the project.
- Chapter 3 – Open Science practices – Open access concepts overview and its implementation in the INITIATE project.
- Chapter 4 – Ethics Management Plan – Highlights ethical methods that should be put into practice in the consortium to mitigate bias and misinformation, and to promote privacy and anonymity
- Chapter 5 – Data and Ethics Governance – Provides the roles and responsibilities of the structure that will be put in place to implement and oversee the practices defined in the DMP.

1.3. Relation to other tasks

D7.2 is a part of the Project Management work package and was firstly mentioned in the D7.1 – Project Quality Management Plan (PQMP). D7.2 will assure that data requirements are, firstly, defined and, afterwards, respected during the whole project, encompassing all data stages: creation, use and processing. It will provide details on the data that the project will monitor and generate, how it will be used (by who and for how long), and how it will be curated and preserved – In line with EC rules, specifically the GDPR. The DMP will be a dynamic tool that is updated regularly throughout the project duration. This plan will cover the handling of data during and after

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the project lifetime, the rules for collecting, processing, using, and generating data and the standards to be applied.

2. Data management plan

2.1. Data summary

Activities related to data collection will begin with the development of the state-of-the-art, with the gathering of already existing data from various previous projects and relevant websites. Starting with a study of the projects in which R&I databases and models have been or will be produced, the process will proceed. The literature, databases of earlier R&I projects and models will be used to gather data.

The wishes, needs and recommendations of the involved stakeholders who are involved or planning to-be-involved in the creation of groups of R&I experts in green transformation will be one of the first steps in data collection process. The data on markets; regulatory, administrative, and legal support; infrastructure aspects; methods and technical and financial tools, will be listed and characterized. The data on a societal level will be collected through a questionnaire to identify the values and needs of communities and experts, with the help of the value-based proposition design approach. The value(s) of the experts and communities would be initial data collected for the development of the project Knowledge Base.

Technical requirements and limitations, as well as the interconnections among INITIATE solutions and data communication, are carefully considered. T2.2 will define a clear set of parameters in which the algorithms, methods and platforms should follow based on expert inputs and needs. This output (D2.1) will in turn be used as a guideline for the development of technical solutions in WP3, and the policy recommendations in WP4, their demonstration and validation in the pilot sites (WP5) and their impact assessment (WP6).

The design and creation of a database for the demonstration of INITIATE solutions will be the focus of T2.3 activity. The database will be populated with relevant sectoral data (produced in T2.1), enabling the models to be executed in accordance with the specified time step for future evaluation. Numerous sources will be used for providing sectoral data that will fill the INITIATE Knowledge Base (KER 7). This database will serve as a repository containing all the information required for INITIATE approach implementation in a consultable way also including an interface with relevant data. Every time sensitive information is taken into consideration, the GDPR regulations are strictly adhered to. The INITIATE database will be easy to search and modify which will make it easy to implement a

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Knowledge Base. The database will also include different sectors, thus enabling the representation of social, economic, environmental, and technical parameters.

Data types and formats can be divided in several categories. Project deliverables and reports, or other document type will be shared and stored in Microsoft Word (.docx) and PDF (.pdf) formats. Project surveys and questionnaires will be developed and shared as google docs and stored as Microsoft Word (.docx) and PDF (.pdf) formats. Visual presentations will be supported by Microsoft PowerPoint (.pptx) or PDF (.pdf) formats. Data repositories and data acquisition files represented in the form of tabular data will be stored in Microsoft Excel (.xlsx), Comma Separated Values (.csv) or as DAT file (.dat). Dissemination materials, such as images, graphics, videos, etc., will be stored as TIFF (.tif), JPEG(.jpg), PNG(.png), INDD (.indd), PDF (.pdf) and MPEG-4 (.mp4). Audio files will be added as Free Lossless Audio Codec (FLAC) (.flac) or mpeg-4 format. The expected data size is not yet possible to define since there is no previous database in which the prediction of data size can be modelled upon.

2.2. FAIR data

The Data Management Plan (DMP) follows the EU guidelines and describes the data management procedures according to the FAIR (Findability, Accessibility, Interoperability, and Reusability) principles, which emphasize the capacity of computational systems to find, access, interoperate, and reuse data with none or minimal human intervention. INITIATE project is creating a INITIATE Knowledge Base. The Knowledge Base (KER 2), with its technical, financial, environmental, social, and legal sets of information, will be used not only by all pilots, but also by other stakeholders that the consortium will reach, namely the Stakeholder Group who have already expressed interest in the project and sister projects. UNIZAG FSB will keep a close contact with all involved stakeholders and policy-led tasks (T4.3, T4.4), ensuring that the Knowledge Base is constantly updated with relevant information to be a tool to support energy sector R&I development through higher institution transformation. Furthermore, R&I (social, economic, environmental and legal) data from the pilots will be gathered to feed the tools of the INITIATE online tool. Regarding these data, the following sections explain how it will be ensured that the different datasets defined in section 3.1 will comply with the FAIR data principles.

2.2.1. Making data findable, including provisions for metadata

Metadata and data should be easy to find, and to facilitate this process, INITIATE will describe the datasets defined in section 2.1 by promoting a consistent naming convention, clear versioning, and an intuitive organization of the repository.

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For proper management and usage of the datasets listed in section 2.1, INITIATE will describe them with metadata that provides detailed information about the available data, including specific variables and covering the 5Vs of big data (volume, value, variety, velocity, and veracity). All aspects involving data acquisition and format will be defined in deliverable D2.2, titled "INITIATE Database and web-based Investment advisor," which is due for submission in M19.

Regarding the management of files generated by the partners during the project activities, a SharePoint channel will be created and managed by the project coordinator. This SharePoint will follow the work breakdown structure presented in the Grant Agreement (WPs, Tasks, and Deliverables) and will include five additional folders:

- Contractual Documents: Grant Agreement and Consortium Agreement (.pdf format).
- Meetings and Workshops: Divided into subfolders for each WP, containing documents for every meeting related to the respective WP.
- Templates and Graphics: For uniform work among the Consortium partners, with presentations (.pptx) and deliverables (.docx) templates.
- Deliverables: For keeping all deliverables at one folder.
- Dissemination activities and events: A special folder for recording past events and defining plan for future events.

Additionally, there will be a restricted file containing contact information for all project participants, named "Mailing List." Figure 1 shows the organization of the INITIATE SharePoint.

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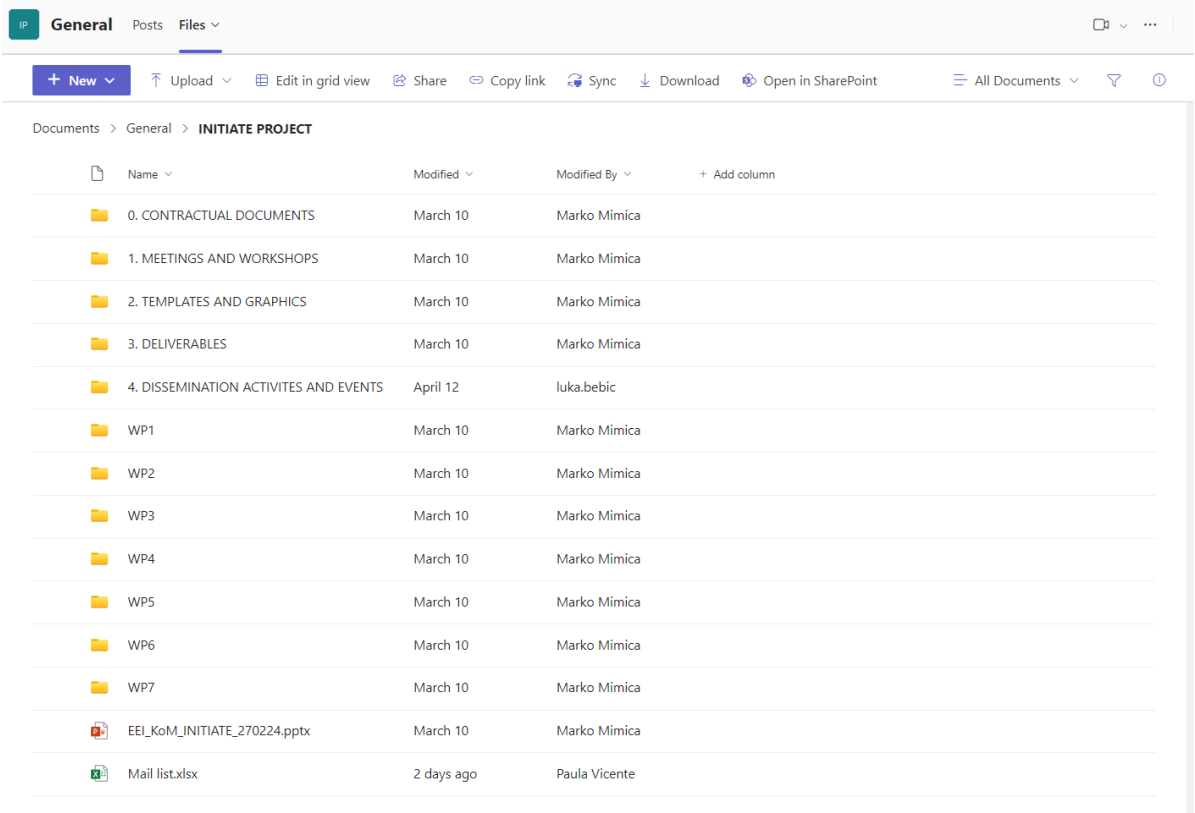


Figure 1 – INITIATE SharePoint

2.2.2. Making data accessible

Datasets tend to degrade or disappear over time because there is a cost to maintaining an online presence for data resources. Therefore, data accessibility involves ensuring long-term storage that allows for easy access and downloading. This is achieved by implementing clear licenses and access conditions, both at the metadata level and for the actual data content.

The data acquired from the pilots, which will feed the tools inside the INITIATE Database, are not yet fully defined. The final list of datasets, along with all related information (format, storage, metadata, etc.), will be part of D2.2.

Regarding the accessibility of data from INITIATE, two different cases are defined depending on the access level: sensitive or public. The deliverables classified as sensitive, and thus restricted to consortium members, will be available on the INITIATE SharePoint repository, which requires permission from the channel manager. Other repositories will be used to publish public information such as project deliverables, tools, and scientific articles. All public deliverables will be automatically

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submitted to Cordis, the EU platform for research results (available at https://cordis.europa.eu/project/id/101136775), and public deliverables along with other information will be published on the project website, at https://initiateproject.eu/ .

2.2.3. Making data interoperable

Data Interoperability is essential to establish a unified European data environment. It is crucial to create a common framework that enables communication not only within the consortium but also with other sister projects and cross-sector initiatives.

In this context, INITIATE will define an open-source common reference architecture, API specifications, and semantic data models as outlined in the requirements related to interoperability. The User and Data Management modules (D7.2) will manage secure and privacy-preserved access to data and user credentials. To handle high velocity, volume, and variety of data while ensuring data integrity, solution scalability, and interoperability, different technologies will be evaluated in the ICP, such as PostgreSQL, MongoDB, HBase, Cassandra and similar. Additionally, the project will use recognized standards and formats for (meta)data to facilitate further use by third-party systems. Appropriate vocabularies will be developed to ensure interoperability, a key aspect for INITIATE. APIs will be established to ensure interoperability (e.g., REST APIs, event-based APIs, data access APIs, MQTT data APIs) between the project and third-party tools (WP3). Two types will be set: Things APIs and Services APIs.

2.2.4. Increase data re-use

Data will be made available as soon as possible and published in open access repositories (e.g., GitHub page), while always respecting GDPR and other privacy directives. All public material will remain accessible both during and after the project. To ensure reusability, data will be meticulously described with accurate attributes. The costs associated with making data FAIR will be detailed in the Data Management Plan.

By employing a DevOps approach for the development of the INITIATE Knowledge Hub and other project tools, developers will integrate their code changes into a central repository (e.g., GitLab, GitHub). This process will include crucial stages such as automated builds, testing, and production releases. Given the project's significant involvement of Stakeholders, compliance with GDPR, the Universal Declaration of Human Rights, and other pertinent national laws will be strictly maintained, as outlined in the Data Management Plan.

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Regarding the data integrated into the Knowledge Hub, reusability will be ensured through the interoperability procedures specified in this document. Detailed information will be provided in D2.2. Data will remain reusable throughout the project's duration and beyond, as the Knowledge Hub and its tools will continue to function post-project, ensuring long-term data reusability.

Data quality will be monitored by the consortium through a four-step process. First, the methodology for managing data collection and processing will be established, distinguishing between data types: data collected or generated from various use cases, data reused from other EU projects, and data from project communication and dissemination activities. Second, roles and responsibilities for data management will be clearly defined. Third, quality parameters will be set according to six main dimensions: accuracy, completeness, consistency, validity, uniqueness, and timeliness. Lastly, a suite of technical tools and KPIs will be deployed to measure and ensure data quality. The selection of tools will be tailored to the project's evolving needs.

2.3. Other research outputs

In addition to the management of data, beneficiaries should also consider and plan for the management of other research outputs that may be generated or re-used throughout their projects. Such outputs can be either digital (e.g. software, workflows, protocols, models, etc.) or physical (e.g. new materials, antibodies, reagents, samples, etc.).

Beneficiaries should consider which of the questions pertaining to FAIR data above, can apply to the management of other research outputs, and should strive to provide sufficient detail on how their research outputs will be managed and shared, or made available for re-use, in line with the FAIR principles.

2.4. Allocation of resources

The allocation of resources for making data FAIR in INITIATE is closely tied to the volume of data processed throughout the project's duration. This volume impacts the cost of long-term storage solutions, which can vary depending on the specific datasets and their computational demands. Major project outputs will be published under an open-source license (e.g., CC BY 4.0) and made available through a GitHub repository. Resource allocation will also account for the efforts involved

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in publications, their potential impact, and the most effective methods for implementing an open-access approach.

Cost estimation is influenced by various factors that will be continually discussed within the consortium. Data management responsibilities are assigned to the Project Coordinator (UNIZAG FSB), who will oversee:

- The maintenance of the project document repository.
- The quality of scientific data outcomes.
- Identification of outputs suitable for publication in designated repositories.
- Upkeep of INITIATE contributions to Open Access.
- Ensuring that data shared through the project website is both easily accessible and backed up appropriately.

Each partner is responsible for ensuring the recoverability of their own generated data.

2.5. Data security

Managing data securely is crucial for the success of INITIATE. In addition to data anonymization, the project will implement data encryption and regular backup procedures. These measures aim to ensure data integrity throughout the project's duration and provide alternatives in case of file loss or corruption. Encryption will offer an extra layer of security to protect data files and information.

In INITIATE, data governance and privacy will be upheld by allowing data owners to maintain control over their data, monitoring and controlling data access, and taking all necessary actions to prevent unauthorized access. The primary responsibility for ensuring data security rests with the Project Partners.

Information security will adhere to relevant standards (e.g., ISO/IEC 27001 and 27002; Code of Practice for Information Security Management) to uphold the core principles of cybersecurity:

- **Confidentiality** – Preventing unauthorized access to information.
- **Integrity** – Ensuring that data cannot be altered without authorization.

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- **Availability** – Making information accessible to authorized users.

Additionally, information security management will incorporate guidelines from the Directive on Security of Network and Information Systems ('Cybersecurity Directive', NIS-Directive 2016/1148) concerning critical infrastructure and the ePrivacy Directive 2002/58, as well as guidance from the European Union Agency for Cybersecurity (ENISA). Data storage practices will comply fully with national and EU legal and regulatory requirements.

Members of the INITIATE Project Consortium are required to designate individuals responsible for overseeing data protection throughout collection, generation, and storage processes. Data must be securely stored and regularly backed up, with multiple copies created to prevent loss in case of hardware failures. These copies should be stored in different locations, with primary storage and backup managed through the project's online collaboration tool (SharePoint). Access to this tool will be restricted to authorized consortium partners via secure login credentials, and additional access controls on specific folders may be applied if necessary. Furthermore, Microsoft 365 SharePoint, used by the project, will not use or scan data for purposes beyond providing the subscribed services. Microsoft does not access or analyze uploaded content for advertising or other purposes.

2.6. Ethics

The INITIATE consortium is fully committed to addressing privacy and data protection concerns, ensuring strict adherence to all relevant European and national laws and directives applicable in the countries where data is collected. Ethical and legal considerations related to data sharing are detailed in Annex 1 of the project's Description of Action. As outlined in the Grant Agreement, these aspects will be closely monitored throughout the project's development, adhering to principles of respect for individuals, gender balance, voluntary and informed participation, and mutual care. All actions will conform to ethical standards and applicable EU regulations for data protection.

The consortium is dedicated to safeguarding both privacy and the individual rights of participants and stakeholders. They are well-versed in EU and national legislation regarding personal data protection and are committed to ensuring that all project activities align with the European Charter of Fundamental Rights and relevant EU data protection regulations, standards, and policy initiatives.

Personal data collected through surveys or questionnaires will be anonymized. Each document will include a description of its purpose at the top of the first page and indicate that the document is

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anonymous to protect privacy. An ethics manager from UNIZAG FSB will oversee the project's adherence to current ethical and data privacy regulations, both locally and EU-wide, ensuring compliance with all legal procedures.

Social engagement activities, including workshops and dissemination events, that involve collecting photos and questionnaires will require clear consent from participants. They will be informed of the purpose and duration of data retention. Participation in these activities will only request the name of the participant's organization and its sector or stakeholder affiliation, excluding any personal data. The consortium is committed to avoiding any use of personal data profiling during dissemination and research activities.

For the long-term preservation of data containing personal information, ethical considerations will be a key focus. According to GDPR Article 5, data will be "collected for specified, explicit, and legitimate purposes and not further processed in a manner that is incompatible with those purposes" and will be "kept in a form that permits identification of data subjects for no longer than is necessary for those purposes."

Ethics issues are more closely described in the deliverable D8.1.

3. Compliance and Legal Considerations

3.1. Data Protection Regulation

The European Union's General Data Protection Regulation (GDPR) stands as a cornerstone of privacy legislation, changing the paradigm of personal data handling and protection within the EU. Implemented on May 25, 2018, the GDPR offers a comprehensive set of guidelines and rights for individuals, while imposing significant responsibilities and obligations on organizations that collect, process, or store personal data. Its overarching goal is to empower individuals with control over their personal information, harmonize data protection laws across EU member states, and ensure transparency, security, and accountability in the digital era. With its wide-reaching impact and extraterritorial scope, the GDPR has become a global benchmark for data protection and privacy regulations, influencing legislation and shaping best practices worldwide. The GDPR introduces measures that raise the bar for businesses attempting to deceive customers using unclear or ambiguous language on their websites. Moreover, it ensures that:

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- Visitors accessing the website are provided with clear information regarding the data being collected.

- Visitors are required to give their consent for the collection of this information by actively clicking a button or taking other actions on the website.

- Visitors are promptly notified in the event of any compromise to their personally identifiable information stored on the website.

- A mandatory evaluation of the website's data security is currently underway.

- An assessment is conducted to determine whether a new employee is needed to fulfil the role of the data protection officer (DPO) or if an existing employee can fulfil this responsibility.

Businesses have various methods to attain GDPR compliance. Conducting audits of personally identifiable information and maintaining comprehensive records of the collected and processed data are among the pivotal measures. Moreover, it is essential for businesses to regularly update privacy notices provided to website visitors and promptly rectify any identified errors in their databases. For the purpose of this regulation, the following definition must be considered:

'personal data': any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person. Personal data include data such as internet protocol (IP) addresses (unique identifiers that can be used to identify the owner of devices connected to the internet) and data from 'smart meters' monitoring energy usage by addresses linked to identifiable persons. 'processing': any operation or set of operations which is performed on personal data or on sets of personal data, whether by automated means, such as collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure, or destruction.

'restriction of processing': the marking of stored personal data with the aim of limiting their processing in the future;

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'profiling': any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements.

'pseudonymisation' means the processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organisational measures to ensure that the personal data are not attributed to an identified or identifiable natural person.

'filing system' means any structured set of personal data which are accessible according to specific criteria, whether centralised, decentralised or dispersed on a functional or geographical basis.

'recipient' means a natural or legal person, public authority, agency or another body, to which the personal data are disclosed, whether a third party or not. However, public authorities which may receive personal data in the framework of a particular inquiry in accordance with Union or Member State law shall not be regarded as recipients; the processing of those data by those public authorities shall be in compliance with the applicable data protection rules according to the purposes of the processing.

'third-party' means a natural or legal person, public authority, agency or body other than the data subject, controller, processor and persons who, under the direct authority of the controller or processor, are authorised to process personal data.

'consent' of the data subject means any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her.

'personal data breach' means a breach of security leading to the accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access to, personal data transmitted, stored, or otherwise processed.

The European Commission, on 4th June 2021, approved two sets of standard contractual clauses. One set is designed for the utilization between controllers and processors within the European Economic Area , while the other set addresses the transfer of personal data to countries beyond the borders of the European Economic Area. In addition, both the GDPR imposes obligations on:

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- **Data controller:** the natural or legal person, public authority, agency, or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; where the purposes and means of such processing are determined by Union or Member State law, the controller or the specific criteria for its nomination may be provided for by Union or Member State law.

- **Data processor**: a natural or legal person, public authority, agency, or other body which processes personal data on behalf of the controller.

Under the GDPR, transferring personal data from a non-EU country to another country requires specific measures to ensure the protection of personal data. The following steps are typically followed to comply with the GDPR when transferring personal data from a non-EU country:

- Determine the legal basis for transfer: identify a valid legal basis for the transfer of personal dana as provided in Article 6 and, if applicable, Article 9 of the GDPR. This may include obtaining the dana subject's explicit consent, fulfilling a contract, or demonstrating compliance with legal obligations.

- Assess adequacy: determine if the destination country ensures an adequate level of data protection as defined by the European Commission. Adequacy can be established through an adequacy decision by the European Commission or appropriate safeguards provided by the recipient country.

- Implement appropriate safeguards: if the destination country does not have an adequacy decision, implement appropriate safeguards to protect the transferred data. This can be achieved using standard contractual clauses approved by the European Commission, binding corporate rules, or other approved mechanisms such as codes of conduct or certification mechanisms.

- Consider derogations: in the absence of an adequacy decision or appropriate safeguards, assess if any derogations under Article 49 of the GDPR apply. Derogations allow transfers in specific situations, such as when the transfer is necessary for the performance of a contract, the protection of vital interests, or the establishment, exercise, or defence of legal claims.

- Inform data subjects: provide transparent information to data subjects about the transfer of their personal data, including the purposes, legal basis, recipients, and safeguards

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implemented. This information should be included in the privacy notice or provided directly to the data subjects.

- Maintain documentation: keep records of the transfer, the legal basis, the safeguards employed, and any relevant documentation to demonstrate compliance with the GDPR requirements. These records should be available for inspection by supervisory authorities.

3.2. Intellectual Property Rights

As innovation plays a central role in Horizon Europe projects, it is essential to establish a robust management strategy for intellectual property (IP) rights. This strategy ensures the protection, utilization, and exploitation of project results, while adhering to the guidelines set forth by the European Union's research and innovation framework program. In line with these objectives, the IP management strategy for the INITIATE project will be detailed descript in Deliverable 6.2 (D6.2) titled "Exploitation and innovation management plan". In summary, the IP management strategy aims to achieve the following objectives:

Identification and Protection: identify the key intellectual property assets generated within the project, including inventions, patents, copyrights, trademarks, and trade secrets. Implement measures to safeguard and protect these assets through appropriate legal mechanisms, such as patent applications and copyrights registrations.

Exploitation and Commercialization: develop an exploitation plan for the most promising Key Exploitable Results (KERs) generated by the project. This plan should outline the steps for bringing the KERs to market, including licensing agreements, spin-offs, collaborations, and technology transfer activities.

Collaboration and Open Innovation: foster collaboration with relevant stakeholders, including industry partners, research institutions. Encourage open innovation practices, such as sharing knowledge, data, and research findings, to maximize the impact and value of the project's results.

To ensure effective IP management, the following 4 key elements will be incorporated into INITIATE framework:

IP Ownership and Rights: clearly define the ownership and rights associated with project-generated IP, taking into account the contributions of project participants and external collaborators. Establish

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agreements, such as Consortium Agreements or Memoranda of Understanding, to clarify IP ownership, access rights, and potential revenue sharing.

IP Valuation and Commercialization Strategy: develop a systematic approach for assessing the value of project IP, considering its market potential, competitive advantages, and potential societal impact. Based on this valuation, establish a commercialization strategy that aligns with the project's goals, timelines, and market dynamics.

IP Risk Management: identify potential risks associated with IP management, including infringement risks, competing technologies, and regulatory constraints. Implement measures to mitigate these risks, such as conducting freedom-to-operate analyses, monitoring IP landscapes, and establishing appropriate contractual provisions with collaborators and contractors.

Dissemination and Open Access: ensure compliance with Horizon Europe's Open Access policies and promote the dissemination of project results through open access publications, data sharing platforms, and public repositories. Consider embargoes or restrictions when necessary to protect potential IP rights during the commercialization process.

Regular monitoring, evaluation, and review of the IP management strategy will be conducted throughout the project's lifespan. This includes periodic assessments of IP assets, exploitation activities, and commercialization outcomes. Lessons learned and best practices will be documented and shared within the project consortium and with relevant stakeholders to optimize future IP management strategies.

3.3. Ethical Guidelines

The INITIATE project is funded under the Horizon Europe programme. Therefore, the project will comply with ethical principles and relevant legislation on local, national, and European level. The project encompasses the implementation of data collection during the piloting and validation phase. The consortium fully recognizes the potential privacy and data protection concerns that may arise and affirms its unwavering commitment to adhere to all relevant European and national legislation, as well as directives applicable to the country where the data collections are conducted. This entails a thorough examination of the collection, processing, and transmission of personal data in accordance with the following principles:

a) The GDPR (Regulation (EU) 2016/679);

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b) The Universal Declaration of Human Rights and Convention 108 for the Protection of Individuals with Regard to Automatic Processing of Personal Data; and

c) national laws that implement these provisions.

Additionally, any additional national-level regulations pertaining to data protection or other sensitive information, excluding GDPR jurisdiction, will be duly considered. The management of project data will strictly adhere to the following prerequisites:

- Consent from the data subject;
- Necessity for performance of or entering a contract;
- Compliance with a legal obligation;
- Protection of the vital interests of the data subject.

To ensure compliance with these requirements, personal data handled within the INITIATE project will undergo anonymization and be stored in a format that precludes user identification. INITIATE will establish a comprehensive data management framework that guarantees the security of collected personal data, guarding against potential abuse, theft, or loss. While most research data generated by the project will be publicly accessible and shared, personal user data will be exempted. The DMP will provide detailed information regarding the types of data produced by the project, its potential exploitation, accessibility for verification and re-use, as well as the strategies for curation and preservation.

The following principles govern the management of Knowledge and Intellectual Property Rights within the INITIATE project and will be established in the consortium agreement to be signed at the beginning of the project. These principles align with the recommendations for Intellectual Property Rights in Horizon Europe. The consortium agreement will clearly identify the background and foreground (results) and specify access rights, where applicable.

- Ownership: each participant will retain ownership of the foreground they generate.

- Joint ownership: in cases where the foreground is jointly generated, participants will reach an agreement based on defined rules outlined in the consortium agreement.

- Protection, use, and dissemination: results with potential industrial or commercial applications will be protected, taking into account legitimate interests. Prior notice of dissemination will be given to

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other participants. Any dissemination of results must acknowledge the financial assistance provided by the Community.

- Access rights: partners have the flexibility to define the background they require and may exclude specific background, not necessarily prior to signing the grant agreement. Exclusive licenses to background and foreground may be granted if other partners waive their access rights, depending on previous agreements. Partners may agree to additional or more favourable access rights than those stated in the consortium agreement. Initially, the partners agreed on open access publishing, but they may consider gold or green access to peer-reviewed scientific publications in the future.

- Management of knowledge in INITIATE: a knowledge management process will be implemented to facilitate the consolidation of the knowledge spiral, promote cooperation, and enable the creation of new knowledge. The process involves gathering and shaping information, indexing for proper dissemination, and an appropriation period for the generation of new knowledge. Tools will be developed to support social interactions, knowledge processing (organizing files through semantic links for easier searches), and intelligent distribution of knowledge (utilizing push and pull actions to optimize distribution).

- Personal data: to ensure anonymity, all personal data within the project will be anonymized, eliminating individual identifiers. Consumption data, which can reveal a consumer's characteristics, will be blurred to prevent its use as an identifier.

- Right to be forgotten: participants have the right to request the deletion of their collected data. With a formal request, the capability to delete the requested data within the period specified by the data subject will be ensured.

- Time of storage: research data, classified as such, will be stored for a minimum of 5 years after the project's completion. Any storage beyond this period will be evaluated and documented based on necessity and applicability.

- **Data security**: ensuring secure data management is of utmost importance. In addition to data anonymization, measures such as data encryption and distributed backup will be implemented. These measures aim to maintain data consistency throughout the project's lifespan and provide alternative options in case of file loss or corruption. Data encryption adds an extra layer of security to protect the integrity of data files and information.

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4. Open Science practices

Following the Horizon Europe guidelines, the INITIATE project open science principles are presented below, justifying how appropriate they are as an integral part of the INITIATE methodology.

Open access: The principles of openness and transparency will underlie all research activities, fostering sharing and collaboration as early as possible, and throughout the project´s life. Open and transparent practices will be implemented in line with the open science policy in Horizon Europe, encouraging the use of the Open Research Europe (ORE) publishing platform and the open repository for research objects. In addition, all project results, reports, toolbox (WP3), dissemination material (T6.1), publications (T6.1), presentations, and research datasets will be available in the project website, whenever possible. The consortium is indeed committed to provide green open access wherever feasible.

'Early and open sharing' of research: Green open-access will allow authors to deposit a Preprint, a potentially revised author version or, where possible, a final peer-reviewed publisher's version (Registered reports) of their publication at an institutional or subject repository that allows public access. Most of these materials will also be freely available in the project website (T6.1), INITIATE will provide accessible PDF files to guarantee that persons visually impaired have access to all text material. The software tools will be released with suitable open-source licenses, while the text and media content shall be released under appropriate Creative Commons licenses.

Reproducibility of research outputs: To enhance reproducibility of INITIATE research outputs open-source software will be used, and existing infrastructure will be harnessed to store data and results. INITIATE will openly publish code, code lists and metadata in GitHub page. Publications will have open access licenses and make use of partners' institutional repositories. Clarity of citation of data sources will maximise the potential for reuse.

Open peer review: Researchers will aim to publish scientific work (T6.1) in venues that follows clear Principles of Transparency, such as peer review processes. Several venues that provide open peer review have been already identified: e.g. Smart Energy; JSDEWES; Climate and Agriculture; the International Journal of Climate Change; Impacts and Responses; The Journal of Climate Change and Health, among others.

Citizen, civil society, and end-user engagement: The INITIATE is committed to engage key stakeholders (in the co-creation of research outcomes and project activities) through creation of methodology for engagement and value-based proposition design towards inclusive R&I development (T1.2) that will consider and include all relevant stakeholders in the process. To enhance this, an open Knowledge

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Base and Stakeholders Group (T1.1) will be formed (initial Group members are stated in section 2.2.2) that will have regular meetings and provide feedback to project partners. This approach will contribute to: (i) better understanding of climate change and need for green energy transition; (ii) co-design process realisation and tailoring the INITIATE solutions to specific user needs; and (iii) increased usability, scalability, and replicability of project results.

4.1. Open Science in Model Grant Agreement

4.1.1. GA Annex 5 - "Open science: Open access to scientific publications"

The beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results. In particular, they must ensure that:

- at the latest at the time of publication, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository for scientific publications
- immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and
- information is given via the repository about any research output, or any other tools and instruments needed to validate the conclusions of the scientific publication.

Beneficiaries (or authors) must retain sufficient intellectual property rights to comply with the open access requirements.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in machine-actionable and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output, or any other tools and instruments needed to validate the conclusions of the publication.

Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

4.1.2. GA Annex 5 - "Open science: research data management"

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The beneficiaries must manage the digital research data generated in the action ('data') responsibly, in line with the FAIR principles and by taking all of the following actions:

- establish a data management plan ('DMP') (and regularly update it) as soon as possible and within the deadlines set out in the DMP, deposit the data in a trusted repository; if required in the call conditions, this repository must be federated in the EOSC in compliance with EOSC requirements
- as soon as possible and within the deadlines set out in the DMP, ensure open access — via the repository — to the deposited data, under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC 0) or a licence with equivalent rights, following the principle 'as open as possible as closed as necessary', unless providing open access would in particular:
- be against the beneficiary's legitimate interests, including regarding commercial exploitation, or
- be contrary to any other constraints, in particular the EU competitive interests or the beneficiary's obligations under this Agreement; if open access is not provided (to some or all data), this must be justified in the DMP
- provide information via the repository about any research output or any other tools and instruments needed to re-use or validate the data.

Metadata of deposited data must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent (to the extent legitimate interests or constraints are safeguarded), in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: datasets (description, date of deposit, author(s), venue and embargo); Horizon Europe or Euratom funding; grant project name, acronym and number; licensing terms; persistent identifiers for the dataset, the authors involved in the action, and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for related publications and other research outputs.

4.1.3. Open science: additional practices

Where the call conditions impose additional obligations regarding open science practices, the beneficiaries must also comply with those.

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Where the call conditions impose additional obligations regarding the validation of scientific publications, the beneficiaries must provide (digital or physical) access to data or other results needed for validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication).

Where the call conditions impose additional open science obligations in case of a public emergency, the beneficiaries must (if requested by the granting authority) immediately deposit any research output in a repository and provide open access to it under a CC BY licence, a Public Domain Dedication (CC 0) or equivalent. As an exception, if the access would be against the beneficiaries' legitimate interests, the beneficiaries must grant nonexclusive licenses — under fair and reasonable conditions — to legal entities that need the research output to address the public emergency and commit to exploit the resulting products and services rapidly and broadly at fair and reasonable conditions. This provision applies up to four years after the end of the action (see Data Sheet, Point 1).

4.2. Open Science Practice in INITIATE project

In the INITIATE project, open access to peer-reviewed scientific publications is a key requirement. The beneficiaries must:

- Deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript into a trusted repository as soon as possible upon publication.
- Ensure immediate open access to the publication via the repository under the latest Creative Commons Attribution International Public License (CC BY) or a similar license. For longer texts, licenses may restrict commercial use or derivative works (e.g., CC BY-NC).
- Provide information on the repository about research outputs and tools needed to validate the publication's conclusions.

Beneficiaries must retain intellectual property rights to comply with these open access requirements. Metadata for deposited publications should be open under Creative Commons Public Domain Dedication (CC0) or equivalent, adhering to FAIR principles and including details such as publication information, Horizon Europe funding, and persistent identifiers.

Research Data Management

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For managing digital research data, beneficiaries are required to:

- Develop and regularly update a Data Management Plan (DMP).
- Deposit data in a trusted repository within the DMP deadlines. If necessary, this repository must be part of the European Open Science Cloud (EOSC).
- Ensure open access to deposited data under Creative Commons licenses (CC BY or CC0), unless access restrictions are justified in the DMP due to legitimate interests or other constraints.
- Provide metadata in line with FAIR principles, including details about datasets, funding, and identifiers.

Additional Practices

Beneficiaries must also adhere to any additional open science obligations imposed by the call conditions. This includes:

- Providing access to data for validating scientific publications, if required, while safeguarding legitimate interests.
- In case of a public emergency, promptly depositing and providing open access to research outputs, unless it conflicts with legitimate interests. In such cases, non-exclusive licenses may be granted to entities needing the output for emergency response.

The beneficiaries will also prepare and regularly update a plan for the exploitation, dissemination, and communication of results, unless specified otherwise by the call conditions.

5. Ethics Management Plan

The beneficiaries must carry out the action in compliance with:

- ethical principles (including the highest standards of research integrity and
- applicable EU, international and national law, including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols.

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No funding can be granted, within or outside the EU, for activities that are prohibited in all Member States. No funding can be granted in a Member State for an activity which is forbidden in that Member State.

The beneficiaries must pay particular attention to the principle of proportionality, the right to privacy, the right to the protection of personal data, the right to the physical and mental integrity of persons, the right to non-discrimination, the need to ensure protection of the environment and high levels of human health protection.

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- aim at human cloning for reproductive purposes
- intend to modify the genetic heritage of human beings which could make such modifications heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed)
- intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer, or
- lead to the destruction of human embryos (for example, for obtaining stem cells).

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the granting authority.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out in the European Code of Conduct for Research Integrity 2 .

This implies compliance with the following principles:

- reliability in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources
- honesty in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way respect for colleagues, research participants, society, ecosystems, cultural heritage and the environment
- accountability for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts and means

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that beneficiaries must ensure that persons carrying out research tasks follow the good research practices including ensuring, where possible, openness, reproducibility and traceability and refrain from the research integrity violations described in the Code.

Activities raising ethical issues must comply with the additional requirements formulated by the ethics panels (including after checks, reviews or audits; see Article 25).

Before starting an action task raising ethical issues, the beneficiaries must have obtained all approvals or other mandatory documents needed for implementing the task, notably from any (national or local) ethics committee or other bodies such as data protection authorities.

The documents must be kept on file and be submitted upon request by the coordinator to the granting authority. If they are not in English, they must be submitted together with an English summary, which shows that the documents cover the action tasks in question and includes the conclusions of the committee or authority concerned (if any).

Issues regarding ethics are further elaborated in D8.1 of INITIATE project.

5.1. Research ethics approval

The INITIATE project has undergone a thorough review by experts from the European Commission and has successfully passed the ethics review. Additionally, the consortium conducted an internal ethics self-assessment, which highlighted data management as a critical ethical area requiring focused attention throughout the project. Other significant concerns identified include the exploitation of results and access to background information.
To address these concerns, the project will rigorously cover all three identified areas to ensure adherence to ethical standards. This deliverable provides comprehensive details on data management, while the forthcoming deliverable 6.2 (Exploitation and innovation management plan) will focus on the exploitation of results and intellectual property issues. The handling of background information will be managed according to agreements established in the Consortium Agreement, with all partners having signed off on the proposed guidelines.

5.2. Ethical dimension of the objectives, methodology and likely impact

The project involves carrying out data collection and a set of case studies to assess the effectiveness of the proposed framework in existing conditions. The consortium is fully aware of the privacy and data protection issues that might arise, declaring its strict compliance with all European and national legislation and directives relevant to the country where the data collections are taking place. That is

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the collection, processing and transmission of personal data will be analysed under principles of: (a) The GDPR (Regulation (EU) 2016/679)90; b) The Universal Declaration of Human Rights and the Convention 108 for the Protection of Individuals with Regard to Automatic Processing of Personal Data and (c) the national laws applying its provisions. Additional regulations at national level that do not fall under the GDPR and apply to data protection or any other sensitive information will also be taken into account. Data managed during the project will be processed only under the following preconditions which need to be met: (i) When the data subject has given her/his consent; (ii) When the processing is necessary for the performance of or entering into a contract; (iii) When processing is necessary for compliance with a legal obligation; (iv) When processing is necessary in order to protect the vital interests of the data subject. To this end, personal data managed within INITIATE will be anonymized and stored in a form which does not permit identification of users. INITIATE will establish a data management framework that guarantees security of collected personal data from potential abuse, theft, or loss. The majority of research data produced by the project will be made public & will be offered, with the exception of the personal user data. The Data Management Plan (DMP) will detail what data the project will produce, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated & preserved. We will ensure that all ethics issues related to activities in the grant are addressed in compliance with ethical principles, the applicable international and national law, and the provisions set out in the Grant Agreement. This includes the ethics issues identified in this report and any additional ethics issues that may emerge during the grant. In case any substantial new ethics issues arise, beneficiaries should inform the granting authority.

5.3. Compliance with ethical principles and relevant legislations

General principles: The general principles for handling Knowledge and Intellectual Property Rights within INITIATE are stated below and will be settled in the consortium agreement to be signed at the project start. These principles are in line with HE Intellectual Property Rights recommendations. Background and foreground (results) will be clearly identified within the consortium agreement and when applicable, granting of access rights will be clearly specified.

Ownership: Each participant will own the foreground it generates.

Joint ownership: When the foreground is generated jointly, participants will have to reach an agreement. Rules to do so will be defined in the consortium agreement.

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Protection, use and dissemination: Results capable of industrial or commercial application must be protected taking into account legitimate interests. Prior notice of dissemination must be given to other participants. Any dissemination must indicate the financial assistance.

Access right: Partners may define the background needed in any manner, and may exclude specific background (not necessarily prior to signature of EC grant agreement). It is possible to grant exclusive licenses to background and foreground if the other partners waive their access rights and depending on previous agreements. Partners may agree to additional or more favourable access rights than those provided for in the consortium agreement. At a preliminary stage, the partners agreed on open access publishing. However, in the future, partners may also opt for gold or green access to peer-reviewed scientific publications.

Management of knowledge in INITIATE: A process of knowledge management will be implemented. This process will provide the consolidation of the knowledge spiral, enable co-operation and will allow for the creation of new knowledge. The process is divided in different steps: At first, the information will be gathered and shaped. Thereupon, it will be indexed in order to be correctly disseminated. This will be followed by an appropriation period, which provides for the creation of new knowledge. Some tools will be set up to support social interactions, knowledge processing (files will be organized through semantic links, to facilitate future searches) and intelligent distribution of knowledge (push and pull actions to optimize the distribution of knowledge).

Personal data: Any personal data will be anonymized, so that there are no individual identifiers in the whole project. Consumption data is a well-defined characterizer of a consumer, so it has to be blurred to not be used as an identifier.

Right to forget: The collected data will be stored, so the consumer has the right to ask for its deletion. In any situation, with a formal request there will have to be the capability to delete the data the consumer asked in the period he/ she determines.

Time of storage: Since the stored data is classified as research data it will be stored for at least 5 years after the end of the project. Any storage further than this date must be evaluated and documented relating to the necessity and applicability of it.

Data security: A fundamental task is to manage the data in a secure way. Besides data anonymization, there will be data encryption and backup distribution. The goal of these measures will be to ensure that data remains consistent over the lifetime of the project and there exist alternatives to the main files, in case they disappear or get corrupted. The encryption component gives an extra layer of security into the data files and information.

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6. Data and Ethics Governance

6.1. Data and Ethics Committee

The data and ethics committee is a structure organized within INITIATE that will focus on the implementation of the DMP. This committee is crucial to ensure that the plans detailed in this deliverable are actually put in practice and to ensure there is someone overseeing the ethics of activities developed along the project.

6.2. Committee composition

The data and ethics committee for INITIATE project will be chaired by the Ethics Manager, which is the main responsible for overseeing the application of the practices that contribute towards the protection of data and confidentiality of stakeholders. Besides overseeing the process, the Ethics Manager is responsible for sharing information and train other partners on the correct procedures to adopt for the implementation of the DMP.

All partners that lead activities that require data collection, such as events, surveys, monitoring activities, and others, will automatically be part of the data and ethics committee as they are responsible to follow all the procedures identified in this deliverable. The Ethics Manager can support this on a supervisory and guiding capacity.

All partners that need to access data for the development of solutions or reports may also join the data and ethics committee as an observer, which may take part in the decision-making process for the implemented practices. These partners may also be requested to join the committee in cases of breach or if significant risks arise that could jeopardise the privacy and confidentiality of the data.

6.3. Roles and responsibilities

The data and ethics committee has the role to implement and oversee the data handling techniques that will ensure that INITIATE adheres to all essential practices that guarantee privacy and protection of stakeholders and the data collected.

The Ethics Manager is responsible for reviewing and approving processes, which are analysed if are in accordance with GDPR guidelines and ethical principles. The Ethics Manager should also do an

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ethical risk assessment to identify potential risks that could compromise the privacy and confidentiality of stakeholders. Those risks and general practices implemented should be continuously monitored by the Ethics Manager to maintain the consistency along the project. The Ethics manager is also the responsible party for managing the consents from stakeholders and for managing access to any personal or the re-identification component of pseudonymized data.

The responsible parties for the data collected have three major roles and responsibilities that need to be considered when collecting the data and engaging stakeholders. First, ensuring data privacy is responsibility of these parties, they should adopt the methods implemented in the project to ensure that all the data they are collecting is kept confidential. The second responsibility is obtaining informed consent. Finally, these parties should make the bridge between the stakeholders addressed and the consortium, being responsible for transmitting the perspectives of those stakeholders and ensure that their interests and concerns are addressed by the consortium.

The parties using the data also have the responsibility of keeping the data confidential and strictly apply any indicated norms, or in cases where no directions are provided, these partners should strictly follow all procedures indicated in the GDPR.

6.4. Data and ethics monitoring

Keeping data privacy requires all partners to work in unison as in some instances it is difficult to control all aspects that guarantee data privacy. Due to this, each partner that has access to the data may be held accountable for breaches, even if they are not part of the data and ethics committee. The committee may not be held accountable for any breaches or other issues that are caused by a specific party due to not following the practices indicated or the GDPR guidelines.

To keep this risk to a minimum, the Ethics Manager will regularly oversee who has access to the data, and revoke access if this is not required anymore. The Ethics Manager will also engage in dialogue with the partners using the data to understand what it is being used for and to ensure that they are respecting the guidelines provided.

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7. References

- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)
- FAIR principles, available at: https://www.go-fair.org/fair-principles/
- H2020 POCITYF D11.8 – Data Management Plan, available at https://pocityf.eu/resources/
- H2020 Smart2B D9.4 – Data Management and System Failure Management Plan, available at https://smart2b-project.eu/results/public-deliverables/

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