Persistent Personal Data Vaults Empowering a Secure and Privacy Preserving Data Storage, Analysis, Sharing and Monetisation Platform

D6.3
Pilots Evaluation of Alpha Platform Version

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Abstract	This deliverable reports on the evaluation of the alpha version of the DataVaults platform, in accordance with the evaluation framework set out in D6.1.
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Executive Summary

This deliverable marks the first use of the Evaluation Framework as set out in D6.1.

The deliverable reports on the technical evaluation of all that was available for scrutiny when the alpha version of the DataVaults platform was released at M20.

It also checked that all the preparation work had been carried out at the demonstration sites, in order to smoothly proceed to the next phase of the project.

The Evaluation Framework also emphasised “evaluation as a management tool” and in this capacity, we revisited our “Theory of Change” for DataVaults and incorporated some new insights into how the project should evolve in the final year.

The technical testing showed that the Alpha Release of the platform served well its purpose of introducing the concept of DataVaults to the demonstrators and for letting them provide early feedback, while the overall potential of the platform as recorded by the demonstrators has been ranked as relatively high, considering that at this point the majority of the features that were delivered fully were very well perceived.

The deliverable paves the way for the Evaluation of the Beta Platform (D6.4) and for the Final Evaluation of the project (D6.5).

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Terms and Abbreviations

API	Application Programming Interface
BDVA	Big Data Value Association
D	Deliverable
DAA	Direct Anonymous Attestation
DoA	Description of Action
DTU	Danish Technical University
EDPIA	Ethics and Data Protection Impact Assessment
EFFRA	European Factories of the Future Research Association
EL	Ethical and Legal
EU	European Union
GDPR	General Data Protection Regulations
IEEE	Institute of Electrical and Electronic Engineers
IFIP	International Federation for Information Processing
IoT	Internet of Things
ISACA	Information Systems Audit and Control Association
KPI	Key Performance Indicator
MVP	Most Valuable Product
ODI	Open Data Institute
PIA	Privacy Impact Assessment
REST API	Representational State Transfer
SoTA	State of the Art
TOC	Theory of Change
TPM	Trusted Platform Module
WP	Work Package

1 INTRODUCTION

1.1 INTRODUCTION

"DataVaults aims to deliver a novel framework and architecture that leverages personal data, coming from diverse sources, to help Individuals construct their unified personal data hub, collect at a single point all of their personal data in a secure and trusted manner, and retain ownership and control on what to share and with whom, also receiving compensation for the artefacts they place at the disposal of other third parties." [1]

This document, as set out in the DoA, covers: "Documentation of the demonstrators' operation and execution consolidating the input of Tasks 6.3-6.7. This report will evaluate the alpha version of the platform." It is the first activity from T6.8-Demonstrators Evaluation and Impact Assessment, which commenced at M19 and runs through to M36. Figure 1 below indicates the overall timings for the project.

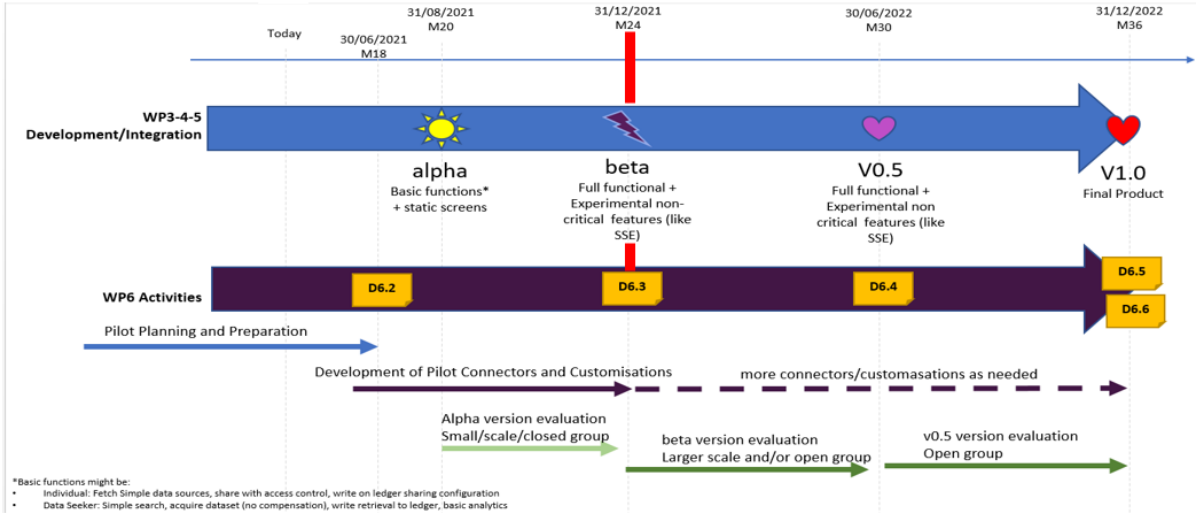

Figure 1: Schedule for WP6

The evaluation framework of D6.1 has been set in operation now that the demonstration activities have commenced. Extensive data collection, regarding the experience of the demonstrator partners with the DataVaults platform, is now being conducted and will continue through to the end of the project. The data collection will meet the guidelines of the predefined evaluation framework and in accordance with the Evaluation Plan, in order to ensure the high quality of the feedback gained and the consistence of the evaluation activities. It also serves a wider function of acting as a general guidelines document for the project. All the activities scheduled for this phase of the project, which are covered in the Evaluation Plan, will be scrutinised.

The Evaluation Plan will continuously be updated as the project evolves as "*An effective evaluation plan is a dynamic tool, or a 'living document', that should be updated on an*

[1] DataVaults DoA. Section 1 3.1, Project Concept.

ongoing basis to reflect changes and priorities over time."[2] The evaluation framework will continue to be studied extensively and should lead to valuable observations and conclusions about the viability and the sustainability of the DataVaults platform. The current version of the Evaluation Plan can be found in Appendix 1 and this will evolve with the project's progress.

D6.1 set out to describe how we will evaluate both the pilots and the project as a whole. It provides the "Documentation of the evaluation framework and validation methodology, defining the various practices for recording feedback from the demonstration activities and including a set of test-cases to be executed by the demonstrator partners."

The demonstrations themselves commenced at M19 (July 2021). This document provides an initial evaluation, coming very quickly into the process of rolling out the demonstrations across the five sites at M22. This will be minimal in relation to the final evaluation. But it will enable us to check that the technology being developed is going in the right direction and will work, it will allow us to check that assumptions made about the project were correct and to enable us to check all the conditions are right and all preparations are in place to make progress in the coming months, including whether the needs and requirements of the stakeholders and of the personal data market are being taken into account.

Iterations of this deliverable will occur with:

- D6.4 Demonstrators' Evaluation of Beta Platform Version [M30].
- D6.5 Final Evaluation and Impact Assessment Report [M36]

Here we are starting to fill in the detail of what needs to be done, starting with what we need to have covered within the first four months of the demonstrators having become active within the project.

The alpha version was made available in M21. It includes all the "basic" functions, which were specified in D5.2, following the availability of the mock APIs. So this first iteration evaluates only what we will have available by M21, with the demonstrations having kicked-off at M20.

The work covered in the first evaluation phase will embrace the creation of connectors and the testing of them. But this does not have a definite deadline. The intention is to have as much of it as possible carried out before M24 and so the scheduling of the alpha phase evaluation needed to be flexible. The intention was to evaluate and report the testing of the WP5 outputs forming the alpha release in a controlled operation environment, and provide as much useful feedback (and not just debugging etc. but focus on user acceptance, perception of the service, feedback from the demonstrators regarding how DataVaults benefits them etc.), whilst identifying any necessary amendments that need to be performed in the scenarios or in the platform etc.

In this document we report on using the platform and providing preliminary feedback and early metrics of what is covered in the evaluation framework set out in D6.1. Given the short

[2]United Nations Environment Agency,"evaluation-criteria-and-ratings,",[Online]. Available: https://www.unenvironment.org/about-un-environment/evaluation-office/our-evaluation-approach/evaluation-criteria-and-ratings.

period involved, this is not anticipated to be huge amounts. Essentially, we are at a stage where we are still developing the technology. And so the questions we will also need to lead with, will concern whether or not the building blocks and the receptacles and background for the demonstration activity is well prepared.

D5.3 is the first release of the DataVaults platform, while it also provides the updated architecture, the APIs, the user stories and the plan for the next releases. It relies on the previously collected technical requirements and user stories presented in the deliverable D5.1 and the architecture defined in D5.2. It also relies on the work performed in work packages WP3 and WP4, where the technical details of the components have been provided.

As such, for the purpose of this initial evaluation stage, we will be focussing only on evaluating the Alpha release of the DataVaults platform and its components as provided in D5.3.

1.2 DOCUMENT STRUCTURE

The document essentially can be seen as having three sections. The **first section** poses the question as to whether all the envisaged preparation work has been successfully carried out. This will embrace a wide range of questions, including:

- Whether the expected progress at this stage of the project has been achieved at all of the demonstration sites in accordance with what was planned in D6.2?
- Have the conditions for having an ethical and privacy situation in keeping with the prescriptions of WP2 and WP10 been met?
- Are the identified interactions with citizens capable of being carried out at each of the demonstration sites?
- Is there sufficient interaction with all the identified stakeholders?

This section is covered by chapter 2 to chapter 4.

The **second section** will concentrate on the evaluation of the technical work from WP3 and WP4, with WP5 acting as the conduit bringing it all together. The technical approach will be covered and the results from the technical evaluation of the alpha version will be brought together. For this purpose, WP5 created specific tests to ensure quality of the code and the required test flows to cover the main aspects of the integration issues.

This section is embraced by Chapter 5.

And the **third section** will embrace progress made on a project level and will check whether the assumptions we have made remain valid. As referred to above, the whole evaluation framework and evaluation process is a dynamic tool and a living document to be studied and be updated on an ongoing basis to reflect changes and priorities over time. Have we identified any changes or new requirements from any of the key stakeholders? Are we learning lessons regarding our “offering” or new emphasis required in terms of our roadmap? Does the DataVaults Theory of Change remain true? And have we any preliminary observations which we may learn from, in the alpha demonstration phase of the project?

This section is embraced by Chapter 6 whilst with Chapter 7, we will draw out any early conclusions which we can make from the evaluation of the alpha version of the platform.

Finally, Appendix 1 will provide an update on the activities to be performed by the demonstrators, which was initially set out in an Appendix to D6.1.

2 LEGAL, ETHICAL, SECURITY, PRIVACY AND TRUST: STATE OF READINESS

2.1 OBJECT OF THE LEGAL, ETHICAL, SECURITY, PRIVACY AND TRUST EVALUATION

This section dwells upon the evaluation of the legal, ethical, security, privacy and trust aspects of the DataVaults technology (platform and App) and of the demonstrators where such technologies are going to be validated and assessed against the requirements elicited in the previous stage of the project. In particular, as regard the legal, ethical, security, privacy and trust requirements, they have been originally set in D2.1 "Security, Privacy and GDPR Compliance for Personal Data Management" and then refined and updated in D2.3 "Updated DataVaults Security Methods and Market Design". Such documents also outlined the surrounding challenges regarding such topics, as well as provided guidelines and hints aimed at supporting their operationalization, both during the execution of the project and, to some extent, in the post-project adoption of DataVaults outcomes. In particular, the assessment is going to be focused, in this evaluation iteration or in the subsequent ones, on:

- **Layer I: the DataVaults demonstrators' processes and operations** (Sect. 2.2), including the ethical procedures and the preparatory activities in view of the interaction with the citizens planned in the next months. The demonstrators themselves need to adhere to the Ethical and Legal requirements specifically set for them within WP2 or in WP10 "Ethics Requirements", such as the need to follow ethical procedures (consent procedures, recruiting procedures, etc.) and to use adequate tools (such as the refined consent form and information sheet, the use of suitable inclusion/exclusion criteria for the involvement of volunteers in the demonstration activities, etc.)
- **Layer II: DataVaults technology (platform and app)** (Sect. 2.3.), encompassing the assessment of the components, tools and services under development in the project and which are validated (and will be further evaluated in the next evaluation iterations) in the demonstrators. This layer includes:
  a) The description of the Ethics and Data Protection Impact Assessment (EDPIA), to be used at the end of the project by each demonstrator and which will be the basis of the final assessment of the legal, ethical, security, privacy and trust aspects of DataVaults technology in the different contexts;
  b) Citizens' perspective on aspects impacting the legal and ethical dimensions of the DataVaults technology (platform and app), to be gathered with dedicated questions for each evaluation iteration, together with the other non-functional requirements questions. Details on how this citizens' feedback gathering will occur for each demonstrator are depicted in Sect. 2.3.2 "Collection of citizens' feedback"

On the basis of these two layers, the mid-term and final EL evaluation regarding EL aspects will be elaborated, with a focus on Layer II. b), which is the one more useful for the future development work and for the operationalization of the ethics-and-privacy-by-design-and-by-default approach. The evaluation addressed by point a) can also be useful, besides for EC to monitor our compliance with H2020 ethical standards, also for the post-project phase, for instance through the elaboration of lessons learnt or blueprints for DataVaults uptake and operation in real-life environments.

2.2 ETHICAL PROCEDURES AND INTERACTION WITH CITIZENS PREPARATION

Evaluation Questionnaire on Ethical and Legal Aspects	
#1 Your reason for using personal data	
What is your primary purpose for collecting and using personal data in DataVaults? *For which use cases/scenarios do you need them?* *Are you replacing another product or service as a result of DataVaults?*	
Olympiacos	Our primary purpose for collecting personal data and demographics data is to improve activity data, social media data and preferences from clubs' fans and members. In addition, we need to collect data from athletes to provide better management of statistical reports and better management of their results from ergometric tests and medical examinations. These are reflected in our three scenarios. With DataVaults platform we will replace some applications and documents from athletes' data.
Piraeus	Our primary purpose for collecting personal data is to : a) improve mobility around sport venues at times of events b) enhance the local commercial market, through the use of citizens commercial profiles c) provide tailored cultural and touristic experiences to tourists and citizens These activities are depicted in the three scenarios included in the demonstration activities of DataVaults.
Andaman7	The first main reason to collect data is to use them to provide new features to our users and improve the attractiveness towards our app to bring new users. The second reason is to be able to help build a better health system by sharing part of such data to B2B partners (with user consent) such as medical research companies. Data collection is needed in both scenarios. Whilst the 1st scenario mainly concerns the collection for B2B partners, the second scenario aims to improve the Andaman7 application. DataVaults will improve our existing product.
Miwenergia	Our main purposes for collecting energy consumption data are to be able to recommend energy-saving tips, design PV installations and generate energy demand prediction models. These are reflected in our three scenarios. We now use an external application to predict our client's energy demand, which could be substituted with our own model trained with information from DataVaults.
Prato	As Prato Municipality, the primary purpose is to access citizens' personal data for improving mobility services and contributing to enrich the cultural offer in the city, together with the involved museums. Use cases are related with mobility, cultural offer and exchange of personal certificates.

	In the case of mobility and culture, DataVaults might substitute current approaches in the acquisition of citizens' personal data, based on the purchase from big data players
#2 Recruitment procedures	
Have you already followed the recruitment procedures, including the inclusion/exclusion criteria, described in D10.1 to identify/recruit research participants?	
Olympiacos	No recruitment has been carried out so far. The recruitment procedures will be applied in the following period of the project, when at least the beta version of the tools will be available and real users will be involved.
Piraeus	No recruitment has been carried out so far. The recruitment procedures will happen in the next months.
Andaman7	Recruitment has not started yet. The plan is to wait for a version of Andaman7 app that already integrates at least a small part of DataVaults before recruiting any user. Recruitment is therefore planned for the beta stage.
Miwenergia	Yes, we have followed every criterion described in D10.1. Every participant has signed the correspondent informed consent and we have informed every participant that their participation is voluntary. We have not finished this process yet.
Prato	No recruitment has been carried out so far. The recruitment procedures will be applied in the following period of the project, when at least the beta version of the tools will be available and real users will be involved.
#3 Informed consent procedures	
Have you already followed the informed consent procedures described in D10.for the participation of humans? Have you already introduced any changes to simplify the informed consent and information sheets inserted in D10.1, in order to make them more intelligible to the research participants and/or to adapt them to the online environment?	
Olympiacos	The informed consent procedure has not been applied yet, since no involvement of real users has been carried out. No changes are foreseen in the already provided form, which is ready to be published and accessible through the DataVaults platform.
Piraeus	The informed consent procedure has not been applied yet. No changes have been made.
Andaman7	We started the development and integration of the informed consent procedure in our registration process. To be able to display it properly on a mobile phone, we will most probably provide a screen summarizing the content and referencing the full version of the consent. During the registration process, the user will also receive the complete document by email.

Miwenergia	Yes, every participant has been well informed with the information sheet and consent form. We have not made any changes to simplify the informed consent yet because we have contacted our participants in a more direct way: via phone and email. It is still our plan to simplify it in later stages.
Prato	The informed consent procedure has not been applied yet, since no involvement of real users has been carried out. No changes are foreseen in the already provided form, which is ready to be published and accessible through the DataVaults platform.
#4 Security and privacy-preserving measures	
Have you already taken the measures for data collection, handling, storage, protection, retention and destruction as described in D10.2, as well as for managing the rights of the users?	
Olympiacos	We carried out an impact analysis on the basis of the platform details provided by technical partners. Since the platform at the moment doesn't store real data and no real usage has been carried out, such measures have not been applied yet
Piraeus	We will handle and store all the information as described in D10.2.
Andaman7	All security and privacy-preserving measures were already integrated in our Andaman7 platform/app before the DataVaults project.
Miwenergia	Yes, we have handled and stored correctly all the information. We have not yet destroyed any documents because no user has claimed his right to do so.
Prato	We carried out an impact analysis on the basis of the platform details provided by technical partners. Since the platform at the moment doesn't store real data and no real usage has been carried out, such measures have not been applied yet.
#5 Profiling	
In case in your demonstrator profiling is expected to occur, have you already informed or are you going to inform the data subjects on it, including also on its possible consequences, according to what planned in D10.2? And in such a case, have you already taken the mitigating measures described in D10.2 to safeguard their rights?	
Olympiacos	Information on profiling is already available in the informed consent form that will be accessed by real users as soon as the platform status will allow it. No real profiling has taken place so far.
Piraeus	Information on profiling is already included in the informed consent form to be used. No profiling has taken place so far.

Andaman7	Profiling is not expected to occur in our use case scenarios.
Miwenergia	Yes, we have implemented all the measures required.
Prato	Information on profiling is already available in the informed consent form that will be accessed by real users as soon as the platform status will allow it. No real profiling has taken place so far.
#6 Special categories of personal data	
Have you planned and/or implemented proper safeguards for the special categories of personal data, if any in your demonstrator? Have you planned and/or implemented adequate measures to ensure that such special categories of personal data will not be used beyond the original purposes?	
Olympiacos	We have not planned any safeguards or measures.
Piraeus	We have not planned any safeguards or measures.
Andaman7	All safeguards for the special categories of personal data were already integrated in our Andaman7 platform/app before DataVaults project. Only anonymized/statistics data will be collected and stored
Miwenergia	We have neither planned nor implemented any safeguards or measures as we do not have special categories of data.
Prato	We carried out an impact analysis on the basis of the platform details provided by technical partners. Since the platform at the moment doesn't store real data, there is no need for applying such measures above those currently in place.
#7 Participation to the DataVaults Ethics Board	
Has a representative of your demonstrator taken part to the activities of the DataVaults Ethics Board (meetings, opinions on deliverables relevant to ethics and privacy, planning of adequate countermeasures, etc.) and brought the specificities of your demonstrators to the attention to the other members, as described in D10.3?	
Olympiacos	Yes, we have attended the Ethics Board.
Piraeus	Yes, we have attended the Ethics Board.

Andaman7	Yes, specificities were communicated during Ethics meetings and through deliverables
Miwenergia	Yes, we have attended all the Ethics Board.
Prato	Yes, one representative is member of the Board and actively takes part in the board discussions, for example as far as compensation methods for public administration are concerned.
#8 Positive impact on people	
Have you considered the positive effects on people of the implementation of your demonstrator? *Are you making things better for society? How and for whom?* *Which individuals, groups, demographics or organisations will be positively affected by it? How?* *How are you measuring and communicating positive impact? How could you increase it?*	
Olympiacos	Positive effects that we have considered for data owners and data seekers. The club will provide marketing campaigns and useful analytics. Moreover, we assume that the demonstrator will contribute in arising members' awareness on personal data management risks and will empower users in maintaining the control on their data sharing. We are planning to use survey tools to measure such impacts and to disseminate results through social channels and communication media.
Piraeus	All scenarios are either targeting the improvement of the life of citizens and tourists (mobility and tailored touristic/cultural experiences) or the enhancement of local economy (empowering local shop owners and entrepreneurs). We are planning surveys in order to measure the expected positive impact, as described in the AF of DataVaults.
Andaman7	Our main objectives are improving the app to help users to take care of their health and ease collection of data for companies that build a better healthcare system for the future. We then aim to have a positive effect on our users (patients), healthcare companies and ultimately the whole healthcare system. The KPIs we are planning to measure should help having a sense of those positive impacts.
Miwenergia	Yes, we have the intention to provide users with useful energy efficiency tips while educating them in awareness of renewable sources and efficiency use of resources. This will not only benefit the individual but will also be good for all society because we plan reduce the impact on the environment.

Prato	Positive effects might arise both for all groups of citizens and data seekers (municipality, cultural institutions, and fiscal service providers) in the improvements of public and cultural services and in the facilitation in the management and sharing of personal certificates. Moreover, we assume that the demonstrator will contribute in arising citizens' awareness on personal data management risks and will empower users in maintaining the control on their data sharing. We are planning to use survey tools to measure such impacts and to disseminate results through social channels and communication media active in the city.
#9 Negative impact on people	
Have you considered the possible negative effects on people of the implementation of your demonstrator? *Who could be negatively affected by it?* *Could the way that data are collected, used or shared, cause harm or expose individuals to risk of being re-identified?* *How are limitations and risks communicated to people (both people whom the data are about and people potentially impacted by their use)?* *What steps can you take to minimise harm?* *How are you going to measure, report and act on potential negative impacts of your demonstrator?*	
Olympiacos	We do not foresee any negative impact on people, related to the three scenarios and the type of data collected
Piraeus	We do not foresee any negative impact on people, related to the three scenarios and the type of data collected.
Andaman7	Negative impacts are not expected by the kind of data collection that is planned during our demonstration. Of course, the fear of sharing such sensitive data will still be present. During the whole demonstration, we are planning to communicate with users in the most transparent way to convince them their data are secured. Any report done by a user at any step of the process will be taken into consideration to reveal and fix any harm.
Miwenergia	We do not consider the users will face negative effects from our collection and use of their data. The users will face some difficulties just as any other user of an innovative application such as DataVaults. We intend to help them in understanding the use of the platform and make the adaptation process as short as we can.
	We are not foreseeing any particular negative effects on people and the technical solutions put in place in the DataVaults tools will

Prato	reasonably prevent the possibility of individuals' re-identifications. Nevertheless, the survey tools that will be adopted in the open demonstration phase might possibly highlight negative impacts perceived by the users. Should this be the case, specific countermeasures will be put in place accordingly.
#10 People's feedback	
Are you routinely building in thoughts, ideas and considerations of people affected in your demonstrator? How? *What information or training might be needed to help people understand data issues?* *Are you going to establish proper interaction mechanisms with data subjects for communicating them their rights and notices, answering their questions and providing further information to them about the data processing?* *Are you going to use some specific functionalities of the DataVaults platform and app?*	
Olympiacos	People's contribution might be taken into account by activating some feedback process related with the demonstrator activities, for example through specific surveys but also social media campaigns managed by the administration. The topic of personal data sharing is increasingly important and some specific communication and training actions could be carried out through social media and institutional channels. At the moment no specific communication tools are included in the DataVaults app/platform, but should this happen, we will consider this opportunity.
Piraeus	We plan to ask for user's feedback via questionnaires, either standalone or through the DataVaults platform.
Andaman7	Any spontaneous feedback will be collected at any time and answered as quickly as possible through our support platform. Such feedback will be done by email or through the Andaman7 app. In addition, we plan to ask feedback through questionnaires sent to users registered to the demonstration via email or via DataVaults app when the functionality is ready
Miwenergia	We plan to ask for user's feedback via questionnaires. We will also be available for them to contact us via email or phone if they have any issues. At some stage, we will carry out the questionnaires through the application itself.
Prato	People's contribution might be taken into account by activating some feedback process related with the demonstrator activities, for example through specific surveys but also social media campaigns managed by the administration. The topic of personal data sharing is increasingly important and some specific communication and training actions could be carried out through social media and institutional channels. At the

	moment no specific communication tools are included in the DataVaults app/platform, but should this happen, we will consider this opportunity.
#11 Privacy-friendliness	
Do you perceive DataVaults as a privacy-friendly technology?	
Olympiacos	Yes, this is essentially the purpose of the DataVaults tools.
Piraeus	Yes, we consider DataVaults to be a privacy-friendly technology.
Andaman7	Yes, the platform is built to be privacy-friendly through the combination of multiple tools that ensures the purpose.
Miwenergia	Yes, we consider DataVaults to be a privacy-friendly technology. Even though, it collects sensitive data, it is required consent from the users to share them and with the anonymization he desires.
Prato	Yes, this is essentially the purpose of the DataVaults tools.
#12 Societal Impact	
From your point of view, what segments of society are expected to benefit most from DataVaults deployment?	
Olympiacos	Potentially, the benefits provided by DataVaults are expected to be felt by a wide number of segments in society, since the topic of personal data management and sharing is currently increasing importance at all levels.
Piraeus	From our point of view, benefits are expected for both the data users and data seekers as described in DataVaults. Data users, in our case citizens and tourist, may benefit directly from the compensation mechanism and indirectly through the improvement of their everyday life (mobility, touristic/cultural experiences), while data seekers, in our case the municipality or the local trade association will benefit in terms of having an extra tool to acquire much needed information for strategic planning.
Andaman7	From the health point of view, the main segments that could benefit are both patients (to be empowered with their data and contribute to better care and research) and the medical research/medical care companies that run clinical trials. The DataVaults platform should bring a powerful tool that will ease recruitment and data collection for such trials. Given the fact that those are usually built to bring better health for everyone, the whole health system should ultimately benefit from it.

Miwenergia	From our energy point of view, people who are responsible for their homes and who are not very educated in energy efficiency and renewable sources will benefit greatly.
Prato	Potentially, the benefits provided by DataVaults are expected for a wide number of segments in society, since the topic of personal data management and sharing is currently increasing importance at all levels. Of course, since DataVaults is a technological solution connecting digital data source, it will address those using digital devices and accessing digital services, who represent certainly an ever growing part of the population.

2.3 EVALUATION OF THE DATAVAULTS TECHNOLOGY

At the core of DataVaults is the provision of safe, secure, private, fair, legal and ethical mechanisms for handling personal data. Therefore, this aspect of the Evaluation Plan was designed to ensure that we conform to everything that has been promised in these respects. Table 1 below sets out how we propose to do this, indicating the metrics, success criteria and data collection process.

Objective	Metrics: Description of indicators towards assessing progress	Measures of change: Success criteria	Data Collection Methods and sources	Frequency of data collection	Alpha phase evaluation
Citizen experience					
C.1 Improving Privacy Risk Exposure Awareness for Individuals when sharing Personal Data. **KPI**	currently zero	100% with introduction of new methods. Delivery of the Platform and of the Dashboard.	The privacy risk metrics dashboard will provide this information, as opposed to the current situation where no such data is available.	From date of availability of dashboard, as appropriate	Not for alpha phase evaluation
C.2 Improve-ment of Individuals Know-ledge on Personal Data Safe-guarding.	Did this facilitate risk situational awareness?	Individuals engaged on the platform will understand better how to share and safeguard their data. Show an increase.	Verified through the AS-IS vs. TO-BE evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate	Not for alpha phase evaluation

C.3 To overcome reluctance to personal data sharing services via DataVaults	Did the DataVaults system contribute to build trust and overcome the data owners' reluctance in sharing their personal data?	Individuals will be educated on how their personal data can be used, while also enjoy remuneration for this, resulting in a trust building. Use of service	Verified through the AS-IS vs. TO-BE evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate	Not for alpha phase evaluation
Did these facilitate both privacy and trust preservation and has there been an Improvement in Trust? And TOC1 Have we given improved control and awareness of how a citizen's data is shared and managed?			Observation from C1, C2 and C3.		Not for alpha phase evaluation
C.4 Increase of the value of personal data attributed back to owners **KPI** Are individuals receiving a fair share of their data value?	currently zero	100% with introduction of new methods. Currently no value is attributed to data owners, and with DataVaults this will change.	Verified through the DataVaults methodology and the AS-IS vs. TO-BE evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate	Not for alpha phase evaluation
C.5 To develop privacy metrics that are easy to understand for data subjects	Develop-ment of user-friendly privacy metrics, whose test will occur in the next phases of evaluation	100% with introduction of privacy metrics and information to the data owners through easy-to-understand privacy notices	Verified through citizen testing and AS-IS vs. TO-BE evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate Privacy Measures to determine the susceptibility of data or a dataset to revealing private information. (https://arxiv.org/abs/1512.00327)	Not for alpha phase evaluation
C.6 Has the personal app been successfully used by individuals	N/A	100% with the use of the personal app by individuals. Currently individuals do not feel fully-comfortable in	Verified through citizen testing and evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate	Not for alpha phase evaluation

for storing, collecting and sharing data and what was their experience here?		sharing their personal data with personal data platforms. With DataVaults this will change, thanks to its functionalities for user control and the fair, transparent share of the value of data (trust building and acceptance of DataVaults)			
C.7 Was the personal app consent mechanism clear and well-received?	N/A	The consent form and information sheet already provided for each of the demonstrators will be refined and updated in order to adapt them to the online environment, the layered approach for consent management described in D2.1 and the indications coming from the EDPS's Guidelines 05/2020 on consent under Regulation 2016/679Version 1.1 (2020)	Verified through citizen testing and evaluation in the demonstrators through surveys, interviews etc.	Surveys and interviews as appropriate	Not for alpha phase evaluation
Legal, Ethical, Security and Privacy aspects					
R.1. "Personal data platforms shall ensure respect of prevailing legislation and allow data subjects and data owners to remain in control of their data and its subsequent use."		Is there compliance with list of requirements identified in WP2?		Section 2.3.3 hereunder shows the state of achievement of the requirements set in D2.2 and D2.3, including compliance with the applicable legislation.	The design of DataVaults technology is taking into account the requirements set in WP2.
R.2. "… Conditions of use and practical arrangements of data sharing should be regulated."		The approach and key choices related to the Smart for the fair and secure personal data management have been defined in T2.3 and is under implementation within WP3, WP4 and WP5		Section 2.3.3 hereunder shows the state of achievement of the requirements set in D2.2 and D2.3, including compliance	The Data Sharing configur-ation service has been developed and will be

		with the applicable legislation.	integrated in the next iterations
R.3. Has there been a contribution to the Basis for Privacy, Ethics and IPR?	This will be part of Lessons Learned.	This will be reported in D6.6	Not for alpha phase evaluation
Do we contribute to and are we aligned with:			
R.4. Ethics driven guidelines and privacy & security standards	Several data ethics guidelines have been central to the design and ongoing development of DataVaults technology, such as the EDPB-EDPS Joint Opinion 03/2021 on the Proposal for a regulation of the European Parliament and of the Council on European data governance (Data Governance Act) Version 1.1 (March 2021), the EDPS Opinion 7/2015 "Meeting the challenge of Big Data. A call for transparency, user control, data protection by design and accountability" (2015), as well as the Open Data Initiative, White Paper "Helping organisations navigate ethical concerns in their data practices (2017) and the "Data Ethic Canvas – User Guide" (2021) Privacy standards for information security (https://www.enisa.europa.eu/news/enisa-news/privacy-standards-for-information-security)	This will be further assessed and reported in D6.4 and D6.5	YES. The current design and ongoing implement-ation of the DataVaults technological artefacts are aligned with the ethics-driven guidelines and privacy & security standards, as resulting in the WP3, WP4 and WP5 deliverables.
R.5. Fundamental Rights and Well-being	The design and ongoing implementation of the DataVaults technological artefacts are driven by Fairness & Privacy-by-Design-and-by-Default approach, enriched with the Protection Goals method, as described in D9.2 and in D2.1	This will be further assessed and reported in D6.4 and D6.5	YES. DataVaults technologies already developed and under developmen t are directed to uphold European values, for respecting fundamental right of the data owners and promote their well-being and

			empower-ment, as resulting in the WP3, WP4 and WP5 deliverables
R.6. Is the personal app compliant with EU regulations and national laws?	D2.1 and D2.3 provide the identification and description of the regulatory sources relevant to the DataVaults components, personal App and cloud-based platform, together with a series of mandatory and recommended legal requirements to be met	This will be further assessed and reported in D6.4 and D6.5	YES. The DataVaults technologies already developed and under develop-ment took into account the relevant legal sources and are compliant with them. Further assessment of this aspect needs to be performed in the following stages of the project, once other outcomes will be finalized
R.7. Did we provide an Ethics monitoring framework?	D9.2, Sect. 2 describes the overall ethical policy of the project. Such a Policy, besides describing the Fairness & Privacy-by-Design-and-by-Default enriched with the Protection Goals Approach, comprises a snapshot of the ethical procedures and responsibilities, the definition of the oversight responsibilities (DataVaults Ethics & Data Protection Officer and DataVaults Ethical Board) and preliminary considerations for the elaboration of the comprehensive Ethical and Data Protection Impact Assessment methodology to be used within WP6, during the demonstrators' operations.	N/A	YES

	Furthermore, D10.2 section 3.1.1 provides a comprehensive ethics risk evaluation table in relation to the pilot's activities. In addition, the Ethics Board has been set, including independent expertise, and is operating with strong interaction with the technical team.		
R.8. Did we successfully adopt novel trusted and security-by-design data mining, management, analysis and sharing techniques?	The approach and processes, were outlined in T2.2, where also the key technological choices were taken.	In line with the approach and techniques set in WP2, these aspects were initially covered by D3.1 and will be further addressed in D3.2 and D3.3, besides in the next WP5 deliverables	Not for alpha phase evaluation
R.9. Have privacy analytic methods been provided and tested?	Details on the approach and procedures for data collection, storage, protection, retention, and destruction to be implemented by the DataVaults tools (app and platform) are and will be further provided in the technical deliverables released by the DataVaults consortium in WP2, WP3, WP4 and WP5.	Next WP3, WP4, WP5 deliverables	Not for alpha phase evaluation

Table 1: Overall evaluation of citizen experience and of Legal, Ethical, Privacy and Security aspects

Three instruments will be used in the next evaluation cycles to assess these aspects. They will be described in the following sections.

2.3.1 Ethics and Data Protection Impact Assessment

The Ethics and Data Protection Impact Assessment (EDPIA) is "functional to the assessment of risks for individuals' rights, freedoms and wellbeing, for ensuring compliance with the data protection law (GDPR[3] and national regimes), and ethical mandates"[4]

The assessment methodology regarding the risks for the personal data will be conducted following the indications of Article 35 sec. 1 GDPR, taking into account the nature, scope, context and purposes of the processing operations in each demonstrator in view of evaluating their impact on the protection of personal data, to identify and reduce the data protection

[3] 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)

[4] DataVaults D9.2 Ethics and Data Management Plan.

risk[5] and the likelihood of privacy harms to individuals, as well as to identify and put in place the appropriate technical and organisational measures to tackle with/mitigate such risks.

As already mentioned in D9.2, the Consortium will adopt a model inspired by the ISACA Model[6] for conducting such data protection assessment, which maps the fourteen ISACA privacy principles to the specific GDPR requirements and therefore allows an easy integration with any additional PIAs standards (Privacy Impact Assessment) required for other possible multiple privacy principles relevant for the demonstrators. Furthermore, this model is well aligned with the protection model focused on individual privacy and user control and efficaciously supports accountability, representing a useful instrument for the demonstrators to showing commitment and due diligence in taking adequate actions to ensure full compliance on an ongoing basis.

The demonstrator will elaborate their own EDPIA in conjunction with the respective DataVaults technological supporting partners, created with reference to the legal and ethical requirements set in D2.1 and D2.3 and considering the specific DataVaults technologies (like services, components) relevant to their context, the data lifecycle and each use cases scenarios, as well as their own privacy and security policies/practices.

Furthermore, in order to adequately cover also the ethical dimensions and to assess to what extent the principle of fairness has been operationalized in each of the demonstrator, the model inspired to the ISACA scheme will be enriched with the Data Ethics Canvas. It consists in a useful tool giving a higher-level framework to develop ethical guidance that suits any context and to assess the ethical implications of any project, thereby allowing to be more trustworthy with data processing. This tool was elaborated by the ADAPT Centre for Digital Content Technology on the basis on the original Business Model Canvas by Alex Osterwalder.

The Data Ethics Canvas is capable of helping those who collect, share and use data in identifying and managing ethical uses, both at the start of the initiative which imply data collection/processing and throughout[7]. On the other hand, thanks to it, the data seekers are supported in putting in place practices ensuring that the way the data is collected and used is trustworthy and ethical, beyond legal compliance.

The following Figure 2 shows the Data Ethics Canvas:

5 The concept of risk is clarified in Recitals 75-79 of the GDPR.
6 ISACA, “GDPR Data Protection Impact Assessment”, 2017

[7] Open Data Initiative (ODI), “Helping organizations navigate ethical concerns in their data practices”, 2017.

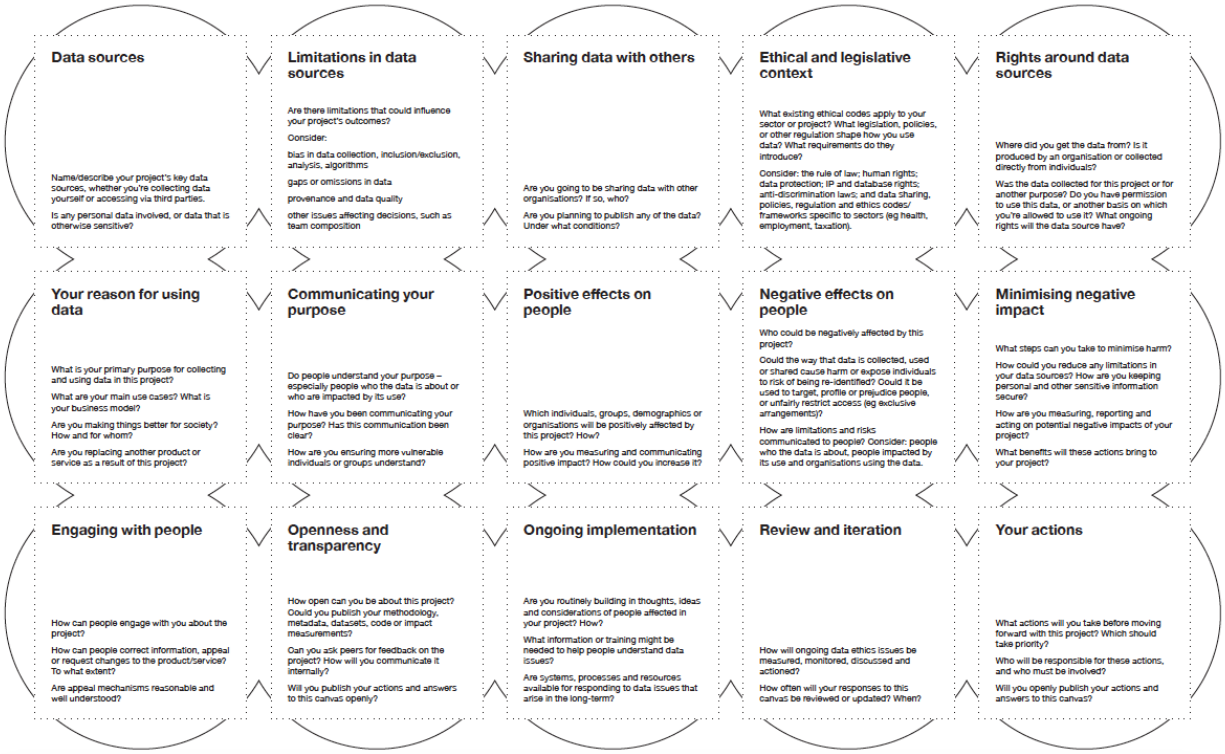

Figure 2: Data Ethics Canvas (source: ODI).

The ODI's Theory of Change is strongly consistent with the DataVaults' vision: "We want people who steward data, and people who create things with it, to act in ways that bring about positive impacts. Ethical use of data helps to improve trust, and bring about the best economic and social outcomes. We want to avoid a future where data is feared or hoarded. We want data to work for everyone"[8]. Some of the points mentioned in the Data Ethics Canvas, such as the envisaged positive and negative impact on society, have already been addressed by the demonstrators elsewhere in this deliverable.

The following questionnaire will be used for conducting the Ethics and Data Protection Impact Assessment in each of the DataVaults demonstrator (one questionnaire for demonstrator) and comprises elements coming both from the ISACA Model and from the Data Ethics Canvas.

Introductory questions		
	Introductory questions	***Responses***
1	Nature, scope, context and purposes of the processing (Recital 90)	
2	List of in-scope personal data items	
3	List of key data sources, whether you're collecting data yourself or accessing via third parties. Is any personal data involved, or data that is otherwise sensitive?	
4	Limitation in data source: are there limitations that could influence your project's outcomes? Consider: • bias in data collection, inclusion/exclusion, analysis, algorithms	

[8] theodi.org/theory-of-change

	• gaps or omissions in data • provenance and data quality • other issues affecting decisions, such as team composition	
5	Recipients of personal data items (if not applicable, indicate N/A). Are you going to be sharing data with other organisations? If so, who? Are you planning to publish any of the data? Under what conditions?	
6	Period for which the personal data will be stored (e.g. in hours, days, weeks or years, etc.)	
7	Functional description of the processing operation	
8	What are your main use cases? What is your business model? Are you making things better for society? How and for whom? Are you replacing another product?	
9	DataVaults assets involved in the data collection and/or processing	
10	Processing or functional assets associated with in-scope personal data (e.g., hardware, software, networks, people, paper or paper-transmission channels)	
Choice and Consent		
11	Do you have documented and enforced privacy and security policies (and supporting procedures) to provide choices, where appropriate, to data subjects regarding use of their personal data? Is consent obtained before using personal information for specific purposes, as required by GDPR? See GDPR Art. 6(1)	
12	Are consents (once obtained) appropriately documented and maintained?	
13	Personal Data Security Risk & GDPR Mitigation Safeguards Actions	
14	Data Subject Privacy Harm and Risk-mitigation Actions	
Legitimate Purpose Specification and Use Limitation		
15	Do you have documented and enforced privacy and security policies (and supporting procedures) to collect only the personal data that are adequate, relevant and limited to what is necessary in relation to the purposes for which the data are processed, in support of data-minimization requirements? See GDPR Art. 5(1)	
16	Do you have documented and enforced privacy and security policies (and supporting processes) in place to ensure that personal data processing is lawful and necessary given the purposes for which the data were collected? See GDPR Art. 6(1)(b)	
17	Do you have documented and enforced privacy and security policies (and supporting processes) in place to ensure that any intended further processing will be reviewed, and handled appropriately, prior to such use (e.g., obtaining additional data-subject consent, ensuring legal compliance, etc.)? See GDPR Art. 6(4)(a)	
18	Have you determined and documented situations to which the right to object does not apply, and implemented appropriate supporting procedures? See GDPR Art. 22(2)	
19	Do the data protection officer job responsibilities include consideration of risks to personal data and the associated harm risks to data subjects so that purpose and use limitation can be appropriately considered? See GDPR Art. 39(2)	

Personal Information and Sensitive Information Life Cycle		
20	Do you have documented and enforced privacy and security policies (and supporting procedures) to keep personal data for no longer than necessary to support the purposes for which they were collected, including legal and any applicable public interest, scientific and historic-research purposes? See GDPR Art. 5(1)	
21	Do you have documented and enforced privacy and security policies (and supporting procedures) to decide whether or not special categories of personal data, or personal data related to criminal convictions/offences, have been used beyond the original purposes for which they were collected? See GDPR Art. 6(4)	
22	Do you have documented and enforced privacy and security policies (and supporting procedures) to determine whether the following types of personal data are collected (and/or processed) under relevant exemptions provided within GDPR, or if such processing needs to be prohibited? a) data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade-union membership b) genetic data c) biometric data for the purpose of uniquely identifying a natural person d) data concerning health e) data concerning a natural person's sex life or sexual orientation See GDPR Art. 9(1)	
23	Do you have documented and enforced privacy and security policies (and supporting procedures) that require implementation of appropriate technical and organizational measures to ensure that, by default, only personal data which are necessary for each specific processing purpose are actually processed? See GDPR Art. 25(2)	
24	Do you have documented and enforced privacy and security policies (and supporting procedures) to perform reviews, when necessary, that determine whether processing is performed in accordance with the data protection impact assessment, whenever the risk represented by processing operations changes? See GDPR Art. 35(11)	
Accuracy and Quality		
25	1) Do you have documented and enforced privacy and security policies (and supporting procedures) to ensure that personal data are kept accurate and up to date, as necessary, and to correct personal data errors without delay? See GDPR Art. 5(1)	
Openness, Transparency and Notice		
26	Do you have documented and enforced privacy and security policies (and supporting procedures) to ensure that personal data are collected for clearly specific and legitimate purposes; not used for processing purposes other than those stated or as defined by GDPR; and are processed fairly, transparently and in compliance with applicable legal requirements? See GDPR Art. 5(1)	
27	Do you have documented and enforced privacy and security policies (and supporting procedures and processes) to communicate to data subjects their rights, notices, and answer their questions and provide information to them	

	relating to data processing, in a manner that is clear, easy to understand, and age appropriate to the data subject? See GDPR Art. 12(1)	
28	Do you have documented and enforced privacy and security policies (and supporting procedures and processes) to provide, at the time personal data are obtained from data subjects, all necessary information elements, such as the data subject's rights; how to restrict use of their associated personal data; how to retract consents for personal data use, etc., as required by GDPR; as well as to ensure fair and transparent processing? See GDPR Art. 13(1), Art. 13(2), Art. 14(2), Art. 21(4)	
29	Do you have documented and enforced privacy and security policies (and supporting procedures and processes) to provide the data subject with information describing any additional purposes for which previously collected personal information will be used and other relevant information, prior to further processing? See GDPR Art. 13(3), Art. 14(4)	
30	Do you have documented and enforced privacy and security policies (and supporting procedures and processes) to inform data subjects of the safeguards applied when personal data are transferred to a third country or to an international organization? See GDPR Art. 15(2)	
Individual Participation		
31	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) that allow data subjects to withdraw consent to use their associated personal data at any time (including personal data used in partnership with other controllers), as long as the withdrawal does not result in legal violations about which you have informed the data subjects? See GDPR Art. 7(3), Art. 26(3)	
32	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) in partnership with any other joint controllers to ensure that a data subject whose identity has been verified can exercise his or her rights to request access to; information about; corrections to; deletion/destruction (erasure) of; or restrictions on associated personal data in compliance with the timing, costs, and format of information delivery requirements mandated by the GDPR? And do these include processes to provide documented reasons for denying requests? See GDPR Art. 12(2), Art. 12(3), Art. 12(4), Art. 12(5), Art. 12(6), Art. 14(3), Art. 16, Art. 17, Art. 21(1), Art. 26(3)	
33	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) to allow a data subject whose identity has been verified to obtain confirmation regarding whether or not personal data are being processed (including personal data used in partnership with other controllers), and when that is the case, to provide the data subject access to the associated personal data, including information concerning the purposes; categories; recipients; retention periods; rights for deletion and registering complaints; ability to restrict personal data processing where feasible	

	and legal, with notices when the restrictions are lifted; and data source details where possible, in compliance with GDPR requirements? See GDPR Art. 15(1), Art. 18, Art. 26(3)	
34	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) to provide a copy of personal data that are not used in the public interest or by official authorities, which copy shall be processed upon request by the data subject, without prejudice; delivered in a commonly used digital format, along with additional copies as requested; for a reasonable fee where the fee is based on actual administrative costs? See GDPR Art. 15(3), Art. 20(3)	
35	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) that enable data subjects to object to the use of their personal data for direct-marketing and profiling purposes, including those that result in decisions or circumstances affecting the associated data subject legally? See GDPR Art. 21(2), Art. 22(1)	
36	Do you have documented and enforced privacy and security policies (and supporting procedures and easy-to-use processes) to enable data subjects to contact the data protection officer for any issue related to processing of their personal data or to the exercise of their rights under GDPR? See GDPR Art. 38(4)	
Accountability		
37	Have you established an appropriately qualified data protection officer and defined the tasks for which he/she will be responsible, in compliance with the GDPR? See GDPR Art. 37(1); Art. 37(2); Art. 37(3); Art. 37(4), Art. 37(5), Art. 37(6)	
38	Do you have documented and enforced privacy policies (and supporting procedures) to ensure that in the event personal data are not obtained from the data subject, the enterprise provides the data subject with the following information: a) identity and contact details of the controller; b) contact details of any applicable data protection officer; c) documentation of the purposes and legal basis for personal data processing; d) documentation of the categories of personal data concerned; e) lists of recipients (or categories of recipients) of the personal data, if any; f) records of intention to transfer personal data to a recipient in a third country or international organization, where applicable; g) the existence or absence of an adequacy decision by the Commission; and h) records of existing safeguards and the means to obtain a copy of them? See GDPR Art. 14(1)	
39	Which DataVaults tool in your demonstrator support accountability?	
Security Safeguards		
40	Do you have documented and enforced privacy and security policies (and supporting procedures) to ensure: a) that appropriate safeguards are implemented to secure personal data, including protections against unauthorized or unlawful processing and against accidental loss, destruction or damage; and	

	b) that appropriate technical and/or organizational measures are applied when personal data are used for purposes other than that for which the data was initially collected (e.g., encryption, access controls, pseudonymization, documented policies, training, log reviews, etc.)? See GDPR Art. 5(1), Art. 24(2), Art. 6(4)	
41	Do you have documented and enforced privacy and security policies (and supporting procedures) to assess the likelihood of privacy harms to data subjects in the event of: a) unauthorised access, sharing or use of personal data; and b) unauthorised or accidental destruction, loss, or alteration or personal data?	
42	Do you have documented and enforced privacy and security policies (and supporting procedures) to implement appropriate technical and organizational measures that ensure a level of security for the personal data appropriate to the personal harm risk, including, as appropriate: a) such controls as pseudonymization and/or encryption; b) such procedures to establish confidentiality, integrity, availability and resilience of processing systems and services, data backup and recovery; and c) regular testing of associated security controls? See GDPR Art. 32(1), Art. 32(2)	
Monitoring, Measuring and Reporting		
43	Do you have documented and enforced policies (and supporting procedures) to provide reports for data subjects (at specified times; upon their request as appropriate; and reflecting all components required by GDPR), including: a) personal data-breach notifications; b) reports regarding correction of personal data erasure and/or incorrect personal data; c) reports showing the content of personal data associated to the subject; d) reports showing the personal data associated to the subject that the enterprise has shared with others, including the reasons for such sharing; and e) full digital copies of personal data transmitted directly to another data controller in support of data portability requirements. See GDPR Art. 17, Art. 19, Art. 20(1), Art. 20(2), Art. 34(2)	
44	Do you have documented and enforced policies (and supporting procedures) governing the content required in DPIA reports, as mandated by the GDPR, including: a) a systematic description of the processing operations, purposes and legitimate interest pursued by your enterprise when applicable; b) an assessment of the necessity and proportion of processing operations in relation to purposes; c) an assessment of the risks to the rights and freedoms related to the data; and d) an assessment of the measures necessary to mitigate risks (including, for example, safeguards, security measures and mechanisms to protect personal data and demonstrate compliance with the GDPR)? See GDPR Art. 35(7)	
45	Do you have documented and enforced policies (and supporting procedures) to maintain a record of processing activities involving personal data that includes: a) the name and contact details for your enterprise and, where applicable, such details for any joint controller's representative and/or data protection officer;	

	b) the purposes for processing personal data; c) a description of the categories of data subjects and of the categories of personal data involved in the processing; d) the categories of recipients to whom the personal data have been or will be disclosed, including recipients in third countries or international organizations; e) transfers of personal data to a third country or an international organization, where applicable, including the identification of that third country or international organization and documentation of associated safeguards; and f) where possible, the established time limits for erasure of the different categories of data? See GDPR Art. 30(1)	
Preventing Harm		
46	Do you have documented data subject harm-prevention policies (and supporting procedures) that specify the rights of data subjects to request removal of their personal data from automated processing and profiling in situations that could result in adverse legal effects or harms to them, and also to specify the actions (and associated contact methods) your enterprise can take to obtain the views of data subjects (or their legal representatives) about the intended processing? See GDPR Art. 22(1), Art. 35(9)	
47	Do you have documented data subject harm-prevention policies (and supporting procedures) to ensure that data subjects who exercise their rights for changing how their personal data are used; request copies of personal data; and/or exercise other rights under GDPR do not adversely affect the rights and freedoms of others? See GDPR Art. 15(4), Art. 20(4)	
Third-party/Vendor Management		
48	Do you have documented third-party / vendor management policies (and supporting procedures) to specify the type of documented contract (in hard copy and/or digital form), or other legal act under union or member-state law, binding on the processor with regard to your enterprise, that set out: a) the subject-matter and duration of the processing; b) the nature and purpose of the processing; c) the types of personal data, categories of data subjects and the eight categories of obligations required under GDPR; d) the obligation to notify your organization of any violations, anticipated changes in the obligations and the rights of your enterprise to verify such requirements? See GDPR Art. 28(3), Art. 28(9)	
Breach Management		
49	Do you have documented personal data breach policies (and supporting procedures) that include requirements for: a) notifying appropriate supervisory authorities of the breach in a timely manner, and with reasons provided for any delays; b) notifying data subjects of high risk breaches (as defined by GDPR) no later than 72 hours after discovery of a breach, if it is determined (following documented procedures for performing harm risk analysis) that the personal data breach will result in privacy harm to the associated data subjects; and c) including all items necessary within the notice as required by GDPR? See GDPR Art. 33(1), Art. 33(2), Art. 33(3), Art. 33(4), Art. 34(1), Art. 34(3)	

Security and Privacy by Design		
50	Do you have documented and enforced policies (and supporting procedures) to build security and privacy protections into the full lifecycle of automated decision-making processes involving personal data; to safeguard the data subject's rights, freedoms and legitimate interests; to enable human intervention by your enterprise (as the controller); to allow the associated data subjects to include their points of view about the associated decisions; and to allow the data subjects to contest the decisions? See GDPR Art. 22(3)	
51	Do you have documented and enforced policies (and supporting procedures) to implement appropriate technical, administrative and physical security and privacy controls, supported by documented privacy principles (e.g., the ISACA Privacy Principles, and/or IEEE privacy standards, etc.), in order to appropriately mitigate harms to individuals to the extent possible in compliance with GDPR and to protect the rights of data subjects? See GDPR Art. 24(1), Art. 25(1)	
Legal, Ethical and Societal Implications		
52	Do people understand your purpose – especially people who the data is about or who are impacted by its use? How have you been communicating your purpose? Has this communication been clear? How are you ensuring more vulnerable individuals or groups understand?	
53	Ethical and Legislative context. What existing ethical codes apply to your sector or project? Are there any legislation, policies, or other regulation shape how you use data, in addition to those listed in D2.3?	
54	Compliance with the approved codes of conduct (Article 35(8)). In not relevant, please insert N/A	
55	Positive effects on people. Which individuals, groups, demographics or organisations will be positively affected by this project? How? How are you measuring and communicating positive impact? How could you increase it?	
56	Negative effects on people. Who could be negatively affected by this project? Could the way that data is collected, used or shared cause harm or expose individuals to risk of being re-identified? Could it be used to target, profile or prejudice people, or unfairly restrict access (e.g. exclusive arrangements)? How are limitations and risks communicated to people? Consider: people who the data is about, people impacted by its use and organisations using the data.	
57	Openness and transparency. How open can you be about this project? Are you asking the volunteer for feedback on the project and its outcomes? Are you building in thoughts, ideas and considerations of people affected in your project? How? What information or training might be needed to help people understand data issues? Are systems, processes and resources available for responding to data issues that arise in the long-term?	

58	Review and iterations Are you planning to measure, monitor and discuss the data ethics issues in the post-project phase and to review this EDPIA?	

Table 2 Ethics and Data Protection Impact Assessment Questionnaire

2.3.2 Collection of citizens' feedback

The main ways for demonstrators to collect feedback will be in two main stands:

a) Through online questionnaires, to be hosted by the platform that will be available to any user registered in the platform, allowing them to provide the necessary input relevant to ethical, legal, privacy and trust implications they consider might be relevant to the DataVaults platform, its way of operation and its concept in general.
b) Through the conduction of small-scale focus groups organised by each demonstrator partner, that will follow the demonstration and hands-on training sessions that will be organised for the audience to get acquainted with the platform. These groups will make use of the same material to be utilised by the questionnaires mentioned above, to produce comparable results, while also a discussion session will be organised to further explore the feedback coming from these users.

These activities will be organised during the Beta phase of the demonstrators in order to get some feedback before the launch of the v0.5 release of the platform, and will be again conducted in the final phase of the demonstrators.

2.3.3 Fulfilment of the Ethical, Legal, Privacy, Security and Trust Requirements

D2.1 "Security, Privacy and GDPR Compliance for Personal Data Management" and D2.3 "Updated DataVaults Security Methods and Market Design" respectively elicit and refine/update the legal and ethical requirements for the design, development and validation of DataVaults cloud-based platform and Personal App, as well as, to some extent, for the future operation of them.

They were elicited, relying on the Fairness & Privacy-by-Design-and-by-Default Approach enriched with the Protection Goals method, as well as on the analysis of the regulatory landscape and on the factual analysis of the privacy-relevant properties and other features foreseen for the personal data collection, processing and sharing in DataVaults services and tool.

This requirement category was accompanied, in the same deliverables, by another one, referring to the technical security, privacy and trust requirements for the DataVaults platform and App, elaborated with a view on an enhanced (holistic) data sharing solution. They were set reflecting on DataVault's work and data flow and on how data security, privacy, sharing and management services are to be engrained in a policy-compliant Blockchain structure.

Both of these two macro-categories of requirements include mandatory and desirable/recommended requirements.

For instance, as regards the legal requirements, the former regard those that are binding, since directly deriving from the legislation (such as GDPR), whilst the latter refer to quite challenging ones, that need to be interpreted taking into account the SoTA, the research

nature of the project and the risk-based approach fostered by GDPR itself. Therefore, as already mentioned in D2.1, the preferable requirements should be interpreted more than recommendations: as a consequence, their assessment demands for a certain degree of flexibility and needs to be established on a case-by-case basis.

The fulfilment of the requirements regarding the DataVaults technology ensures that it is legally compliant, ethically sound and gives rise to a trusted, secure privacy-friendly enhanced (holistic) data sharing solution.

The following Table 3, which does not cover other “usability” aspects which will be covered as non-functional specifications/requirements, shows the initial assessment (for alpha phase evaluation) of the fulfillment of the Legal, Ethical, Privacy, Security and Trust requirements set in D2.1 and refined in D2.3. It will be further utilized for the next evaluation iterations, to ensure that all of them are met by the final technological artefacts.

Requirement	Status	Alpha	Beta	Final
Legal requirements to be fulfilled				
Purpose limitation and legitimate aim	Yes **Completed**	• DataVaults Personal App Terms and Privacy Notes • DataVaults Cloud Platform Terms and Privacy Notes		
Data minimisation	Yes **Ongoing**	• DataVaults Personal App Terms and Privacy Notes • DataVaults Cloud Platform Terms and Privacy Notes • Access Policy Engine		• Risk Privacy Metrics Dashboard and Engine
Data Accuracy	Yes **Ongoing**		• TPM DAA Module Component	
Integrity and Confidentiality	Yes **Ongoing**	• Anonymise • Access Policy Engine		• ABE Engine
Storage Limitation	Yes **Ongoing**			• DataVaults Secure Storage Containers
Transparency	Yes **Ongoing**	• Access Policy Engine	• DataVaults DLT infrastructure	
Privacy and Data Protection by Design and Privacy by Default	Yes **Ongoing**			• DataVaults Secure Storage Containers • ABE Engine
Avoidance of discrimination (including social sorting) and of harm	Yes **Ongoing**	• DataVaults Personal App Terms and Privacy Notes • DataVaults Cloud Platform Terms and Privacy Notes		
Informed Consent	Yes **Ongoing**	• DataVaults Personal App and Cloud Platform Terms and Privacy Notes		
Set of requirements referring to the voluntary participation to DataVaults demonstrators	Yes **Ongoing**	• DataVaults Personal App Terms and Privacy Notes • DataVaults Cloud Platform Terms and Privacy Notes		
User Control	Yes **Ongoing**	• Access Policy Engine		• Risk Privacy Metrics Dashboard and Engine • Wallet
Data subject's rights	Yes **Ongoing**	• Access Policy Engine • Data Request Resolver	• DataVaults DLT infrastructure	• Risk Privacy Metrics Dashboard and Engine

				• Wallet
Enforcement	Not Started		• DataVaults DLT infrastructure	
Fairness by Design	Yes **Ongoing**	The whole design and development is driven by this approach.		
Effective "sharing the wealth" paradigm	Yes **Ongoing**	The whole design and development is driven by this approach.		
Privacy Notice	Yes **Completed**	• DataVaults Personal App Terms and Privacy Notes • DataVaults Cloud Platform Terms and Privacy Notes		
Data breaches	Not Started			• DataVaults Personal App Penetration Test • DataVaults Cloud Platform Penetration Test
Accountability	Not Started			• DataVaults Operations Manual
Record of processing activities	Not Started			• DataVaults Operations Manual
Data Protection Impact Assessment	Yes **Ongoing**			• Risk Privacy Dashboard and Engine
Technical and organizational measures	Yes **Ongoing**	Access Policy Engine		• DataVaults Secure Storage Containers • ABE Engine
Use of private environment/cloud as much as possible	Yes **Ongoing**			• DataVaults Secure Storage Containers • ABE Engine
User and data protection friendly User Interface	Yes **Ongoing**			• Risk Privacy Dashboard and Engine
Measures in case of profiling	Not Started		Anonymiser (Personas)	• Risk Privacy Dashboard and Engine • Wallet
Appointment of Data Protection Officer	Yes **Completed**	DPO Assignment		
Assignment of responsibilities	Yes **Completed**	Responsibilities Assignment		
Ethics Board set-up and involvement	Yes **Completed**	Ethics Board Setup		

Checklist for the Privacy, Security and Trust				
Integrity and Confidentiality	YES – **completed**	Sharing Configurator Component		
Authorization and Access Control	YES – **completed**	Access Policy Engine		
Non-repudiation and Accountability of Actions	Not started	Not for the alpha stage version		
Anonymity	YES - **ongoing**	Not for the alpha stage version		
Conditional Anonymity	YES – **completed**	Anonymiser		
Unlinkability	Not started	Not for the alpha stage version		
Data Privacy	YES – **ongoing**	Not for the alpha stage version		
Forward and Backward Privacy	Not started	Not for the alpha stage version		
Trustworthiness and Operational Correctness	Yes - **ongoing**	Personal Wallet		
Cryptography	YES – **completed**	Sharing Configurator		
Ledger Security	YES – **completed**	Trusted DLT Engine		

Table 3: Checklist for Legal, Ethical, Privacy, Security and Trust requirements

Thus, from all of the above, it can be concluded that all the required activities capable of being carried out at this stage of the project have been carried out. And that the foundations for further ensuring that we will conform to all expected criteria for the legal, ethical, security, privacy and trust aspects of the DataVaults technology, have all been put in place. Similarly, the demonstrators where such technologies are going to be validated and assessed against the requirements elicited in the previous stage of the project, are well prepared for the final stages of the project.

3 PREPAREDNESS AND STATUS OF THE DEMONSTRATION SITES

As identified in deliverables D6.1 and D6.2, demonstrators contribute to the evaluation process in three distinct ways, with all five demonstrators equally active in their evaluation of all aspects of DataVaults.

- Primarily they participate to showcase the technology and to check it is suitable. Collectively they can contribute to aspects of the project they have in common.
- Secondly, they need to see value in the use of the technology for their own purposes.
- Thirdly, they can add insight and lessons learned to the higher level and strategic goals for the project as a whole.

Given the inter-locking nature of D6.1 and D6.2 in planning the demonstration and the required metrics and in the evaluation of the achievement of the goals linked to these metrics, the sections below report on the actual status of the demonstrators and provide their progress relevant to the demonstration activities.

It is reminded that the demonstration phase in every setting has been split into 3 different phases, which go hand in hand with the releases of the platform, and those are

- Phase Alpha, running from M19-M24, working with the Alpha release of the platform,
- Phase Beta, running from M25-M30, grounded on the Beta release of the platform,
- Final Phase, running from M31-M36, evaluating the platform's version 0.5 release.

In this deliverable, the focus is on the activities performed during Phase A.

It is noted that at the current stage, the five demonstrators worked with the Alpha version of the DataVaults platform, which according to the DoA offered as a mix of working prototypes and mock-ups, with the main purpose of this stage being that of debugging and allowing the demonstrators to get acquainted with the overall system, conducting small, close group experiments, and working on customisation and data preparation aspects as identified in their plans. As such, none of our identified KPIs are to be measured, as those are grounded on the actual operation of the platform and these will be able to be measured following the release of the beta and of the v0.5 version of the DataVaults platform.

As such, the following sections provide a status update of the planned activities provided as part of D6.2, while the updated plan for each demonstrator for the period M25-M36 is provided in Appendix 1.

3.1 DEMONSTRATOR #1 - SPORTS AND ACTIVITY PERSONAL DATA (OLYMPIACOS)

3.1.1 Target Audience Reached during Alpha Phase

3.1.1.1 Data Owners

During the Alpha phase, a small set of data owners were reached, with them being employees of Olympiacos, in order to start testing the first release of the platform internally.

3.1.1.2 Data Seekers

In the alpha phase the sole data seeker was Olympiacos, working on getting to know the platform and identifying issues that could be relevant to the data seekers to be contacted for the beta phase. During the beta phase, Olympiacos will aim to invite 5 external companies.

3.1.2 OLYMPIACOS Demonstrator Scenarios Evolution

3.1.2.1 Scenario A - Club Fans and Members Personal Data Marketplace

3.1.2.1.1 Validity of Scenario

The scenario is still valid and no main changes are planned for the moment, but this issue will be furtherly investigated once the beta version of the tool will be available. For example, one issue that we will have is on the connection with the ticketing system about the presence of data owners in the stadium for football matches. On the other hand, we might request data from the individuals directly for recording their presence in stadiums manually.

3.1.2.1.2 Objectives of OLYMPIACOS Scenario A

Objective	Status	Expected in Phase
Connect internal CRM of the club to DataVaults cloud platform.	In Progress	Alpha
Share data of fans and members with DataVaults cloud platform.	In Progress	Beta
Brand the DataVaults personal app, for example as an affiliate of Olympiacos.	Not Started Yet	Beta
Promote DataVaults personal app to existing fans and members (e.g. via e-mail).	Not Started Yet	Final
Advertise and implement compensation for connecting the DataVaults app with social media data sources based on the features that will be offered by the platform.	Not Started Yet	Final
Push questionnaires to fans to extract information in the absence of other data sources.	Not Started Yet	Final

Table 4: OLYMPIACOS Scenario A objectives

3.1.2.1.3 OLYMPIACOS Scenario A Evolution

Actions taken so far:

- Analysed the connections of the internal CRM of the club to identify the connection points to DataVaults
- Evaluated other data sources that could be used for data collection
- Identification of sign-in options/authentication path for users stored in the CRM
- Shared fixed data amongst the club to alpha phase users of the platform
- Developed simple questionnaires via the platform
- Evaluated the technical solution of the alpha release from the perspective of Individuals and Data Seeker

3.1.3 OLYMPIACOS Scenario B – Athletes Sports and Activity Data Sharing

3.1.3.1.1 Validity of Scenario

The scenario is still valid and no main changes are planned for the moment.

3.1.3.1.2 Objectives of OLYMPIACOS Scenario B

Objective	Status	Expected in Phase
Connect internal portal of the club to DataVaults to fetch information upon individuals' command.	In Progress	Alpha
Share personal data and athletic activity data of athletes with DataVaults cloud platform.	In Progress	Final
Promote DataVaults Personal App to athletes, trying to include a proportion of professional athletes.	Not Started Yet	Final
Run analytics on the performance of the athletes based on the collected data.	Not Started Yet	Final

Use DataVaults platform as the main channel to collect athletic activity and ergometric and medical examination data from the athletes who take part in the initiative.	Not Started Yet	Final

Table 5: OLYMPIACOS Scenario B objectives

3.1.3.1.3 OLYMPIACOS Scenario B Evolution

Actions taken so far:

- Ongoing work into transform static isolated data into data sources to be used by the project as files
- Performed experimental sharing of such files over the platform
- Evaluated the technical solution of the alpha release from the perspective of Individuals and Data Seeker

3.1.4 Demonstrator's Activities Timeline

The following table presents the main activities performed within the demonstrator during the Alpha phase.

It is noted that due to the timing of the release of the Alpha release of the platform and the need of debugging from the technical partners, some activities planned for the Alpha phase need to be extended, as indicated in the following diagram (marked with orange)

Demonstrator 1 OLYMPIACOS	**M19**	**M20**	**M21**	**M22**	**M23**	**M24**	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**
Scenario A - Club Fans and Members Personal Data Marketplace												
Alpha Phase												
Connect internal CRM to DataVaults												
Share data of fans and members												
Collect data from a few of early adopters												
Club stakeholders inspect data												
Scenario B - Athletes Sports and Activity Data Sharing												
Alpha Phase												
Transform static isolated data												
Connect data sources to DataVaults												
Test sharing features												
Club stakeholders inspect data												

Table 6: Execution Timeline for Demonstrator #1 - OLYMPIACOS

3.2 DEMONSTRATOR #2 - STRENGTHENING ENTREPRENEURSHIP AND MOBILITY (PIRAEUS)

3.2.1 Target Audience Reached during Alpha phase

The following sub sections provide a status update on the audience reached by the demonstrators during the alpha phase of the demonstrator.

3.2.1.1 Data Owners

The Municipality of Piraeus has already established a list of data owners, as a group consisted of Municipal personnel and some citizens derived from Pireapp, the Municipal application for declaring problems within the city.

3.2.1.2 Data Seekers

At this stage the Municipality of Piraeus is the sole data seeker. Reaching other Data Seekers will be mainly done by direct invitation. This is foreseen as a task for the latest stages of the project, when the Datavaults platform is publicly available. At this stage we have made an initial contact (in person meeting) with the Piraeus Trade Association, a stakeholder in one of our scenarios and a potential data seeker in the DataVaults platform.

From an overall perspective, Piraeus has provided feedback and comments regarding the technical aspects of the alpha version to aid the progress and improvement of the beta version.

3.2.2 PIRAEUS Demonstrator Scenarios Evolution

This section provides a status update on the validity and progress of the initial scenarios defined for the demonstrator in D6.2.

3.2.2.1 PIRAEUS Scenario A - Smart Mobility Services for Individuals

3.2.2.1.1 Validity of Scenario

The Scenario is still valid, as initially described.

3.2.2.1.2 Objectives of PIRAEUS Scenario A

Objective	Status	Expected in Phase
Setup the DataVaults personal app to contain the necessary for this scenario information	Not Started Yet	Final
Extract data of citizens from existing apps (e.g., PireApp) to be used for promotional purposes, always following the agreement/instruction of the user to retrieve their data	Achieved	Beta
Brand the DataVaults personal app, to be able to promote it through the Municipality of Piraeus channels.	Not Started Yet	Beta
Advertise and implement compensation (e.g., perks) for connecting the DataVaults app with social media data sources (e.g., Facebook profile, Instagram profile, etc.) based on the features that will be offered by the platform	In Progress	Final
Push questionnaires to citizens and fans in order to extract information in the absence of other data sources	In Progress (Achieved for Alpha Phase)	Beta

Table 7: PIRAEUS Scenario A objectives

3.2.2.1.3 Scenario A: Evolution during Alpha Phase

Actions taken so far:

- We have collected citizen's data from PireApp
- We have formed an initial group of users
- We have completed the questionnaires to be distributed in order to collect data from the above group
- We will collect, examine and analyse the initial data, in order to evaluate the possibility of taking action on them. This task has been shifted into the beta phase, without producing any other effect on the tasks of the next phases.

3.2.2.2 PIRAEUS Scenario B - Empowering local entrepreneurship

3.2.2.2.1 Validity of Scenario

The Scenario is still valid, as initially described.

3.2.2.2.2 Objectives of PIRAEUS Scenario B

Objective	Status	Expected in Phase
Setup the DataVaults personal app to contain the necessary for this scenario information	Not Started Yet	Final
Extract lists of citizens from existing apps (e.g., PireApp or an upcoming touristic application) to be used for promotional purposes	Achieved	Beta
Promote DataVaults personal app to citizens (e.g., via e-mail or through the website) and tourists (e.g., via posters and leaflets at the Cruise Terminal)	Not Started Yet	Beta
Advertise and implement compensation (e.g., perks) for connecting the DataVaults app with social media data sources (e.g., Facebook profile, Instagram profile, etc.) based on the features that will be offered by the platform	In Progress	Final
Push questionnaires to citizens and tourists in order to extract information in the absence of other data sources	In Progress (Achieved for Alpha Phase)	Beta

Table 8: PIRAEUS Scenario B objectives

3.2.2.2.3 Scenario B: Evolution during Alpha Phase

Actions taken so far:

- We have collected citizen's data from PireApp
- We have formed an initial group of users
- We have completed the questionnaires to be distributed in order to collect data from the above group
- We will collect, examine and analyse the initial data, in order to evaluate the possibility of taking action on them. This task has been shifted into the beta phase, without producing any other effect on the tasks of the next phases.
- We have completed the Piraeus Trade Association initial engagement task.

3.2.2.3 PIRAEUS Scenario C - Services for Personalized cultural and touristic experiences

3.2.2.3.1 Validity of Scenario

The Scenario is still valid, as initially described.

3.2.2.3.2 Objectives of PIRAEUS Scenario C

Objective	Status	Expected in Phase
Setup the DataVaults personal app to contain the necessary for this scenario information	Not Started Yet	Final
Extract lists of citizens from existing apps (e.g., PireApp or the upcoming touristic application) to be used for personalized cultural and touristic experiences	Achieved	Beta
Brand the DataVaults personal app, to be able to promote it through the Municipality of Piraeus channels	Not Started Yet	Beta
Promote DataVaults personal app to citizens (e.g., via e-mail or through the website) and tourists (e.g., via posters and leaflets at the Cruise Terminal)	Not Started Yet	Final
Advertise and implement compensation (e.g., perks) for connecting the DataVaults app with social media data sources (e.g., Facebook profile, Instagram profile, etc.) based on the features that will be offered by the platform	In Progress	Beta
Push questionnaires to citizens and tourists in order to extract information in the absence of other data sources	In Progress (Achieved for Alpha Phase)	

Table 9: PIRAEUS Scenario C objectives

3.2.2.3.3 Scenario C: Evolution during Alpha Phase

Actions taken so far:

- We have collected citizen's data from PireApp
- We have formed an initial group of users (Municipality users, small group of citizens from PireApp)
- We have completed the questionnaires to be distributed in order to collect data from the above group
- We will collect, examine and analyse the initial data, in order to evaluate the possibility of taking action on them. This task has been shifted into the beta phase, without producing any other effect on the tasks of the next phases.

3.2.3 Demonstrator's Activities Timeline

The following table presents the main activities performed within the demonstrator during the Alpha phase.

It is noted that due to the timing of the release of the Alpha release of the platform and the need of debugging from the technical partners, some activities planned for the Alpha phase need to be extended, as indicated in the following diagram (marked with orange)

Demonstrator 2 PIRAEUS	**M19**	**M20**	**M21**	**M22**	**M23**	**M24**	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**
Scenario A - Smart Mobility Services for Individuals												
Alpha Phase												
Collect citizen's data from PireApp												
Form initial group of users												
Collection of data (not completed)												
Examine and analyse data(not completed)												
Scenario B - Empowering local entrepreneurship												
Alpha Phase												
Collect citizen's data from PireApp												
Form initial group of users												
Collection of data												
Piraeus Trade Association initial engagement												
Examine and analyse this initial data												
Scenario C - Services for Personalized cultural and touristic experiences												
Alpha Phase												
Collect citizen's data from PireApp												
Form initial group of users												
Collection of data												
Examine and analyse this initial data												

Table 10: Execution Timeline for Demonstrator #2 - PIRAEUS

3.3 DEMONSTRATOR #3 - SECURE HEALTHCARE DATA RETENTION AND SHARING

3.3.1 Target Audience Reached during Alpha phase

The following sub sections provide a status update on the audience reached by the demonstrators during the alpha phase of the demonstrator.

3.3.1.1 Data Owners

At this stage of the project, no additional action was taken regarding data owners. We still continue to regularly inform our user-base about the project through our newsletters and social network. Users will be on-boarded in the project as soon as we have the ability to use Andaman7 app as a data source in the personal app. This should occur during the Beta phase. As long as this interconnection is under development, data owners will be limited to a closed group of Andaman7 collaborators testing the current functionalities of the personal app from a user perspective and with the aim to improve user experience, avoid bugs and prepare the integration to our environment.

3.3.1.2 Data Seekers

At this stage, Andaman7 is the only data seeker involved. Its role is currently limited as a tester of the current version of the platform and available functionalities as a generic data seeker.

At the end of the beta phase we should have a more clear view of the possibilities offered by the platform in the medical field and so, new data seekers may be involved.

3.3.2 ANDAMAN7 Demonstrator Scenarios Evolution

3.3.2.1 ANDAMAN7 Scenario A - Get data from Andaman7 and provide to health sector

3.3.2.1.1 Validity of Scenario

The Scenario as described in D6.2 is still valid.

3.3.2.1.2 Objectives of ANDAMAN7 Scenario A

Objective	Status	Expected in Phase
Develop the backup of Andaman7 content through the DataVaults platform	In progress	Final
Develop a connector to the DataVaults platform	In progress	Beta
Develop and run a fictitious clinical exercise	In progress	Final
Patient recruitment	Evaluating best way to do it	Final
Service creation to integrate onboarding process into Andaman7	In progress	Beta

Table 11: ANDAMAN7 Scenario A objectives

3.3.2.1.3 ANDAMAN7 Scenario A Evolution

Actions taken so far:

- Test of DataVaults alpha version.
- Analysis and development of backup components of Andaman7 app.
- Analysis and partial development of the connector to automatically upload Andaman7 data to DataVaults personal app.
- Made contact with the DataVaults technical team to analyse the best way to communicate with the DataVaults app while keeping as much as possible to our non-cloud exchange mechanism.
- Creation of Andaman7 services plugins to integrate onboarding and DataVaults related features into Andaman7 app and analysis of onboarding process.
- Creation of a first draft of a fictitious clinical trial.

3.3.2.2 ANDAMAN7 Scenario B - Data collection and Andaman7 improvements

3.3.2.2.1 Validity of Scenario

The Scenario as described in D6.2.

3.3.2.2.2 Objectives of ANDAMAN7 Scenario B

Objective	Status	Expected in Phase
Develop a connector to the DataVaults platform	In progress	Final

Develop data integration	Behind Schedule due to lack of health data sources	Beta
Patient recruitment	Evaluating best way to do it	Final
Service creation to integrate onboarding process into Andaman7	In progress	Final

Table 12: ANDAMAN7 Scenario B objectives

3.3.2.2.3 ANDAMAN7 Scenario B Evolution

Actions taken so far:

- Test of DataVaults alpha version.
- Made contact with the DataVaults technical team to analyse the best way to communicate with the DataVaults app while keeping as much as possible to our non-cloud exchange mechanism.
- Creation of Andaman7 services plugins to integrate onboarding and DataVaults related features into Andaman7 app and analysis of onboarding process.

3.3.3 Demonstrator's Activities Timeline

The following table presents the main activities performed within the demonstrator during the Alpha phase.

Some tasks were extended to beta phase as the Alpha release of the platform had to be debugged and therefore missed some functionalities needed to achieve the first timeline goals. Some actions planned for the beta stage could be started with the current status of the platform so we decided to move them to this alpha phase in order to avoid any loss of time.

Demonstrator 3 ANDAMAN7	**M19**	**M20**	**M21**	**M22**	**M23**	**M24**	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - Get data from Andaman7 and provide to health sector																		
Alpha Phase																		
Dev. upload connector																		
Dev. download connector																		
Dev. backup																		
Patient recruitment																		
Service creation																		
Fictitious clinical study																		
Scenario B - Data collection and Andaman7 improvements																		
Alpha Phase																		
Dev connector																		
Dev data integration																		

Patient recruitment																		
Service creation																		

Table 13: Execution Timeline for Demonstrator #3 – ANDAMAN7

3.4 DEMONSTRATOR #4 – SMART HOME PERSONAL ENERGY DATA (MIWENERGIA)

3.4.1 Target Audience Reached during Alpha phase

The following sub sections provide a status update on the audience reached by the demonstrators during the alpha phase of the demonstrator.

3.4.1.1 Data Owners

We are currently engaging MIWenergia clients to involve them in DataVaults as data owners. The initial plan is to involve 15-20 MIWenergia customers and 5-10 non-customers, but for this alpha phase we only approached direct clients. We have now managed to involve 10 real users and expect to achieve at least 15 by the end of M24. In the Alpha phase, real data from internal users have been used to define the data structure and the API developed. For the Beta phase, data retrieving to the platform is planned for the initial users.

MIWenergia is contacting entities that may be interested in accessing the data of individuals, mainly electricity consumption data. The lack of capacity to access this data means that institutions such as universities or energy service providers do not perform research tasks or provide their services correctly.

3.4.1.2 Data Seekers

MIWenergia will participate not only as a bridge to the data owners providing connection to their data but also as a data seeker, additionally, other private and public institutions such as universities or research centres can be considered data seekers for research and statistical purposes. Within this framework, it is proposed to involve in the initial functional version of the platform at least two data seekers to provide the point of view of both the private and the public sector. In the event that the planned developments are advanced, this participation can be transferred to when the platform contains the necessary implementations, and so the participation of external data seekers is not foreseen until the final phase of the platform.

The contact with potential data seekers is done by the usual methods with each entity, normally by email, introducing the advantages and potential of the platform. At the actual stage of the platform, without data retrieving functionalities, the actions done aim to be informative than recruiting actions.

The first phase of the platform will be used as an introduction to the platform, as a demonstration. Access to external data seekers is not expected to be provided until the minimum functionalities have been implemented and tested by the pilots.

During all phases of the platform, the feedback of the data seekers will be collected, and it will determine the level of acceptance of the data seeker's tools. Suggestions and comments are expected to be analysed to improve the user experience.

From an overall perspective, MiWenergia has provided feedback and comments regarding the technical aspects of the alpha version to aid the progress and improvement of the beta version.

3.4.2 MIWENERGIA Demonstrator Scenarios Evolution

3.4.2.1 MIWENERGIA Scenario A – PV installation design for self-consumption

3.4.2.1.1 Validity of Scenario

The scenario is still valid.

3.4.2.1.2 Objectives of MIWENERGIA Scenario A

Objective	Status	Expected in Phase
To have a functional API that returns customer's hourly consumption	Achieved	Alpha
Additional mock-ups definition	In Progress	Beta
Participant Recruitment	In Progress	Final

Table 14: MiWenrgia Scenario A objectives

3.4.2.1.3 MIWENERGIA Scenario A: Evolution Plan

MIWenergia has developed an API in order to provide customer's data to DataVaults. With the AP individuals will be able to share their energy consumption data into the DataVaults platform. This API will also be used in the other two scenarios as the main channel to provide data.

We have successfully tested our API, although it has not yet been integrated with DataVaults. This is expected to happen in the next phase. For the moment, it only works with real data from artificial users we manufactured. In the next phase, it will be possible for real participants to retrieve their actual data from the API.

We are currently approaching different MIWenergia clients to recruit them as participants for the DataVaults platform. We developed a workshop with some of our closest clients and we selected some of them for this purpose.

Due to the need to collect information manually from users, mock-ups are being defined and must be implemented so that they can enter the additional information needed to develop the scenarios.

3.4.2.2 MIWENERGIA Scenario B - Improve profiling of the clients to enhance energy efficiency

3.4.2.2.1 Validity of Scenario

The scenario is still valid.

3.4.2.2.2 Objectives of MIWENERGIA Scenario A

Because some of the initial tasks are common to the different scenarios and have already been defined above. Only additional tasks will be mentioned here.

Objective	Status	Expected in Phase
Energy efficiency mock-ups definition	In Progress	Beta

Table 15: MiWenergia Scenario B objectives

3.4.2.2.3 MIWENERGIA Scenario B: Evolution

The necessary developments that need to be made to the platform in order to be able to collect personal information from users are being defined.

3.4.2.3 MIWENERGIA Scenario C – Energy consumption patterns with personal preferences

3.4.2.3.1 Validity of Scenario

Though some tasks will be partially delayed to later phases, the scenario is still valid. In 4.5 the timeline shows the initial approach and the modifications.

3.4.2.3.2 Objectives of Demonstrator's Scenario

Objective	Status	Expected in Phase
Hobbies and interests mock-ups definition	In Progress	Beta

Table 16: MiWenergia Scenario C objectives

3.4.2.3.3 MIWENERGIA Scenario C: Evolution

Although there are common tasks in the first phase for all 3 scenarios, it is necessary to define how users will contribute additional non-standardized information to the platform. For example, the hobbies they have or the schedules they follow at work.

Through the implementation of the scenarios, the aim is to acquire knowledge of the customers in order to improve the services offered by the company. As a result, it is expected that both the relationship with customers and employees will improve, thus increasing customer satisfaction and increasing the company's revenue through additional services.

3.4.3 Demonstrator's Activities Timeline

Due to the fact that the initial planning of tasks and jobs for the Alpha phase could not be completely fulfilled, due to delays relevant to the Alpha release of the platform, some of the activities had to be extended in the beta phase.

Demonstrator 4 MiWenergia	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
Scenario A - PV installation design for self-consumption																		
Alpha Phase																		
Testing MIWenergia API																		
API adaptation																		
Dwelling mock-up definition																		
Data verification																		
Participant Recruitment																		
Scenario B - Improve profiling of the clients to enhance energy efficiency																		
Alpha Phase																		
Energy efficiency mock-ups definition																		
Scenario C - Improve profiling of the clients to enhance energy efficiency																		
Alpha Phase																		
Hobbies and interests mock-ups definition																		

Table 17: Execution Timeline for Demonstrator #4 - MIWENERGIA

3.5 DEMONSTRATOR #5 - PERSONAL DATA FOR MUNICIPAL SERVICES AND THE TOURISM INDUSTRY (PRATO)

3.5.1 Target Audience Reached during Alpha phase

The following sub sections provide a status update on the audience reached by the demonstrators during the alpha phase of the demonstrator.

3.5.1.1 Data Owners

In the current phase of development of the alpha version of the platform, no specific involvement of external data owners has been foreseen, since priority was given to test the platform functionalities with avatar users provided by technical partners.

A brochure has already been prepared to introduce the pilot purposes to possibly interested data owners, to support the launch of the pilots on a wider scale with the beta version of the tool

3.5.1.2 Data Seekers

In the current phase of development of the alpha version of the platform, the role of data seeker was carried out by internal staff committed in testing operations. The aim was mainly that of checking the currently available functionalities of the tools, in anticipation of a more structured adoption of the forthcoming beta version, where both the Mobility Office and the two participating museums will be involved.

A larger involvement will be possibly carried out in the final phase of the project, when the release of the app and platform will be mostly consolidated

3.5.2 PRATO Demonstrator Scenarios Evolution

3.5.2.1 Scenario A - Access to personal data for the analysis of mobility solutions

3.5.2.1.1 Validity of Scenario

The scenario is still valid, and no main changes are planned for the moment.

3.5.2.1.2 Objectives of PRATO Scenario A.

Objective	Status	Expected in Phase
To involve a reasonable number of data owners to provide their personal data including mobility behaviours and preferences.	Not Started Yet	Final
To test the platform as a mobility operator (Data Seeker) and check the functionalities of data search and purchase.	In Progress	Beta
To evaluate the platform tools for data analytics to improve and integrate the current procedures adopted for mobility planning.	Not Started Yet	Final
To build citizens' samples as a mobility operator, on the basis of specific profiling specifications, and to push them specific questions to enrich the existing knowledge base.	Not Started Yet	Final
To build specific questionnaires and surveys as a mobility operator and send them to the selected citizen samples.	In Progress	Beta
To get back sample's answers as a shared dataset according to the data sharing procedures implemented in the platform, including compensation schemas, and analyse them with the platform tools.	In Progress	Final
To provide feedbacks and comments for the technical improvement of the DataVaults app and platform.	Concluded for alpha version	Alpha, Beta, Final

Table 18: PRATO Scenario A objectives

3.5.2.1.3 PRATO Scenario A: Evolution

The alpha version of the app and the platform has been tested internally by the project staff, to check the basic functionalities available, both from the data owner's and data seeker's point of view (e.g. fetching simple data sources, sharing with access control, making simple search and data acquisition). The objective in this phase was to provide feedback and comments to the technical partners to support the development of the beta version of the tools.

3.5.2.2 PRATO Scenario B - Access to personal data for the improvement of cultural offer in the city

3.5.2.2.1 Validity of Scenario

The scenario is still valid and no main changes are planned for the moment.

3.5.2.2.2 Objectives of PRATO Scenario B

Objective	Status	Expected in Phase
To involve a reasonable number of data owners to provide their personal data including cultural preferences, attendance and liking of cultural events.	Not Started Yet	Final
To test the platform as a cultural institution (Data Seeker) and check the functionalities of data search and purchase.	In Progress	Beta
To evaluate the platform tools for data analytics to improve and integrate the current procedures for the planning of cultural offer.	Not Started Yet	Final
To build citizens' samples on the basis of specific profiling items and to push them specific questions to enrich available information.	Not Started Yet	Final
To build specific questionnaires and surveys as a mobility operator and send them to the selected citizens' samples.	In Progress	Beta
To get back sample's answers as a shared dataset according to the data sharing procedures implemented in the platform, including compensation schemas, and analyse them with the platform tools.	In Progress	Final
To get back sample's answers and analyse them with the platform tools.	Not Started	Final
To provide feedbacks and comments for the technical improvement of the DataVaults app and platform.	Concluded for alpha version	Alpha, Beta, Final

Table 19: PRATO Scenario B objectives

3.5.2.2.3 PRATO Scenario B: Evolution Plan

The alpha version of the app and the platform has been tested internally by the project staff, to check the basic functionalities available, both from the data owner's and data seeker's point of view (e.g. fetching simple data sources, sharing with access control, making simple search and data acquisition). The objective in this phase was to provide feedbacks and comments to the technical partner to support the development of the beta version of the tools.

3.5.2.3 PRATO Scenario C - Access to personal data for the delivery of personal certificates

3.5.2.3.1 Validity of Scenario

The scenario is still valid and no main changes are planned for the moment.

3.5.2.3.2 Objectives of PRATO Scenario C

Objective	Status	Expected in Phase
To verify the software connection (API) between the city population registry and the DataVaults app and implement the inclusion of the civil certificates inside the project data model.	Not Started Yet	Beta
To test the proposed innovative document exchange between citizens and the CGIL – CAAF fiscal support	Not Started Yet	Beta

centre by involving a small group of users (2-3 citizens).		
To evaluate the platform tools for data analytics to improve and integrate the current procedures for the planning of cultural offer.	Not Started Yet	Final
To evaluate the whole procedure to check strong and weak points and suggest possible technical improvements, from both data owner's and data seeker's point of view.	Not Started Yet	Final

Table 20: Prato Scenario C objectives

3.5.3 PRATO Demonstrator's Activities Timeline

The following table presents the main activities performed within the demonstrator during the Alpha version. As far as scenario C is concerned, the activity originally planned for the alpha version has been postponed until the beta version, due to implementation requirements.

Demonstrator 5 Prato	**M19**	**M20**	**M21**	**M22**	**M23**	**M24**	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - Access to personal data for the analysis of mobility solutions																		
Alpha Phase																		
Check of tool development																		
Set up of a small testing group																		
Test activity on the platform basic functionalities																		
Collection of feedbacks																		
Scenario B - Access to personal data for the improvement of cultural offer in the city																		
Alpha Phase																		
Check of tool development																		
Set up of a small testing group																		
Test activity on the platform basic functionalities																		
Collection of feedbacks																		
Scenario C - Access to personal data for the delivery of personal certificates																		
Alpha Phase																		
Release of the API with the population registry																		

Demonstrator 5 Prato	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
Test of the certificate flow procedure																		
Collection of feedbacks																		

Table 21: Execution Timeline for Demonstrator #5 - PRATO

3.5.4 Summary

Thus, from the above, it can be seen that all the demonstration sites are as well prepared as can be expected to carry out their prescribed roles in the project and that much progress has been evidenced in the few months that the demonstration sites have been active.

4 COMMUNICATION /INTERACTION WITH STAKEHOLDERS

WP6 activities proceed in tandem with WP8 by coordinating the communication and interaction with the various types of stakeholders. Notably, the dissemination team extends its activities much further than knowledge diffusion and reaches out to key stakeholders from various sources (companies, affiliated projects, clusters and initiatives, associations, other key collaborators etc.) that have the expertise to provide valuable advice and assist in the overall evaluation process through their experience and work in related fields.

The KPIs reported in WP8 deliverables are also interconnected with liaisons, synergies, F2F feedback and the two-way interaction from stakeholders, whose importance we have shown in the Evaluation Framework.

Questions raised	Response	Comment
Have we identified the stakeholder's roles in evaluation planning, implementation, interpretation of results and decision-making about the next steps?	YES	WP8 has categorised stakeholders in basic types of "potential adopter, data provider, data seeker, common scope content, common audience" etc. These are then directly linked to the roles described in the evaluation process and implementation
Has the list of stakeholders been reviewed to ensure all appropriate stakeholders are included?	YES	The online engagement tracker is constantly revised by all partners and includes companies from the real market, affiliated projects, common network companies, key associations and many others. Feedback has also been taken into account during workshops and common events which also provided valuable ideas for extended stakeholder group inclusion.
Have we created a plan for stakeholder involvement and a communication strategy?	YES	Indeed, the dissemination and communication strategic plan includes an entire section dedicated to synergies and liaisons that engages stakeholders in the evaluation process. Furthermore, we have set up an Industrial Liaison Group that will be formed among selected key members from the 220+ real market companies engaged, the 37 affiliated projects with similar scope,

		and this can be further expanded towards the end of the project with a list of key respondents/experts in the form of a "valorisation board" (example key BDVA members, key Smart Cities Initiative Members and affiliated projects, Key partner networks etc.)
Have areas been identified for stakeholder input?	YES	Input area categorisation was twofold. First, through the online survey and questions on sensitive issues such as privacy of data, and compensation schemes and intentions, and second by also seeking entities that could become first movers-adopters or providers/seekers of data as depicted in the engagement tracker
Have stakeholders been brought together as needed?	YES	Numerous workshops with affiliated projects within the scope of DataVaults have been conducted and key liaisons are achieved, where DataVaults was the central-coordinating entity (example Major Cities of Europe, BDVA, and Smart Cities Marketplace etc.). Moreover, DataVaults leads synergies for the production of a common book planned to be published and several common activities in the overall circular economy and dataspaces initiatives with selected affiliated projects (indicatively projects i3-Market, DigiPrime, DOME4.0 etc.).
Have key stakeholders been targeted for regular participation.	YES	The DataVaults extrovert activities always try to engage many key stakeholders in discussions, workshops, events, webinars, and through recursive F2F meetings. More than 40 stakeholder organisations have been engaged through events, and a potential target of 220+ real market companies have been identified for F2F discussions on the DataVaults scope.
Have we involved stakeholders in the evaluation process?	YES	1) through the live audience feedback tool sli.do during online workshops gathering Likert scale responses 2) through the synergy with 16 affiliated projects that received the DataVaults online survey 3) Through numerous responses and F2F discussions with the engaged organisations mentioned in the dissemination tracker 4) Through the direct feedback of affiliated projects and their members in the 10+ common events, workshops and webinars

Table 22: Communication with stakeholders

Thus, the carrying out of the activities set out in the Stakeholder Engagement Plan within D8.1 has provided a solid mechanism for further interactions to occur and assist in the shaping of the project as it progresses.

5 TECHNICAL ASPECTS – TECHNOLOGY ACCEPTANCE BY THE DEMONSTRATORS

As part of Task 5.5-Technical Verification and Integration Testing, execution of both automated and manual tests will be performed on a regular basis synchronized with release schedules and the progress of this testing procedure will be monitored here. All the software development activities will be followed, and a software verification and testing framework will be employed to be used on all outputs.

The components of the platform will be covered by functional and integrated tests. To keep the quality of the User Interface component, manual test scenarios will be created based on the input received from the previous WPs and become automated possibly. Execution of both automated and manual tests will be performed on a regular basis synchronized with release schedules. Essentially Task 5.5 will recap all the "Unit tests" of the different components of the DataVaults Platform (Personal App & Cloud Platform) and verify if these unit tests are correct.

As the core of the technical evaluation of the developed product is happening under WP5, in this section we are going to cover the technical acceptance of the developed solution from the perspective of the demonstrators, based on qualitative, high level evaluation.

For measuring the quality of the system from a user's perspective (e.g. non-software performance level evaluation) DataVaults makes use of the ISO 25010 Quality in Use Model[9], which describes the perception of the quality of the system from a user's perspective.

The different characteristics and sub-characteristics of this model are derived from testing or observing the results of real or simulated use of the system and in the DataVaults case these are the results of the different pilot rounds that are executed within WP6.

The Quality in Use Model assesses software quality (from a user point of view) using the following set of characteristics (each of them including other sub-characteristics):

- Effectiveness – Measuring the accuracy and completeness with which users achieve specified goals
- Efficiency – Evaluating the resources expended in relation to the accuracy and completeness with which users achieve goals
- Satisfaction- Aiming to capture the degree to which users are satisfied with the experience of using a product in a specified context of use
- Safety – Providing the degree to which a product or system does not, under specified conditions, lead to a state in which human life, health, property, or the environment is endangered
- Usability - The extent to which a product can be used to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

[9] https://www.iso.org/obp/ui/#iso:std:iso-iec:25010:ed-1:v1:en

Figure 3: Quality in use model view based on the ISO/IEC 25010:2011 standard

The next table presents the qualitative evaluation metrics which correspond to the quality in use model for evaluating the DataVaults platform from an end-user (demonstrator's perspective), always based on the promised results of each release round.

It is noted that not all parts of the model are evaluated, as some are not relevant to the DataVaults case. Furthermore, this evaluation concerns only the features and the experience provided by the alpha release of the platform, and the same exercise will be performed at the end of each demonstration phase, aiming to identify problems in each release and correct them in the upcoming releases.

Sub-characteristics	KPIs	Assessment Question	Mean Value	OLYMPIACOS	PIRAEUS	ANDAMAN7 D	MIWENERGIA D	PRATO
Functional completeness	Level of Completeness	Do the features offered by DataVaults cover all tasks/objectives promised for this release? YES/NO	**Y**	Y	Y	Y	Y	Y
Functional correctness	Level of Correctness	Does the platform provide accurate results when it comes to its operations? YES/NO	**Y**	Y	Y	Y	Y	Y
Functional appropriateness	Level of Appropriateness	Do the function of DataVaults accomplish the promised tasks foreseen in this release? YES/NO	**Y**	Y	Y	Y	Y	Y
Ease of Use	Level of Ease of Use	Does DataVaults have attributes that facilitate usability? YES/NO/Partially	**Partially**	Partially	Y	Partially	N	Partially
User interface aesthetics	Aesthetics Level	Do the aesthetics of the DataVaults Personal App UI satisfy the needs of the user?	**Y**	Y	Y	Y	Y	Y
User interface aesthetics	Aesthetics Level	Do the aesthetics of the DataVaults Cloud based platform UI satisfy the needs of the user?	**Y**	Y	Y	Y	Y	Y

Effectiveness	Level of Effectiveness	Can you accurately your goals with the system? Scale 1-5	**4,0**	4	4	3	2	3
Efficiency	Level of Efficiency	Do you think DataVaults covers the intended purpose? Scale 1-5	**4,0**	4	4	4	2	3
Usefulness	Usefulness Index	Do you find DataVaults useful? Scale 1-5	**4,3**	5	4	2	3	4
Trust	Trust Index	Do you trust DataVaults and its results? Scale 1-5	**4,8**	5	5	5	4	5
Pleasure	Pleasure Index	Does DataVaults Personal App please you when you use it?	**3,8**	4	4	4	3	4
Pleasure	Pleasure Index	Does DataVaults Cloud Platform please you when you use it?	**3,8**	4	4	4	3	4
Comfort	Comfort Index	Do you feel that the DataVaults Personal App provides a comfortable UI and workflow? Scale 1-5	**4,0**	4	4	4	3	3
Comfort	Comfort Index	Do you feel that the DataVaults Cloud based Platform provides a comfortable UI and workflow? Scale 1-5	**3,8**	4	4	4	3	3
Flexibility	Flexibility index	How much do you believe DataVaults can be used the system for other purposes than the intended use? And which are those? Scale 1-5	**2,7**	2	3	3	3	2
Accessibility	Accessibility Index	To which extent do you believe DataVaults can be used by disabled users? Scale 1-5	**-**	-	-	-	-	-

Table 23: Qualitative Evaluation Results per Demonstrator

First, regarding the completeness and correctness of the services, all five demonstrators provided a positive answer to aspects such as “Level of Completeness”, “Level of Correctness”, and “Level of Appropriateness”. This does not directly mean that the version provided covers the whole of the functionalities that are promised by DataVaults, nor that no bugs have been identified, and the answers are explained as the demonstrators considered in their answers the current backlog of features, which were promised by the Alpha release that has been delivered with minor deviations. Moreover, bugs were also evident, and this somehow affected the “Ease of Use” dimension, however this fact was expected, and a ticketing method has been implemented to rapidly record and deal with any bugs found during the pilot operation. The limitations that were there (like absence of integration point with demonstrators, etc.) had a negative impact on these dimensions (seen in the qualitative evaluation scores of the “Effectiveness” and “Efficiency”), as it was not possible for demonstrators to fully test their scenarios. As a result, some of the scenario tasks were shifted to the beta phase and will be evaluated once these limitations are waived. However, even with those limitations presented, the mean values of those dimensions were above average. This is also reflected in the “usefulness” dimension, where a score for 4.35/5 is reached, as the limitations to connect external sources and to run scenarios do not allow to have an objective evaluation of this dimension.

What is quite of value is the high score of 4.8/5 reached in the “Trust” dimension, as all demonstrators find, even from this preliminary stage that the methods and tools used to protect users’ data and to provide a sense of trust relevant to the whole operation of the platform is very high.

The “Ease of Use” dimension was also affected by the absence of a user manual and methods to guide the user, which was a known fact and will be taken into consideration in the next releases of the platform, with the milestone for this information to be delivered being v0.5 where the platform will open to the greater public.

Regarding the UX of both the Personal App and of the Cloud based platform, they both score above average, in the “Pleasure” and “Comfort categories”, reaching almost a score of 4/5, as well as in the qualitative evaluation of the “UI aesthetics”. Considering the rapid prototyping phased that was followed for the Alpha release of the whole infrastructure, these scores are deemed highly satisfactory, and they reaffirm that the technologies used by the consortium as well as the way the UX was designed meets even at these early phases, most of the demands of users. However, as the UX is not fully deployed and improvements need to be performed, accessibility was not able to be evaluated in this first version release and is something that will be evaluated in the upcoming releases.

Finally, when it comes to the “flexibility” dimension, a relative low score of 2.8/5 is reached, as demonstrators at this point of roll-out do not consider the product to be able to cover other needs than those initially identified. However, demonstrators commented that as the pilots will evolve and more features will be made available, there would be a better chance to identify other possible uses of the platform; nevertheless, with the demonstrators just having executed a fraction of their scenarios, it is quite early to have an objective evaluation of this dimension.

In general, summarizing the above points of the technical evaluation from the perspective of the demonstrators, it is evident that the Alpha Release of the platform served well its purpose of introducing the concept of DataVaults to the demonstrators to provide early feedback prior to the release of the next versions, and it scored relatively high in certain areas. Of course, as the Alpha release is a blend of functional and non-functional views (following the project’s DoA plan), the limitation in certain features did not allow pilots to conduct a thorough evaluation and these are mostly relevant to aspects such as running the core scenarios of the demonstrators. Of course, this was expected and has been also reflected in the planning schedules of the demonstrators, where the core work on integration and operation of their scenarios takes flesh from the beta release of the platform. Despite this fact, even in this first, non-public, and semi functional prototype, the potential recorded by the demonstrator for the whole systems is relatively high, and proper feedback has been provided to the software development teams to further elaborate on certain aspects towards improving the overall perception of users for the platform.

6 EVALUATIVE THINKING AND VALIDITY OF THE DATAVAULTS THEORY OF CHANGE

6.1 THE "EVALUATIVE THINKING" PROCESS

An evaluation that reflects evaluative thinking is the systematic process of telling the DataVaults "story" by:

- Identifying assumptions about why we think the project will work and be a success
- Determining what change we expect to see during and after we implement what we have set out to do in the Description of Action (DoA).
- Collecting and analysing data to help us understand what happened during the project.
- Communicating, interpreting, and reflecting on the results.
- Using these results and lessons learned to help make informed decisions to be able to plan for a successful exploitation after the project finishes.

Part of the storytelling included the creation of a "Theory of Change" and a "Logic Model".

A general perception is that evaluation should be designed into a project from the beginning. The DataVaults Evaluation Framework established that evaluation should be viewed as a collaborative process that involves all of the stakeholders in various roles, whilst it helps tell the story of the DataVaults project through a continuous cycle of asking, planning, and acting, reflecting and improving. We should strive to make sure that findings are practical and useful for end users and inform decision-making and capacity building for further exploitation and sustainability. Indeed, evaluation can be regarded as a means of communication within the project.

In short, "*Evaluation is an objective process of understanding how a project or other intervention was implemented, what effects it had, for whom, how and why*".[10]

Thus, here we need to reference anything we have taken on board in the work we have carried out which may have shaped our view of the DataVaults "Theory of Change" elaborated in Chapter 2 of D6.1.

6.2 EVALUATIVE THINKING AND BUSINESS MODEL PROGRESS

The Evaluation Framework set out how we were to tackle how we have contributed to providing a novel business model and contributions to the data economy. But this again is an aspect of the evaluation plan which cannot be tackled in any detail until the final stages of the project, although any progress made will be reported as it occurs. The current objectives remain valid. Until we move from testing within a controlled closed group to engaging with a wider audience, we do not expect any change.

However, there have been three influences in particular, which have both confirmed our initial perceptions for the DataVaults business plan and its contribution to the data economy and

[10] HM TREASURY, The Magenta Book, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf.

given them added focus, which may lead to embracing additional objectives and give rise to further exploitation opportunities.

One has been feedback from reviewers and other stakeholders, whilst the second is linked to the valuable input gained through the DataVaults efforts in establishing and leading the Smart Cities MarketPlace "Citizen Control of Personal Data" Initiative.[11] And with DataVaults continuing close liaison with BDVA being the third.

In the final phases of the project, we will take into account further suggestions made at the first review, both in evolution of the DataVaults exploitation strategy and within the work led by DataVaults in the Smart Cities MarketPlace Initiative.

6.2.1 Smart Cities MarketPlace

The work initiated by DataVaults in the Smart Cities MarketPlace is shaping the project through providing new engaged stakeholders having conditions they would wish to see being met, whilst at the same time, providing answers to points raised by existing stakeholders, including the reviewers.

6.2.1.1 Evaluative Thinking and Input from the MarketPlace membership to act upon

A set of questions have been identified as this initiative, set up early in 2021, matures. If answers can be provided to these questions as DataVaults develops, the more likely it is that we will be able to deploy at scale. Other requirements will arise and be added to the list. The purpose of the "Citizen Centric approach to data" initiative within the Marketplace can be summed up as **helping to build the conditions and relationships whereby the citizen will be willing to share personal data with a city and with other actors in the data economy.** Whilst having a clear focus, it will recognise its role in the wider MarketPlace community and contribute as widely as possible, as synergies appear. Removing obstacles would grow the extremely valuable "personal data lake" which would then increase activity in the data economy and enrich existing data eco-systems.

The initiative's aim is to grow in force until it is able to achieve its shared target with the general movement towards smart cities in Europe, which is: "That those smart cities in Europe, having an urban data platform, would collectively reach a total of 300 million inhabitants by 2025."

From the perspective of the initiative's drivers and involved actors, they would seek to be able to provide to those 300 million citizens the means by which they can safely share their data, with it remaining under their own control. Identifying and replicating these mechanisms would be at the core of our work.

Who they share their personal data with would be their choice. Sharing it with the smart city would benefit the city, with improved policy-making and better services for the citizens. They could share it altruistically for example, within the health eco-system or to enhance mobility

[11] https://smart-cities-marketplace.ec.europa.eu/action-clusters-and-initiatives/action-clusters/citizen-focus/citizens-control-personal-data

options. Or by selling it, having the mechanisms available for them to do this securely and transparently, or for rewards in other forms.

Success here would bring about tremendous benefits to the Data Economy as whole, and in particular to the digital SMEs within those cities, with access to data being regarded as more of a problem than access to finance.

Growing an accessible "Personal Data Lake" will provide a means for improving most aspects of how data is currently utilised. And enable us to move more speedily to having a distinct European Data Model, of more benefit to wider society, rather than focussed on global commerce.

Similarly, for simplicity, a starting point of the RUGGEDISED Project and the Erasmus Study [12] has been adopted. This Report shaped the initial design of the initiative, having outlined a set of actions required, some of which we have pursued immediately as a starting point for our work, which will evolve steadily, as more stakeholder requirements are expressed. For example, having governance structures to widely adopt has been added to the list.

These actions included:

1. To **identify the Lighthouse cities** leading on societal engagement; Find the lighthouse cities that are leading the pack, and find out how and for what impact in our field.
2. Involve citizens by **creating impactful use cases and easy to use services/Apps** and **facilitate citizens to remain in control of their data** which is at the core of DataVaults
3. Unpick 'trust'; analyse and set in place clear useful actions. The top 3 measures in terms of their perceived importance for trust building are privacy statements and **GDPR compliancy**, information **transparency/dashboard for users** and the use of a data (privacy) charter, describing the key principles of the platform.
4. Establish a **clear legal charter** and measurable goal for use of data by industry
5. Develop frameworks for **accountable and trustworthy** use of data(platforms) and AI
6. Develop **very practical use cases**, that explore **what data could be shared** and combined and how that can be managed to deliver **greater value**
7. Pilot a **CDO network**, and adopt/adapt the CDO role definition
8. **Capture/pilot collaborative** / **joint business case**; develop method and tools that will **help multiple cities adopt.**[13]

Groups have been established to provide the answers to the questions raised, which DataVaults alone would not be able to provide during the lifetime of the project.

6.2.1.2 Related comments from the review

1. DataVaults can potentially disrupt the monopolies that are on the rise.

To seriously disrupt the monopolies, it is recognised that the impact will be more if multiple cities across the EU can simultaneously deploy the platform. Hence the movement towards putting in place the conditions which will enable this goal to be pursued. The majority of

[12] https://smart-cities-marketplace.ec.europa.eu/resources/1888

[13] https://smart-cities-marketplace.ec.europa.eu/sites/default/files/2021-03/Notes%20-%20Workshop%20Citizen%20Control%20workshop%20on%2025.02.2021_0.pdf

partners referred to smart cities in their exploitation strategies at the outset, and looking for synergies and a joint roadmap to deployment at scale is emerging from the early work, further shaping our evaluative thinking.

2. Some demonstrators might have impact on local authorities, e.g. mobility/transport

Pursuing the links between the mobility cluster within the Smart Cities MarketPlace, raises the potential for revenue generation and added value to a city, particularly in situations which they are familiar with and this aspect will be pursued, alongside the culture, leisure and health aspects etc. Including mobility and energy as fed back by the reviewers.

3. Societal Challenges and Value dimension for stakeholders and use-cases

From above, addressing societal challenges is a key influence on our project. A group has been set up to build upon the work started by the Safe-Deed Project which focusses on the value of data and a specific novel mechanism for exploring the value of data within a city, focussing on "the story behind the use of data", will be scrutinised further.[14]

7 CONCLUSIONS

From Chapter 2, we can see that the necessary technical, ethical and legal steps have been put in place to ensure that we can confidently proceed with deploying future iterations of the platform at the demonstration sites.

Successful stakeholder interactions have provided "food for thought" in progressing the "evaluative thinking" and the Theory of Change underpinning the DataVaults project, confirming that we are on track.

Similarly, the demonstration sites themselves are well-prepared for the next phase of the project.

The alpha trials have shown that from a technical perspective the first release of the platform has been very well perceived. The methods and functions offered do generate a very high feeling of trust, and in general the features offered are in line with what has been expected by the demonstrators based on the development backlog which was used to deliver the Alpha release of the platform. It is noted though that due to various limitations naturally imposed by the alpha version not being fully functional, demonstrators could not fully evaluate all aspects of the system, which is a task to be performed during the beta evaluation phase, where also a more thorough evaluation of the UX will be performed, as the alpha release did not focus on user interface aesthetics, as the main goal was to deliver semi-functional mockups.

Lessons have been learned during the alpha phase testing and have been reported in the document where relevant. But future iterations will provide the customary "lessons learned" section as the project matures and generates significant lessons to be shared more widely.

[14] Safe-Deed Project, "D4.3 Report on context-aware and context-unaware valuation," 2020.

APPENDIX 1: UPDATED PLAN OF DEMONSTRATOR'S ACTIVITIES (M25-M36)

The detailed timetable has evolved as the evaluation process has moved forward and will be reviewed regularly, but clearly, it is indicative, as meaningful detail can only be added as the project progresses. As such, the following tables present the activities to be performed by each demonstrator for the next period of the project, based on the initial plan provided in D6.2 and the progress recorded so far.

Extensions to the activities of the Alpha phase are marked as orange in the following tables.

Demonstrator 1 OLYMPIACOS	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - Club Fans and Members Personal Data Marketplace												
Alpha Phase												
Connect internal CRM to DataVaults												
Share data of fans and members												
Collect data from a few of early adopters												
Club stakeholders inspect data												
Beta Phase												
Open up the use of DataVaults personal app												
Acquire analytics from the DataVaults cloud platform												
Pilot a branded version of the DataVaults personal app												
Final Phase												
Branded DataVaults app available to everyone												
Activate the sharing compensation mechanisms												
Acquire analytics from the DataVaults cloud platform												
Club stakeholders verify personas												
Invite club sponsors												
Scenario B - Athletes Sports and Activity Data Sharing												
Alpha Phase												
Transform static isolated data												
Connect data sources to DataVaults												
Test sharing features												
Club stakeholders inspect data												
Beta Phase												
Showcase basic analytics extracted with DataVaults												
Recruit (professional) athletes												
Final phase												
Branded DataVaults app available to everyone												
Acquire analytics from the DataVaults cloud platform												
Showcase acquisition of athletic activity and ergometric and medical examination data												

Demonstrator 1 OLYMPIACOS	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
Invite club sponsors												

Table 24: Updated Execution Timeline for Demonstrator #1 - OLYMPIACOS

Demonstrator 2 PIRAEUS	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
Scenario A - Smart Mobility Services for Individuals												
Alpha Phase												
Collection of data												
Examine and analyse data												
Beta Phase												
Open up the use of DataVaults personal app to greater groups of users												
Acquire analytics												
Final Phase												
Make the branded version of the DataVaults personal app available to everyone												
Acquire advanced analytics from the DataVaults cloud platform and propose actions for smart mobility												
Activate the sharing compensation mechanisms												
Scenario B - Empowering local entrepreneurship												
Alpha Phase												
Collection of data												
Examine and analyse this initial data												
Beta Phase												
Open up the use of DataVaults personal app to greater groups of users												
Acquire analytics												
Final phase												
Make the branded version of the DataVaults personal app available to everyone												
Acquire advanced analytics from the DataVaults cloud platform and propose actions to empower local entrepreneurship												
Activate the sharing compensation mechanisms												
Scenario C - Services for Personalized cultural and touristic experiences												
Alpha Phase												
Collection of data												
Examine and analyse this initial data												
Beta Phase												
Open up the use of DataVaults personal app to greater groups of users												

Acquire analytics	
Final phase	
Make the branded version of the DataVaults personal app available to everyone	
Acquire advanced analytics from the DataVaults cloud platform and propose personalized cultural and touristic experiences	
Activate the sharing compensation mechanisms	

Table 25: Updated Execution Timeline for Demonstrator #2 - PIRAEUS

Demonstrator 3 ANDAMAN7	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - Get data from Andaman7 and provide to health sector												
Alpha Phase												
Dev. upload connector												
Dev. download connector												
Dev. backup												
Patient recruitment												
Beta Phase												
Service creation												
Users onboarding												
Data collection												
Fictitious clinical study												
Study recruitment												
Final Phase												
Study data collection												
Result documentation												
Data seeker presentation / onboarding												
Scenario B - Data collection and Andaman7 improvements												
Alpha Phase												
Dev connector												
Dev data integration												
Patient recruitment												
Beta Phase												
Service creation												
Users onboarding												
Analytics												
Integration improvement												
Involve new sources												
Final phase												
Criteria identification												
Connector for statistics												
Integration												

Table 26: Updated Execution Timeline for Demonstrator #3 – ANDAMAN7

Demonstrator 4 MIWENERGIA	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - PV installation design for self-consumption												
Alpha Phase												
Dwelling mock-up definition												
Participant Recruitment												
Beta Phase												
API, data reliability												
Real users												
Energy basic analyses												
Data extraction												
Implementation virtual wallet												
Implementation of compensation methods												
PV calculation method												
Final Phase												
API non-customers												
Use compensation methods												
Use PV calculation method												
DataVaults benefits analysis												
Scenario B - Improve profiling of the clients to enhance energy efficiency												
Alpha Phase												
Energy efficiency mock-ups definition												
Beta Phase												
Clustering basic analyses												
Data extraction												
Energy efficiency factors												
Final phase												
Energy efficiency measures												
Scenario C - Energy consumption patterns with personal preferences												
Alpha Phase												
Hobbies and interests mock-ups definition												
Beta Phase												
Profiles and basic analyses												
Data extraction												
Def. Commercial campaigns												
Playground external data test												
Final phase												
Use commercial campaigns												
Neural networks analysis												

Table 27: Updated Execution Timeline for Demonstrator #4 - MIWENERGIA

Demonstrator5 PRATO	**M25**	**M26**	**M27**	**M28**	**M29**	**M30**	**M31**	**M32**	**M33**	**M34**	**M35**	**M36**
Scenario A - Access to personal data for the analysis of mobility solutions												
Expanding the pilot												
Continuous set up of a larger user group												
Test of advanced platform functionalities												
Planning and testing of questionnaire preparation and sending												

Planning and testing of data analysis procedures	
Evaluation of results	
Consolidating the pilot	
Continuous extension of the user group	
Data collection, questionnaire and data analytics in a real context	
Data analysis for mobility planning and evaluation of results	
Scenario B - Access to personal data for the improvement of cultural offer in the city	
Expanding the pilot	
Continuous set up of a larger user group	
Test of advanced platform functionalities	
Planning and testing of questionnaire preparation and sending	
Planning and testing of data analysis procedures	
Evaluation of results	
Consolidating the pilot	
Continuous extension of the user group	
Data collection, questionnaire, and data analytics in a real context	
Data analysis for the planning of cultural events and evaluation of results	
Scenario C - Access to personal data for the delivery of personal certificates	
Testing the procedure	
Release of the API with the population registry	
Test of the certificate flow procedure	
Collection of feedbacks	
Consolidating the procedure	
Set up of a larger user group	
Verification of the certificate sharing procedure in a real context	
Result evaluation	

Table 28: Updated Execution Timeline for Demonstrator #5 – PRATO