Federated decentralized trusted dAta Marketplace for Embedded finance

D2.1 - Requirements Analysis, Specifications and Co-Creation

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Definitions

Acronyms	Definition
AI	Artificial Intelligence
API	Application Programming Interface
DL	Deep Learning
ES	Expected Shortfall
ESG	Environmental, social, and corporate governance
EU	European Union
GDPR	General Data Protection Regulation
HRP	Hierarchical risk parity (HRP) algorithm
IP	Internet Protocol
ISIN	International Securities Identification Number
IT	Information Technology
KPI	Key Performance Indicator
KYC	Know Your Customer
ML	Machine Learning
NLP	Natural language processing
PDF	Portable Document Format (for Adobe Acrobat Reader)
QA	Quality Assurance
SAX	Situation Aware Explainability
TFEU	Treaty on the Functioning of the European Union
TR	Technical Requirement
TXT	Text|TeXT file
UC	Use Case
VAR	Value at Risk
XAI	eXplainable Artificial Intelligence

Executive Summary

D2.1 comprises the first version of a series of versions documenting the outcomes of Task 2.1, entitled "Requirements, Specifications and Co-Creation". D2.1 constitutes a living document which will regularly be updated throughout the duration of the task, depicting the updates in the elicitation and analysis of requirements, whether functional or non-functional, whether business, technical, or regulatory.

Deliverable D2.1 presents the methodology followed towards eliciting the business, technical and regulatory requirements of the FAME federated asset space, and describes how this methodology was implemented in FAME. The adopted requirement engineering framework is based on the Agile Scrum methodology. The main tool used towards eliciting the FAME Generic Requirements was the Document Analysis methodology, while the main tools utilised during the Pilot Specific Requirements engineering process, were Co-Creation Workshops capitalizing upon the usage of User Stories. In more detail, one co-creation workshop per demonstrator was organised, in which the demonstrator partners and the technical partners were engaged in order to properly analyse each business requirement and formulate the respective technical requirement(s) from each business requirement.

The document describes the elicited FAME Generic Requirements that the federated asset space is designed to support, including both functional and non-functional requirements, stemming mainly from the Description of Action, as well as from the functionalities supported by external to the project, well-established marketplaces. In total, 38 FAME Generic Requirements have been identified, which may be updated and/or refined during the course of the project. These updates on the FAME Generic Requirements backlog will be documented in the upcoming versions of the deliverable.

In addition, the document describes the elicited Business (Pilot-Specific) Requirements that the FAME federated asset space is designed to support, stemming mainly from the FAME project pilots. In total, 116 Business (Pilot-Specific) Requirements have been identified, which may be updated and/or refined during the course of the project. These updates on the FAME Business (Pilot-Specific) Requirements backlog will be documented in the upcoming versions of the deliverable. Moreover, the document presents the core regulations that affect the implementation decisions and future operation of the FAME federated asset space.

The document focuses on GDPR, PSD II, MiFiD II, and AI ACT, while the elicited regulatory requirements will be included in the second version of the deliverable. Last but not least, the document describes the elicited (functional and non-functional) technical requirements of FAME, which have been extracted from the analysis of the generic requirements, as well as from the business requirements. In total, 106 (functional) technical requirements, and an additional 13 (non-functional) technical requirements have been identified which may be updated and/or refined during the course of the project.

These updates on the FAME (functional and non-functional) technical requirements backlog will be documented in the upcoming versions of the deliverable.

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1 Introduction

FAME is an extended marketplace and asset (data, algorithm, tutorial) space which provides a federation of entities (data providers, consumers, assets, …) with specialized functionalities, enabling the discovery and utilization of data assets and technology components to support EmFi applications. D2.1 aims to report on the outcomes of the requirements engineering and co-creation processes based on the efforts undertaken in the context of T2.1. It aims to present the methodology followed towards eliciting the business, technical and regulatory requirements of FAME, and the methodologies and tools employed to analyse the extracted requirements. D2.1 documents the Generic Requirements that the FAME federated asset space is designed to support, including both functional and non-functional requirements, as well as the business requirements stemming from the FAME project pilots that will be used towards validating the FAME concept, usability, and value. D2.1 also documents the technical requirements of the federated asset space, which have been extracted from the analysis of the Generic FAME Requirements, as well as from the business requirements. Last but not least, D2.1 also aims at providing a high-level presentation of the core regulations that affect the implementation decisions and future operation of FAME.

1.1 Objective of the Deliverable

D2.1 comprises the first version of a series of versions documenting the outcomes of Task 2.1, entitled "Requirements, Specifications and Co-Creation". D2.1 actually constitutes a living document which will regularly be updated throughout the duration of the task, depicting the updates in the elicitation and analysis of requirements, whether functional or non-functional, whether business, technical, or regulatory. As such, the objectives of deliverable D2.1 are manyfold:

1) To present the requirements elicitation methodology followed towards eliciting the business, technical and regulatory requirements of FAME, and to describe how this methodology was actually implemented.
2) To analyse the co-creation activities performed, and the co-creation tools employed in order to facilitate the implementation of the requirements elicitation methodology.
3) To document the elicited Generic Requirements that the FAME federated asset space is designed to support, including both functional and non-functional requirements, stemming mainly from the Description of Action, as well as from the functionalities supported by external to the project, well-established marketplaces.
4) To document the elicited Business (Pilot-Specific) Requirements that the FAME federated asset space is designed to support, stemming mainly from the FAME project pilots.
5) To present the core regulations that affect the implementation decisions and future operation of FAME. Note: The elicited regulatory requirements will be included in the second version of the deliverable.
6) To document the elicited (functional) technical requirements of the FAME federated asset space, which have been extracted from the analysis of the Generic Requirements, as well as from the business requirements.
7) To document the elicited (non-functional) technical requirements of the FAME federated asset space, which have been extracted from the non-functional Generic Requirements.

1.2 Insights from other Tasks and Deliverables

As aforementioned, D2.1 comprises the first version of a series of versions documenting the outcomes of Task 2.1. As such, D2.1 does not receive input from other deliverables, but rather serves as input for the upcoming technical deliverables, mainly those constituting the outcomes of WP3, WP4 and WP5. Nevertheless, the upcoming versions of D2.1 will also receive input from these deliverables

(namely D3.x, D4.x and D5.x, where x signifies the various versions of the corresponding deliverables), updating the corresponding functional and non-functional technical requirements of the FAME federated asset space, as well as from deliverable D6.1 entitled "Use Cases Specification and Pilot Sites Preparation" which will provide updates to the corresponding business (Pilot-Specific) requirements that FAME will support. However, D2.1 has received preliminary input from the work undertaken in the context of T2.2, entitled "Platform Architecture and Technical Specifications", running in parallel with T2.1, with the (functional and non-functional) Generic Requirements being aligned with the corresponding updates as compared to the specifications described in the DoA, introduced in the context of this task.

1.3 Structure

The document comprises of 7 main chapters and its structure is as follows:

1. Chapter 1 introduces the deliverable highlighting its objective and its relation to other deliverables.
2. Chapter 2 presents the methodology followed towards eliciting the business, technical and regulatory requirements of the FAME federated asset space. It documents the steps of the adopted requirement engineering framework followed, the methodologies and tools employed to elicit and analyse requirements, and describes how the requirements elicitation methodology was actually implemented. In addition, it analyses the co-creation activities performed, and the co-creation tools employed in order to facilitate the implementation of the requirements elicitation methodology.
3. Chapter 3 documents the Generic Requirements that the FAME federated asset space is designed to support, including both functional and non-functional requirements. The Generic Requirements backlog on M6 contains all the collected and elicited Generic Requirements stemming mainly from the Description of Action of FAME, as well as from the functionalities supported by well-established marketplaces including yet not limited to SecureIoT, FINSEC Marketplace, INFINITECH Marketplace, PolicyCLOUD Data Marketplace and more.
4. Chapter 4 documents the Business (Pilot-Specific) Requirements that FAME is designed to support. The Business Requirements backlog on M6 contains all the collected and elicited Business Requirements stemming mainly from the FAME project pilots.
5. Chapter 5 provides a high-level presentation of the core regulations that affect the implementation decisions and future operation of the FAME federated asset space. As the project matures, these (and probably additional) regulations will be studied in more detail so as to also provide a list of solid regulatory requirements that will in turn drive the implementation and piloting activities in the project.
6. Chapter 6 documents the technical requirements of the FAME federated asset space, which have been extracted from the analysis of the Generic Requirements, as well as from the business requirements. The chapter includes the (functional) technical requirements backlog on M6 of the project, which have been elicited from the functional Generic Requirements as well as from the and business requirements of FAME. It also includes the (non-functional) technical requirements backlog on M6 of the project, which have been elicited from the non-functional Generic Requirements of FAME. Last but not least, the deliverable provides a mapping between the elicited business requirements and the extracted technical requirements.
7. Chapter 7 concludes the deliverable.

2 Requirements elicitation methodology

2.1 Approach

Requirements engineering in software development is considered the multi-step process related to the identification, elicitation, analysis, formulation, validation, and management of the needs and expectations of stakeholders. The requirement engineering framework safeguards that the produced software artefacts will address all the needs and expectations of the stakeholders reducing the risk of failure as any potential issue can be spotted early enough to allow low-cost adjustments. In addition to this, the requirement engineering framework ensures that the software artefacts will be developed in the most cost-effective and efficient way as it reduces misunderstandings and produces solid requirements that drive the implementation activities.

2.1.1 FAME Requirements Engineering Framework

Within the context of FAME, the adopted requirement engineering framework is based on the Agile Scrum methodology [1], however it has been slightly modified so as to fit the specificities and address the needs of the project more efficiently. It includes the following steps:

1. **Stakeholders Identification:** This step includes the identification of all related stakeholders and/or stakeholder categories (including yet not limited to financial organizations, insurance organizations, educational organizations, software houses, industrial organizations etc.)
2. **Functional & Non-Functional Requirements Elicitation**: This step includes the collection of the needs and expectations of all involved stakeholders. This involves capturing both functional requirements (what the system should do) and non-functional requirements (qualities, constraints, or conditions the system must meet, such as performance, security, or scalability). It gathers all the information related to the expected benefits from the stakeholder, the pains of the stakeholder, the problem to be solved, as well as any constraints and boundaries. The outcomes of this process are the user requirements, including both Generic Requirements and Pilot Specific / Business Requirements, along with Regulatory requirements.
3. **Technical Requirements Elicitation**: This step actually comprises of three discrete sub-steps analysed below:
    a. **Requirements Analysis & Prioritization:** This step includes the analysis and assessment of the requirements in terms of their business value, their necessity, their consistency, their completeness and their feasibility. The requirements are analyzed to ensure they are clear, consistent, and achievable, and they are also prioritized based on their importance and impact on the system's success. Additionally, during this process any constraints or limitations that may affect the development activities are identified.
    b. **Requirements Technical Documentation:** This step includes the documentation of the identified requirements from a more technical perspective in a clear, consistent, and unambiguous manner while also including their prioritization and grouping. The outcomes of this process are technical requirements. Standard templates or formats are used in order to ensure consistency and ease of understanding, while relevant details such as descriptions, acceptance criteria and dependencies are also included.
    c. **Requirements Validation & Verification:** This step includes the validation of the requirements in terms of completeness, consistency, and accuracy. It also validates that the requirements are testable and meet the needs and expectations of the stakeholders. Requirements validation usually involves testing, user feedback, and acceptance criteria verification.

4. **Requirements Management**: Requirements may evolve over time due to changes in business needs, technology advancements, or user feedback. This step includes all the activities performed during the development phase for the monitoring, tracking, update, and validation of the requirements as the development activities progress so as to keep them aligned with the evolving system and stakeholder expectations.

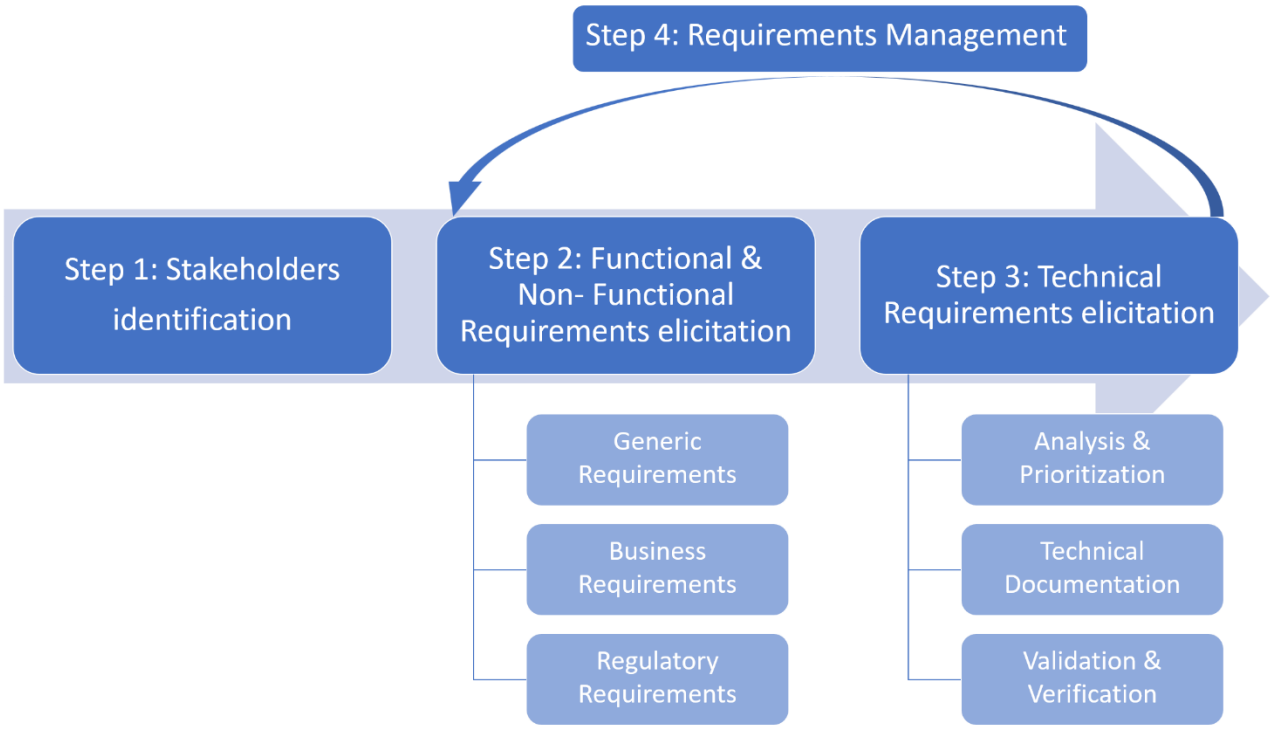

Figure 1 - FAME Requirement Engineering framework

2.1.2 Requirements Engineering Framework Methodologies & Tools

In terms of methodologies and tools to elicit and analyse requirements, several ones currently exist, which may be used towards eliciting business and technical requirements, either individually or in combination, depending on the specific needs and constraints. These amongst others include:

- **Interviews**: Conducting one-on-one interviews with stakeholders allows for direct communication and in-depth exploration of their needs, expectations, and constraints. Interviews provide an opportunity to gather rich information and clarify any uncertainties.
- **Surveys and Questionnaires**: Surveys and questionnaires allow for gathering requirements from a large number of stakeholders in a cost-effective manner. These can be distributed electronically, and respondents can provide their feedback and requirements at their convenience.
- **Co-Creation Workshops**: Workshops bring together multiple stakeholders in a facilitated session to discuss and collaborate on requirements. Various techniques like brainstorming, group discussions, and visual modeling can be used to foster collaboration and gather different perspectives.
- **Document Analysis**: Analyzing existing documentation, such as user manuals, business processes, and technical specifications, can provide valuable insights. This methodology helps in identifying gaps, inconsistencies, and opportunities for improvement.
- **Use Cases and User Stories**: Use cases and user stories are techniques used to capture functional requirements from a user's perspective. Use cases describe interactions between users and the system, while user stories focus on specific user goals and the system's response.

- **Storyboarding**: Storyboarding is a visual technique that uses sketches or drawings to illustrate how users interact with the system. It helps stakeholders visualize the user experience and identify key requirements.
- **Prototyping**: Creating prototypes or mock-ups of the proposed system allows stakeholders to visualize and interact with the system early in the requirements gathering process. Feedback from stakeholders on the prototypes helps in refining and validating requirements.

2.2 FAME Requirements Engineering Framework Implementation

2.2.1 Introduction

Towards implementing the second step of the requirements engineering framework, namely the Functional & Non-Functional Requirements Elicitation step, the FAME consortium focused on three requirements elicitation verticals:

1) **Generic Requirements** elicitation, concerning the identification and elicitation of functional and non-functional requirements stemming from the project vision and the designed conceptual architecture, aspiring to cover a set of functionalities that can be exploited by a wide variety of the FAME federated asset space users and related stakeholders, both internal as well as external to the project consortium.
2) **Pilot Specific Requirements** elicitation, concerning the identification and elicitation of business requirements stemming from the needs and pains of the FAME pilot partners, aspiring to satisfy additional user-specific requirements that have probably not been captured through the Generic Requirements elicitation process and focus more on specific domain-vertical needs.
3) **Regulatory requirements** elicitation, concerning the identification of regulatory requirements that will facilitate boosting the compliance of the assets shared and traded through FAME with applicable regulations in EmFi UCs.

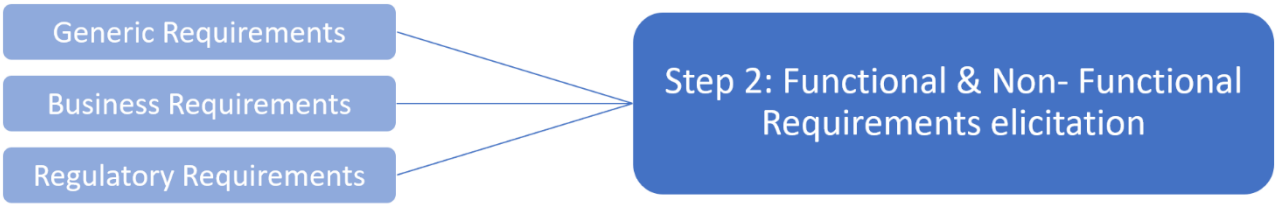

Figure 2 - FAME Functional & Non-Functional Requirements Elicitation step

Afterwards, towards implementing the three following steps of the requirements engineering framework, namely the i) Requirements Analysis & Prioritization step, the ii) Requirements Technical Documentation step, and the iii) Requirements Validation & Verification step, the FAME consortium focused on the elicitation of the FAME Technical Requirements.

4) **Technical Requirements** elicitation: Following the business requirements collection, the consortium focused on the extraction of the technical requirements from the elicited business requirements. Technical requirements describe the technical design specification of the system towards the delivery a desired function or behaviour of the system which satisfies a set of specific business needs. The scope of the technical requirements is to define how the features and functionalities are implemented accompanied by the respective success criteria.

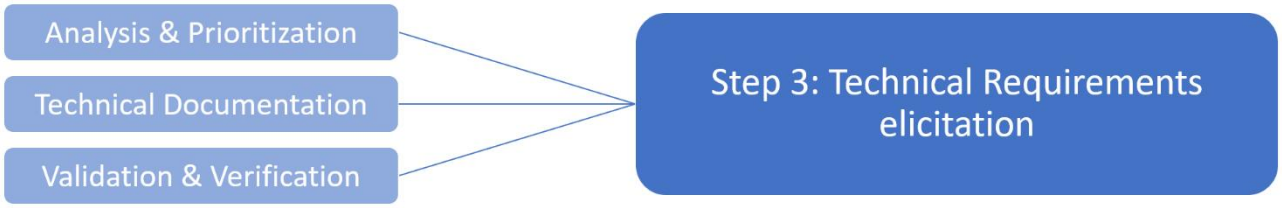

Figure 3 - FAME Technical Requirements Elicitation step

2.2.2 FAME Stakeholders Identification

Having analysed what the FAME federated asset space is and what it expects to offer to its end users, while also having analysed the pilot cases that will be used to evaluate and validate the validity of the assumptions made, the technical robustness and the business value of the FAME federated asset space, and all other relevant scientific, technical and business indicators, the consortium has compiled the initial list of identified stakeholders which are also utilised in the user stories definition. Table 1 presents the list of all identified stakeholders elaborating on their role.

Table 1 - FAME stakeholders

Role	Description
Application provider	The user's main objective is to provide an application software for automating or facilitating the execution of a specific task.
Data provider	The user's main objective is to provide internal data assets to external parties, referring to any type of organization (including data spaces/data marketplaces owners).
Software developer	The user's main objective is to design and implement a specific software to meet the end-users' needs by employing diagrams and models, writing code, and ensuring overall functionality.
Researcher	The user's main objective is to carry out academic or scientific research towards discovering new information or reaching a new understanding.
Data analyst	The user's main objective is to inspect, clean, transform, and model data with the goal of discovering useful information, informing conclusions, and supporting decision-making.
Financial organization	The user's main objective is to collect funds (from the public or other institutions) and invest them in financial assets by dealing with financial transactions such as investments, loans, and deposits.
Regulator	The user's main objective is to control an activity or process and make certain that it operates as it should, checking whether a business is working according to official rules or laws.
Citizen	The user's main objective is to be a member of a society and having rights because of belonging to this society (i.e., in FAME a citizen is considered anyone who has not the abovementioned roles).
Educator	The user's main objective is to educate or train people in order to acquire knowledge, competence, or virtue, via the practice of teaching.

2.2.3 FAME Generic Requirements Engineering Framework Implementation

Generic Requirements concern the functional and non-functional requirements of a system. A system's requirements can be broadly classified into i) functional requirements and ii) non-functional requirements. Functional requirements describe what the system should do, the specific features and

functionalities it needs to provide to meet the users' needs. These requirements define the system's behavior and describe the interactions between the system and its users or other systems. Examples of functional requirements for an IT system could include yet are not limited to i) user authentication and authorization, ii) data input and manipulation, iii) integration with external systems, etc. Non-functional requirements, on the other hand, describe the qualities, constraints, and characteristics that define how the system should perform or behave. These requirements typically focus on aspects beyond the system's specific functionalities. Examples of non-functional requirements for an IT system could include its i) performance, ii) usability, iii) security etc. As aforementioned, the main tool used within the context of FAME towards eliciting the Generic Requirements was the **Document Analysis** methodology, during which the Description of Action was analysed by the consortium partners so as to safeguard that all aspired functionalities laid down in the document during the proposal conceptualization phase will be properly taken into consideration so that they will be evaluated by the technical partners responsible for implementing and delivering them.

2.2.4 FAME Pilot Specific Requirements Engineering Framework Implementation

Pilot Specific requirements, or business requirements generally describe the business need by answering the question "*what the stakeholder or business would like to do*."

Hence, the scope of the business requirements is to define what is needed from the system accompanied by the respective success criteria. Typically, they relate to an overall business objective which describes the expectations of the stakeholder or business from the system answering the question "*what the stakeholder or business would like to achieve.* "In general, from a business objective multiple business requirements may arise. Business requirements should describe the need for the system, the beneficiaries of the system, when and where it will be utilised and how the system will be evaluated against these requirements. However, the purpose of business requirements is not to describe the mean or way of implementation of the system, and they should not encompass the system's implementation details.

The main tools utilised within the context of FAME during the Pilot Specific Requirements engineering process were **Co-Creation Workshops capitalizing upon the usage of User Stories**. The scope of the co-creation workshops designed was to apply systemic design and participatory practises based on approaches which effectively integrate social systems principles for the engagement of stakeholders and users into the design and decision-making process of complex systems. They provided a collaborative and structured process creating the creative thinking spaces for all core stakeholders to identify, analyse and document their needs and ideas for the problem at hand. Hence, these co-creation workshops were leveraged as an effective and time-efficient approach to collaboratively discover innovative, creative, and complete solutions to challenges, problems at hand or potential opportunities. The series of co-creation workshops organized in the context of FAME facilitated better communication, innovative thinking, trust, and commitment, thus enabling more fruitful discussions and results, while driving the upcoming implementation activities. The details of the co-creation workshops organized towards eliciting the Pilot Specific Requirements are presented in Section 2.2.

Throughout the FAME Co-Creation Workshops, the business requirements elicitation process was facilitated through a solid template that was formulated and used in order to collect the required information, presented in Table 2. The business requirements were collected using this template capitalizing upon the initial use cases identified by the pilot partners, describing the aspired interactions between the users and the system.

Table 2 - Business Requirements Template

Requirement Detail	Short description
Business Objective	Description of the overall business objective describing the expectations of the stakeholder or business from the system
Business Requirement	Description of the business requirement describing the business need
Area	The business area that the requirement is applicable to, such as management, marketing, sales, financial, services, etc..
Type	• Functional Requirements which describe the way a solution should function from an end user´s perspective covering the features and functions of the system which are expected from the business user. • Non-Functional Requirements which describe the operational characteristics of the system.
Functionality	• A categorisation of the requirement based on the need. This falls under the user, technical and infrastructure requirements or other categories.
Priority	The priority of the specific requirement is defined as follows: • Critical: The requirement should be met otherwise the business objective is not achievable • Preferred: The business objective can be achieved without this requirement but not in the most efficient and effective manner • Optional: The business object can be achieved even if the specific requirement is not met.

2.2.5 FAME Technical Requirements Engineering Framework Implementation

Technical requirements describe the technical design specification of the system towards the delivery a desired function or behaviour of the system which satisfies a set of specific business needs. The scope of the technical requirements is to define how the features and functionalities are implemented accompanied by the respective success criteria. The main tools used towards eliciting the FAME federated asset space Technical Requirements were **Co-Creation Workshops capitalizing upon the usage of User Stories**. The user stories are used to capture functional requirements from a user's perspective and focus on specific user goals and the system's response. They describe in informal manner the technical specifications of a software feature from the perspective of the end user. The scope of the user stories is to document the added value of each feature to the business user. Following the Agile methodology, each user story is defined as the smallest unit of work describing an end goal. In this sense, user stories describe the requirements from the perspective of an end-user goal. Hence, each user story defined what the user utilising the system wants to be able to do. In general, each user story should have a minimum set of characteristics [3]:

- Independent: It should simple and singular with no references to other user stories
- Negotiable: It should leave room for further discussion during the implementation phase while having a clear goal and benefit.
- Valuable: It should add value to the system and the stakeholder
- Estimable: It should be easy to size in terms of planning and prioritization
- Small: It should represent an amount of work that is feasible and realistic as a small functionality
- Testable: It should be easily tested and verified

The definition of a user story is as follows:

As a < *role or user* > **I want** <*goal*> **so that** <*benefit*>

The following table describes each parameter of a user story:

Table 3 - User Story template

User story parameters	**Description**
Role or user	Describes the stakeholder type. (See Table 1)
Goal	Describes the intent of the stakeholder (what he/she is trying to achieve or the particular problem that is solved)
Benefit	Describes the overall benefit/goal of the stakeholder, what is the overall intention of the stakeholder

Besides the definition of the user story, it is very important that each user story is accompanied by the respective acceptance criteria that should testable, precise, and concise and understandable by all involved parties. Furthermore, each user story should be prioritized in the same manner as with the business requirements via the critical, preferred, and optional levels.

2.3 Applied Methodologies & Tools

2.3.1 Performed Co-Creation Activities

As aforementioned, FAME utilised the concept of the co-creation workshops as the main collaborative and structured process for the various steps of the adopted requirement elicitation approach. In order for the co-creation workshops to be as much effective and efficient as possible, the proper preparation and planning is required. Hence, the structure of each workshop was clearly defined and the objectives of each workshop were set. All stakeholders were invited and online tools were utilised to facilitate the smooth and efficient planning and hosting of the workshop.

With regards to the business requirements elicitation a series of co-creation workshops were organised by the consortium. In particular, the consortium organised co-creation workshops for the demonstrators of the project in which the respective demonstrator partners were engaged along with the respective technical partners of the project. During these workshops, the demonstrator partners were able to present and elaborate on:

- The scope and the business context of their demonstrator
- The business objectives of their demonstrator elaborating their problem at hand, their pain points, what are the expectations or the aspired improvements from FAME
- The stakeholders that they are aspiring to assist by addressing their business objectives and what is needed in order to achieve them

Through these workshops, the business requirements stemming directly from each demonstrator partner were elicited in a collaborative manner using the business requirements template that was presented in the previous paragraph. The elicited FAME pilot specific / business requirements are presented in detail in Section 4 of the current deliverable.

Table 4 presents the details of the organised co-creation workshops for the business requirements elicitation.

Table 4 - Business Requirements elicitation co-creation workshops

#	Workshop title	Scope	Date
1	1st Joint Pilot Co-creation Workshop	This initial workshop was organised to present the methodology and tools that will be used in the upcoming workshops. The stakeholders were familiarised with the process and an initial set of business requirements were elicited.	30/03/23
2	Pilot 7: Assessing the Quality and Monetary Value of Data Assets Workshop	This workshop focused on the business requirements elicitation from Pilot 7	03/04/23
3	Pilot 5: ESG Scorecard Ranking & Sustainable Portfolio Optimisation & Pilot 6: Embedding Climatic Predictions in Property Insurance Products Workshop	This workshop focused on the business requirements elicitation from Pilot 5 and Pilot 6	20/04/23
4	Pilot 2: Embedding Finance Services in a Personalized Citizen Wallet	This workshop focused on the business requirements elicitation from Pilot 2	24/04/23
5	Pilot 1: FaMLy – A powerful financial recommendation engine for families	This workshop focused on the business requirements elicitation from Pilot 1	04/05/23

Note: Pilot 3 and Pilot 4 are currently under reformation hence the respective workshops will be performed during the second iteration of workshop which are planned after M6.

The second part of the organised co-creation workshops were dedicated to the requirements analysis, documentation and validation with a clear focus on the extraction of the technical requirements from the collected business requirements. To this end, the consortium organised one co-creation per demonstrator in which the demonstrator partners and the technical partners were engage in order to properly analyse each business requirement and formulate the respective technical requirement(s) from each business requirement. To assist this process, a set of guidelines were also prepared and circulated to all partners before the co-creation workshops were performed.

Through these workshops, the technical requirements stemming directly from each business requirement of each pilot were collaboratively extract in the form of user stories using the user stories template that was presented in the previous paragraph. The complete list of FAME technical requirements is presented in detail in Section 5 of the current deliverable. Table 5 presents the details of the organised co-creation workshops for the technical requirements extraction.

Table 5 - Technical Requirements extraction co-creation workshops

#	Workshop title	Scope	Date
1	Pilot 1 Technical Requirements Extraction	This workshop focused on the extraction of technical requirements from business requirements of Pilot 1	29/05/23
2	Pilot 6 Technical Requirements Extraction	This workshop focused on the extraction of technical requirements from business requirements of Pilot 6	31/05/23

3	Pilot 5 Technical Requirements Extraction	This workshop focused on the extraction of technical requirements from business requirements of Pilot 5	08/06/23
4	Pilot 2 Technical Requirements Extraction	This workshop focused on the extraction of technical requirements from business requirements of Pilot 2	16/06/23
5	Pilot 7 Technical Requirements Extraction	This workshop focused on the extraction of technical requirements from business requirements of Pilot 7	19/06/23

2.3.2 Co-creation collaboration tools

For both the business requirements elicitation and the technical requirements extraction co-creation workshops, the need for tools that will enable the efficient and effective collaboration and coordination of multiple partners was identified. Hence, the consortium decided to utilise well-established online collaboration tools that will ensure the successful execution of the collaborative and structured process required for the co-creation workshops in a productive and efficient manner.

Regarding the business requirements elicitation process, the consortium decided to utilise the online collaboration platform Miro (www.miro.com). Miro is an online collaborative whiteboard platform. Miro empowers remote, in-office, and hybrid teams to communicate and collaborate across formats, tools, channels, and time-zones without the constraints of physical location, meeting space, and whiteboards. Miro's features fully satisfied the goals of the co-creation workshops as it enabled the smooth collaboration of multiple partners during the definition of the business requirements. Miro enabled the interaction of the partners via the use of online boards where each partner can easily provide his/her input simultaneously while also enabling the interaction of the user via comments and notes. For the purposes of these workshops, a board has been created containing one separate table per demonstrator and different rows per use case of the demonstrator (Figure 4).

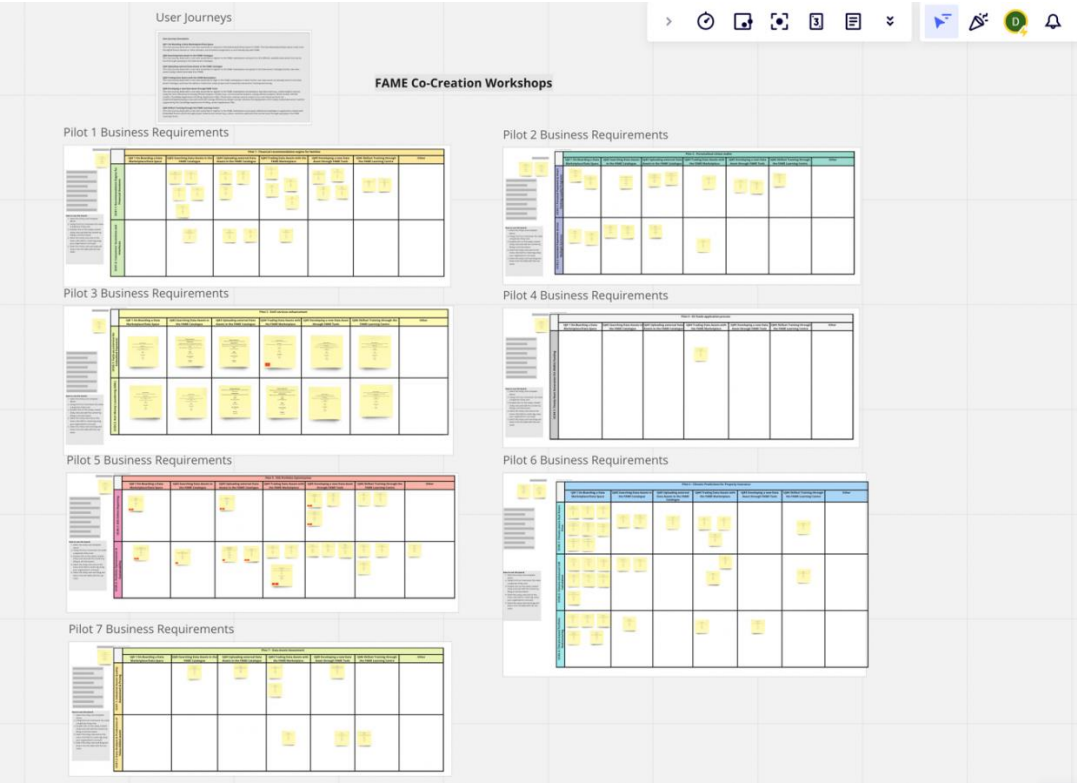

Figure 4 - FAME business requirements Miro boards

The concept of sticky notes has been utilised in order to collect the required input per business requirement. As presented in Figure 5, the template documented in 2.2.4 has been transformed into a sticky note template which all partners utilised in order to provide their input. In addition to the above, a set of guidelines were provided on each table of the board in order to assist the partners to provide their input.

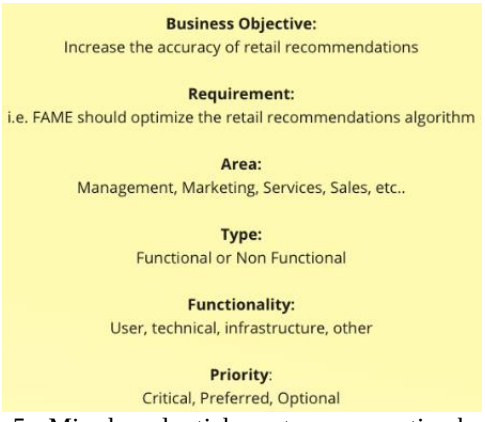

Figure 5 - Miro boards sticky notes representing business requirements

The following figures (Figure 6, Figure 7) present some indicative examples of the input collected through the Miro boards. The outcomes of these workshops were provided as input to the next series of workshops that were dedicated the technical requirements extraction.

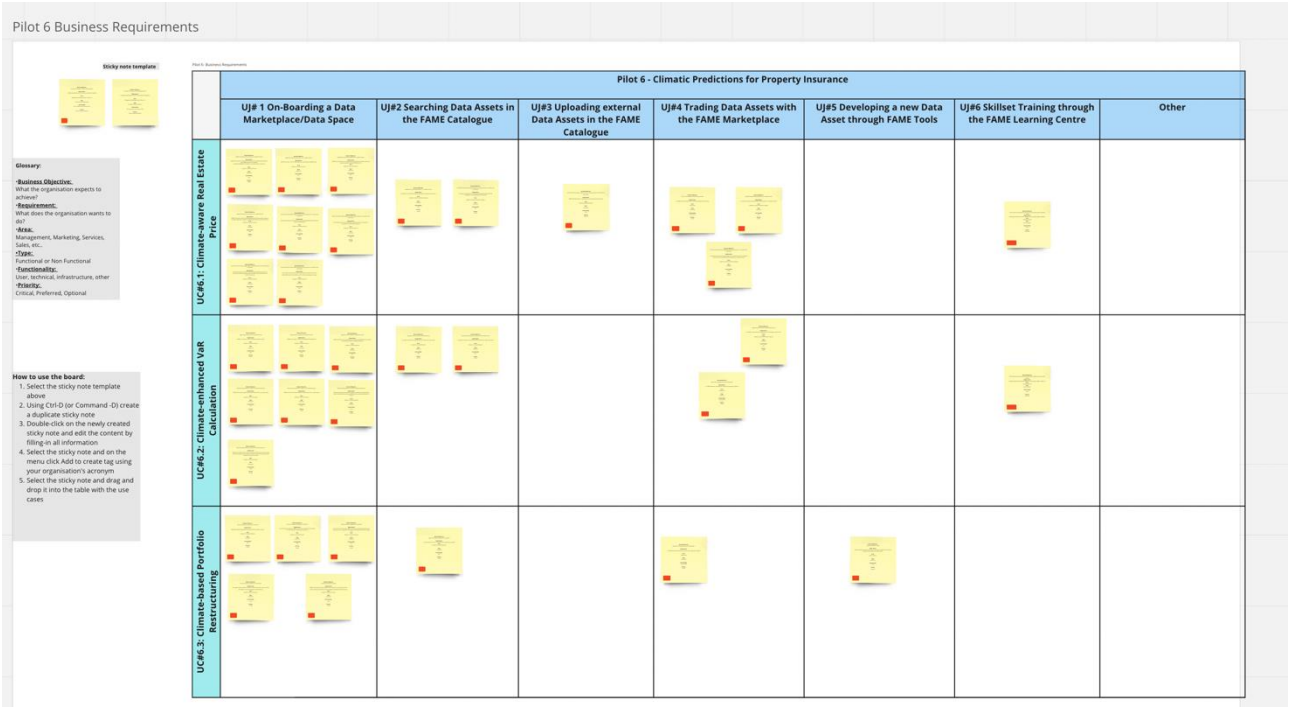

Figure 6 - Miro boards business requirements example (1)

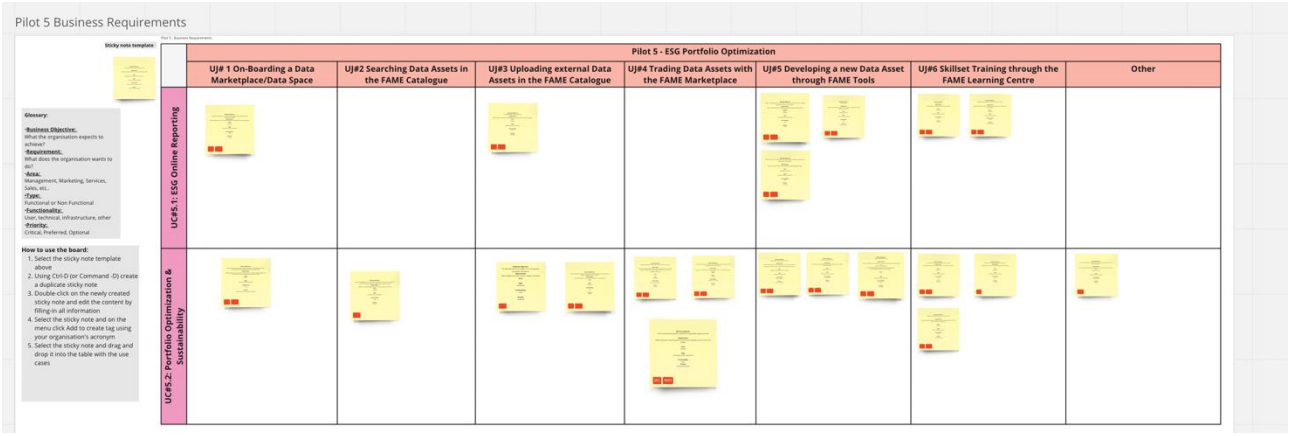

Figure 7 - Miro boards business requirements example (2)

For the technical requirements extraction, the consortium decided to utilise the online spreadsheets of Excel offered by Microsoft SharePoint. Due to the nature of the information included in technical requirements, the structure of online spreadsheets facilitate the collection of such information in a more clear and organised manner. A template has been created and shared among the partners in order to collaboratively through a series of online workshop fill in the details of the technical requirements going on one by one on the collected business requirements. The following figures (Figure 8, Figure 9) display some indicative examples of the input collected through the Excel online spreadsheet.

Technical Req ID	Priority	As a ...	I want to ..	So That ..	Acceptance / Success Criteria
TR1	Preferred	data provider (including data spaces/data marketplaces owners)	assess the quality of my data assets	I can validate their applicability for predictive analytics	metrics/quality dimension (completeness, timeliness, validity, etc.)
TR2	Preferred	data provider (including data spaces/data marketplaces owners)	be able to assign a quality score to each of my data assets	I can compare them among them and give them a price	quality score comparison between raw and processed data
TR3	Preferred	data provider (including data spaces/data marketplaces owners)	estimate the value of each data asset used for maintenance	I can assign them an indicative pricing	provision of a model/calculation based on the effort spent for the QA process (WP4 to assist in defining specific pricing models)
TR4	Preferred	data provider (including data spaces/data marketplaces owners)	to compare the performance of new analytical models against the existing ones already in use	I can compare performance of new models againts existing ones	the platform offers the tools to compare the models in use with the suggested new models e.g. by selecting specific periods in the time series and comparing results in order to assess their performance
TR5	Preferred	data provider (including data spaces/data marketplaces owners)	Make my industrial data assets available through FAME under my preferred license schemes	I can re-purpose/reuse/sell data assets for industrial maintenance	during dataset uploading process, the user will be able to select from a list various relevant licensing schemes
TR6	Critical	software developer	use tools that the platform has to offer to achieve more accurate prediction results	FAME as a platform offers tools to obtain more precise predictions in the scope of preventive/predictive maintenance and improve the overall equipment effectiveness (OEE)	FAME's trusted analytics and energy-efficiency toolkit will be able to process federated datasets stored in MOH's infrastructure
TR7	Preferred	data analyst	to perform data curation on my data assets	I can increase the utilization of the available data assets for predictive maintenance purposes	Find relevant results based on keywords and other meta-data using the FAME search engine
TR8	Preferred	data provider (including data spaces/data marketplaces owners)	to be provided with the means to create/upload/share/index/find training materials	I can train industrial workers on how to assess and understand data produced by IIoT devices and sensors	Offer users the means to create/upload/share training materials, facilitate the indexing, finding of relevant training materials

Figure 8 - Technical requirements in SharePoint (1)

Technical Req ID	Priority	As a ...	I want to ..	So That ..	Acceptance / Success Criteria
TR1	Preferred	application provider	be able to request a trial version of the data asset	I evaluate it and decide to purchase it later on	As a user I am able to request and get access to a trial version of the data asset via a sample
TR2	Critical	data provider (including data spaces/data marketplaces owners)	be able to trade produced data assets	I can monetize the produced by FAME results	As a user I am able to trade in FAME marketplace my data assets that are produced through FAME tools
TR3	Critical	data provider (including data spaces/data marketplaces owners)	be able to replicate a data asset	I can create different versions of the data assets I own	As a user I am able to create a copy of my data asset and create a new version of it
TR4	Critical	data provider (including data spaces/data marketplaces owners)	have a version control of my data assets	I can track changes on my data assets	As a user I am able to create, management and check the different versions of my data assets
TR5	Critical	data analyst	search and explore the data assets of the marketplace via an intelligent way (i.e. filters, keywords, metadata, word combination..)	I can easily and effectively discover what I am interested in	As a user I am able to search and discover data assets using multiple search ways
TR6	Preferred	data analyst	to be able to discuss, review and comment on a data asset	I decide if I will purchase the data asset	As a user I am able to review and comment on a data asset
TR7	Preferred	data provider (including data spaces/data marketplaces owners)	to be able to automatically update data assets with new data via a streaming mechanism	I can create a new version of my data asset	As a user I am able to upload new data via new streaming data on my data assets and create a new version of it
TR8	Optional	data provider (including data spaces/data marketplaces owners)	to be able to automatically update data assets with new data via a file upload mechanism	I can create a new version of my data asset	As a user I am able to upload new data via new files on my data assets and create a new version of it

Figure 9 - Technical requirements in SharePoint (2)

3 FAME Generic Requirements

3.1 Overview

As described in Section 2, Generic Requirements concern the functional and non-functional requirements that a system is designed to support. These requirements define the system's behavior and describe the interactions between the system and its users or other systems. Towards eliciting the Generic Requirements within the context of FAME, the main tool used was the Document Analysis methodology, during which the Description of Action was analysed by the consortium partners so as to safeguard that all aspired functionalities laid down in the document during the proposal conceptualization phase will be properly taken into consideration so that they will be evaluated by the technical partners responsible for implementing and delivering them.

In the following paragraphs the list of elicited FAME Generic Requirements is presented in the form of tables. The table is composed by the following information:

- **Requirement ID**: The unique identifier of each business requirement is a composed by the pilot number (i.e., P1, P2, etc.) and incremental number.
- **System Requirement**: The description of the requirement the system needs to address.
- **Type**: Functional or Non-functional requirement type.
- **Functionality**: The category of the business need.
- **Priority**: The assigned priority of the requirement.

Table 6 - Generic Requirements

Req. ID	System Requirement	System Requirement Description	Assoc. Task	Type	Functionality	Priority
GR_001	Deliver a user dashboard	Design and deliver a user dashboard through which a user can view his/her own assets and identify additional assets.	T2.4	Functional	User	Critical
GR_002	Support federated identity management	Support self-sovereign identities and access to assets from federated marketplaces.	T3.1	Functional	User, Technical	Critical
GR_003	Support interfaces for data assets trading, pricing, and data policy management	Develop and/or enhance interfaces to support interfaces for data assets trading, pricing and data policy management based on various data exchange models and ontologies.	T3.1	Non-Functional	Technical, Infrastructure	Critical
GR_004	Support asset policy management (/Ensure the sovereignty of the data being traded)	Support the management and enforcement of asset access policies in the FAME federated asset space, including asset access and visibility restrictions based on defined criteria (including e.g., organization type, user role, locality etc.).	T3.2	Functional	User, Technical	Critical
GR_005	Support access to external asset policies	Support access to the security policies of the underlying data marketplaces and data spaces.	T3.2	Non-Functional	Technical	Critical
GR_006	Support consolidation of asset access policies	Support the consolidation of asset access policies at the level of the FAME federated asset space.	T3.2	Non-Functional	Technical	Critical
GR_007	Support mapping of external asset access policies to FAME asset access policies	Support the mapping of FAME policies to the lower-level policies of the underlying providers.	T3.2	Non-Functional	Technical	Critical
GR_008	Support identification / discovery of assets	Support searching and filtering of assets from various federated data sources and marketplaces, including unstructured, semi-structured and fully-structured assets, so that users will be able to discover assets across different marketplaces and spaces.	T3.3	Functional	User, Technical	Critical
GR_009	Support (federated) asset acquisition / export / local download	Support (federated) discovered asset acquisition / export / local download from the different marketplaces and spaces.	T3.3	Functional	User, Technical	Critical
GR_010	Support the modelling and transformation of the federated assets to the FAME ontologies and models for EmFi	Support the modelling and transformation of the various federated assets from the formats and semantics of the individual underlying marketplaces and data spaces, to the FAME ontologies and models for EmFi, linking existing	T3.3 T3.4	Functional	Technical	Critical

		ontologies of the finance sector with ontologies from other sectors (e.g., retail, smart cities, healthcare) in-line with the requirements of embedded finance use cases.				
GR_011	Support (EmFi-related) regulatory compliance of assets	Specify and implement security policies and data policies that will boost the compliance of data assets to applicable regulations in EmFi use cases.	T3.5	Functional	Technical	Critical
GR_012	Support assets provenance and traceability	Deliver a baseline blockchain infrastructure which will be used for data assets provenance and traceability, while serving as a basis for supporting the trading and monetization schemes.	T4.1	Functional	Technical, Infrastructure	Critical
GR_013	Support writing and querying the metadata of assets	Deliver APIs for writing and querying the metadata of the assets included / indexed in the federated catalogue.	T4.1	Functional	User, Technical	Critical
GR_014	Support (dynamic) asset trading schemes	Leverage the data assets' metadata to produce various trading schemes to facilitate their monetization. It should enable configurability in terms of trading and monetization schemes i.e., enable the FAME federated asset space operator(s) to activate different schemes for different users, communities, collections of data assets and other granularities.	T4.2	Functional	User, Technical	Critical
GR_015	Support (dynamic) asset monetization and pricing schemes	Leverage the data assets' metadata to produce various pricing and monetization schemes (based on discrete dynamic pricing criteria). It should leverage metadata information including metadata about the completeness, the volume, the quality, the timeliness. It should implement dynamic market mechanisms that will change the price of the data asset according to the demand for it in the scope of the marketplace.	T4.2	Functional	User, Technical	Critical
GR_016	Support trading and pricing of data assets	Design and implement (over a blockchain infrastructure) trading and pricing of (federated) assets, including support for (dynamic) asset trading, pricing, and monetization schemes.	T4.3	Functional & Non-Functional	Technical, Infrastructure	Critical
GR_017	Support token-based configurability of tokens	Design and implement programmable and configurable Smart Contracts enabling encoding hybrid trading and pricing rules based on tokens.	T4.3	Functional & Non-Functional	Technical, Infrastructure	Critical

GR_018	Support semantic search of federated assets	Support semantic search over the federated FAME catalogue.	T4.4	Functional	User, Technical	Critical
GR_019	Support dynamic ranking of semantically discovered federated assets	Support schemes for ranking the results according to relevance and value-based attributes of the data assets.	T4.4	Functional	Technical	Critical
GR_020	Support operational and governance models	Implement the technical infrastructure for supporting the specified Operational and governance models, including support for users' registration, management of subscriptions, management of pay-as-you-go, Data-as-a-Service schemes and more.	T4.5	Non-Functional	Technical, Infrastructure	Critical
GR_021	Support the identification and acquisition of AI/ML techniques for EmFi use cases	Specify, implement, and make available in the marketplace a library of AI/ML techniques for EmFi use cases. It will comprise classical ML techniques and most popular deep learning techniques.	T5.1	Functional	User, Technical, Infrastructure	Critical
GR_022	Support (federated) (training and) execution of analytics (AI) services	Support (training and) execution of analytics (AI) services that are deployed and hosted on federated / cloud infrastructures. The federated AI services should be accessible and customizable through the FAME federated asset space while physically deployed and hosted outside of FAME. The federated AI services should be able to securely receive a configuration and/or input file and securely return the output of the analysis to the requestor.	N/A	Functional	User, Technical, Infrastructure	Preferred
GR_023	Support the identification and acquisition of (federated) AI-based models that are appropriate for supporting incremental analytics	The library of AI/ML techniques for EmFi use case should include AI-based models that are appropriate for supporting incremental analytics.	T5.1	Functional	User, Technical, Infrastructure	Critical
GR_024	Support the identification and acquisition of (federated) AI-based models that can be explained (/Support explainability of developed / executed AI services)	The library of AI/ML techniques for EmFi use case should include AI-based models that can be explained based on the FAME XAI techniques.	T5.2	Functional	User, Technical, Infrastructure	Critical

GR_025	Support scoring the explainability of the different models	Specify and implement a framework for scoring the explainability of the different models towards comparing alternative approaches, balancing performance vs. explainability trade-offs.	T5.2	Functional	User, Technical	Critical
GR_026	Support Situation-Aware Explainability (SAX)	Support Situation-Aware Explainability (SAX), considering casual sequencing and constraints, broader context information (e.g., temporal) behind decisions, as well as inferential association between subsequent process enactments.	T5.2	Functional	User, Technical	Critical
GR_027	Support Incremental Analytics	Support Incremental Analytics, providing mechanisms that incrementally and continually compute (real-time / run-time) analytical results over previously computed snapshots of queries.	T5.3	Non-Functional	Technical, Infrastructure	Critical
GR_028	Support Energy Efficient Analytics	Support the decomposition of AI/ML techniques in a series of incremental queries, being energy efficient, since they perform a small part of the query operation which reduces I/O and data transfer operations., while at the same time keeping track of the CO2 benefit of the incremental analytics.	T5.3	Non-Functional	Technical, Infrastructure	Critical
GR_029	Support profiling techniques for cloud/ edge computing applications	Support the assignment of cloud edge applications in different profiles, such as real-time applications, low latency applications, applications requiring many data points, batch processing applications and more.	T5.4	Non-Functional	Technical, Infrastructure	Critical
GR_030	Support the deployment of configurations that optimize CO2 emissions	Based on the assignment of cloud edge applications in different profiles provide deployment configurations that optimize CO2 emissions without compromising the functionality and the expected performance of the UC.	T5.4	Non-Functional	Technical, Infrastructure	Critical
GR_031	Support federated machine learning scenarios	Implement a Federated Machine Learning Infrastructure, which will be destined to support privacy friendly and energy efficient data sharing in federated learning scenarios where many different nodes (e.g., marketplaces) contribute assets.	T5.5	Non-Functional	Technical, Infrastructure	Critical
GR_032	Support organization onboarding	Provide the means for the registration of an organization in FAME so that the organization is able to share own (federated) assets.	N/A	Functional	User, Technical, Infrastructure	Critical

GR_033	Support asset upload	Provide the means for a registered organization in FAME to upload its own assets on FAME federated asset space.	N/A	Functional	User, Technical, Infrastructure	Critical
GR_034	Support asset suggestion	Support the suggestion of similar assets.	N/A	Functional	User	Optional
GR_035	Support asset request	Support communication with asset owners towards requesting similar and/or enhanced and/or customized / personalized assets.	N/A	Functional	User	Optional
GR_036	Support asset review	Support reviewing assets available through the marketplace leaving feedback for both the asset owners and for the asset consumers.	N/A	Functional	User, Technical	Preferred
GR_037	Support asset curation	Support the various processes associated with asset curation, including yet not limited to asset cleaning, asset anonymization, asset integration, asset transformation, asset versioning etc.	N/A	Functional	User, Technical	Preferred
GR_038	Provide educational & training content	Support the provision of educational content through e.g., training courses, webinars, white papers etc.	N/A	Functional	User	Preferred

Note: N/A in the table above refers to requirements not stemming directly from the Description of Action of FAME, but from functionalities supported by reviewed marketplaces including yet not limited to SecureIoT, FINSEC Marketplace, INFINITECH Marketplace, PolicyCLOUD Data Marketplace and more.

3.2 Generic Requirements backlog

The presented tables constitute the current version of the FAME Generic Requirements backlog on M6. It contains all the collected and elicited Generic Requirements stemming mainly from the Description of Action of FAME, as well as from the functionalities supported by well-established marketplaces including yet not limited to SecureIoT, FINSEC Marketplace, INFINITECH Marketplace, PolicyCLOUD Data Marketplace and more. Nevertheless, as the project evolves additional Generic Requirements may arise, while the existing ones may also be updated and/or refined. These updates on the FAME Generic Requirements backlog will be documented in the upcoming versions of the deliverable.

4 FAME Pilot Specific (Business) Requirements

4.1 Overview

As described in Section 2.1, business requirements should clearly define the business need of the stakeholder by documenting what is needed from the system along with the success criteria that will be used for the stakeholder acceptance process. Through the organised co-creation workshops that were presented in Section 2.2, a series of business requirements were collected from the FAME stakeholders.

In the following paragraphs the list of elicited business requirements per FAME demonstrator is presented in the form of tables. The table is composed by the following information (based also in the template presented in Section 2.1):

- **Requirement ID**: The unique identifier of each business requirement is a composed by the pilot number (i.e., P1, P2, etc.) and incremental number.
- **Use Case ID**: The pilot's use case number per the FAME DoA.
- **Business Objective**: The description of a specific business objective of the pilot
- **Business Requirement**: The description of the business requirement of the pilot
- **Area**: The business area that the requirement is applicable
- **Type**: Functional or Non-functional requirement type
- **Functionality**: The category of the business need
- **Priority**: The assigned priority of the requirement

4.2 Pilot 1 business requirements

The scope of Pilot 1 is to develop a powerful recommendation engine for families, leveraging ML and advanced analytics over an extensive pool of data assets from the pilot's ecosystem. To this end, the recommendation engine aims to customise the user experience of pilot's clients as well as to develop more user-friendly consumer interfaces.

In the following table, the details of the collected business requirements stemming from Pilot 1 are presented.

Table 7 - Pilot 1 business requirements

Business Req. ID	Use Case ID	Business Objective	Business Requirement	Area	Type	Functionality	Priority
P1_BR1	UC1	Generate good quality recommendations to increase customer value	Handle disputes and returns (ex: bad data asset quality, not as expected...)	Sales	Functional	User	Preferred
P1_BR2	UC1	Monetize data assets	FAME should allow trading data assets created through FAME tool (ex: I upload data asset X, combine it with Y into Z and sell Z)	Data	Functional	User	Optional
P1_BR3	UC1	Generate good quality recommendations to increase customer value	FAME should allow replication of data assets when they are generated online (ex: if FAME allows adding columns or combining datasets online, it should provide a way to replicate transformations in the future, ex. with updated data)	IT	Functional	Technical	Optional
P1_BR4	UC1	Generate good quality recommendations to increase customer value	FAME should have searching and filtering capabilities, including unstructured data. Ideally, searching would be intelligent and not only keyword based. ex: "find me data about consumption patterns in Europe in 2023"	Data	Functional	User	Critical
P1_BR5	UC1	Generate good quality recommendations to increase customer value	FAME should allow discussing, reviewing and questioning about a data asset	Data	Functional	User	Preferred

P1_BR6	UC1	Monetize data assets	Upload new versions of data assets continuously as they are available, possibly in streaming (to be consumed in streaming by buyers)	Data	Functional	Technical	Optional
P1_BR7	UC1	Comply with regulation	Identify, alter and mask client sensitive information on upload	Compliance	Functional	Technical	Optional
P1_BR8	UC1	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P1_BR9	UC1	Train finance sector professionals on customers' profiling mechanisms	Development of tutorials, Webinars, How-to videos, Jupyter notebooks	Insurance	Non-Functional	User	Preferred
P1_BR10	UC1	Train finance sector professionals on using recommender systems for financial decisions	Development of tutorials, Webinars, How-to videos, Jupyter notebooks	Insurance	Non-Functional	User	Preferred
P1_BR11	UC2	Monetize data assets	Provide statistics about dataset usage / downloads	IT	Functional	User	Optional
P1_BR12	UC1	Comply with regulation	FAME should be able to trace each data object to its origin (ex: column A comes from dataset B and is a sum of column C from dataset D and E, uploaded by X)	Data	Functional	User	Optional
P1_BR13	UC1	Comply with regulation	Restrict data access and visibility	IT	Functional	Technical	Optional
P1_BR14	UC1	Comply with regulation	FAME should have tools that automatically anonymize data (ex: aggregations)	Compliance	Functional	User	Optional
P1_BR15	UC1	Generate good quality recommendations to increase customer value	FAME should allow buying fractional parts of data assets, possibly at reduced price	Data	Functional	User	Preferred
P1_BR16	UC1	Generate good quality recommendations to increase customer value	FAME should allow requesting data assets to registered entities in FAME	Data	Functional	User	Preferred
P1_BR17	UC1	Monetize data asset	Fame should provide estimates of data asset value, based on similar data assets	Sales	Functional	User	Optional
P1_BR18	UC1	Generate good quality recommendations to increase customer value	FAME should recommend related data assets when selecting another data asset	Data	Functional	User	Optional
P1_BR19	UC1	Monetize data assets	Support continuous updates	IT	Functional	Technical	Optional
P1_BR20	UC2	Understand dataset usage	Provide statistics about dataset usage / downloads	IT	Functional	Technical	Optional

P1_BR21	UC2	All participants having the ability access FAME data marketplace	Being able to provide data to the marketplace and monitor data usage by other marketplace users	Data, Credit	Functional	Technical	Critical
P1_BR22	UC2	All participants having the ability access FAME data marketplace	Monitor our data usage by other marketplace users	Data, Credit	Functional	Technical	Critical
P1_BR23	UC2	Search Data regarding similar Credit services usage	Filter aggregated or individual data that could be useful to our analytics and management team to explore and analyse	Product Development	Functional	User	Preferred
P1_BR24	UC2	Search Data regarding similar Credit services usage	Export Data in order to explore it in our data tools	Product Development	Functional	User	Preferred
P1_BR25	UC2	Search Data regarding similar Credit services usage	Availability from FAME and project participants to interact in order to share knowledge and data clarification	Product Development	Functional	User	Preferred
P1_BR26	UC2	Enrich FAME Marketplace	Being able to download data from the marketplace	IT, Data	Functional	Technical	Critical
P1_BR27	UC2	Enrich FAME Marketplace	Allow continuous upload of data to the marketplace	IT, Data	Functional	Technical	Critical
P1_BR28	UC2	Enrich FAME Marketplace	Security measures: limit access, identify, alter and mask client sensitive information on upload,	IT, Data	Functional	Technical	Critical

4.3 Pilot 2 business requirements

The scope of Pilot 2 is to develop novel EmFi services in an urban context, where data from smart services are used to provide additional finance related services. To this end, Pilot 2 aims to create citizen's EmFi profile by leveraging existing parking data, onboarding other behavioural data of citizens and by using citizens profiles to generate and provide personalised citizen-centric offers and recommendations. On the other hand, Pilot 2 aims to extend citizen wallet to a broader range of services such as transportation services, payments of fines, etc.

In the following table, the details of the collected business requirements stemming from Pilot 2 are presented.

Table 8 - Pilot 2 business requirements

Business Req. ID	Use Case ID	Business Objective	Business Requirement	Area	Type	Functionality	Priority
P2_BR1	UC1	Analyse parking data in terms of locality, frequency, and time of parking	FAME should optimize the data analysis part in order to be pinpoint parking habits	Parking Management, Marketing	Functional	User, technical, infrastructure,	Critical
P2_BR2	UC1	Request data from other organisations that have loyalty programs in order to analyse the rewarding mechanisms	FAME should offer an added value to an external entity in order to add their data and offer an authorized and usable onboarding/registration procedure	Parking Management, Marketing	Functional	User, technical, infrastructure,	Preferred
P2_BR3	UC1	Acquire knowledge and training on the platform so as to leverage the city's IT personnel competencies	FAME should offer training feature (e.g., webinars, user guide, MOOCs, online training sessions etc)	Public administration, management	Functional	User, technical, infrastructure,	Critical
P2_BR4	UC1	Request and onboard data from other organizations so as to leverage the services of the city e.g., traffic data	FAME should offer an added value to an external entity in order to add their data and offer an authorized and usable onboarding/registration procedure	Parking Management, Marketing	Functional	User, technical, infrastructure,	Critical
P2_BR5	UC1	Reduce the costs that refer to the management of the parking system of the city	FAME should optimize the data analysis in order to identify solutions that can make the system less costly for the city	Parking Management, Marketing	Functional	technical, infrastructure,	Preferred
P2_BR6	UC1	Analyse parking and behavioural data in terms of locality in order to design new services e.g. if a citizen owns a shop, then short term	FAME should optimize the data analysis part in order to be pinpoint parking and other habits and localities	Parking Management, Marketing	Functional	User, technical, infrastructure,	Critical

		parking for customers could be foreseen					
P2_BR7	UC1	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P2_BR8	UC1	Correlate data sources to offer new services	FAME should offer a view of correlated data and usable visualizations for a city employee	Public administration	Functional	User, technical	Critical
P2_BR9	UC1	Exploit data on parking payments to design specific offers e.g., discounts	FAME should offer an analysis of parking payments and usable visualizations e.g., time, duration, location etc	Public administration, management	Functional	User, technical	Critical
P2_BR10	UC2	Request and onboard data from other organizations so as to leverage the services of the city e.g. traffic data	FAME should offer an added value to an external entity in order to add their data and offer a authorized and usable onboarding/registration procedure	Parking Management, Marketing	Functional	User, technical	Critical
P2_BR11	UC2	Analyse parking and behavioural data in terms of locality in order to foresee the addition of other municipal services	FAME should optimize the data analysis part in order to be pinpoint parking and other habits and localities	Parking Management, Marketing	Functional	User, technical, infrastructure,	Critical
P2_BR12	UC2	Analyse parking and behavioural data in terms of high/low demand in order to develop a dynamic pricing scheme	FAME should optimize the data analysis part in order to be able to foresee parking demand based on historical data	Parking Management, Marketing	Functional	User, technical, infrastructure,	Preferred
P2_BR13	UC2	Offer citizen wallet to citizens	Develop a citizen wallet for citizens to consume services in one app	Marketing	Functional	User	Critical
P2_BR14	UC2	Develop a dynamic parking pricing scheme	Develop a dynamic pricing mechanism based on parking demand	Parking Management, Marketing	Functional	User, technical, infrastructure,	Preferred
P2_BR15	UC2	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical

4.4 Pilot 5 business requirements

The scope of Pilot 5 is to develop an online reporting tool that will provide weighted portfolio sustainability scores for ESG investments. On the one hand, Pilot 5 will develop the ESG reporting tools that will combine various ESG metrics and will aggregate different dimensionalities of data to provide synthetic measures that rank assets using a multi-criteria model. On the other hand, Pilot 5 will leverage the developed ESG reporting tools to perform portfolio optimisations towards the transition to sustainable finance.

In the following table, the details of the collected business requirements stemming from Pilot 5 are presented.

Table 9 - Pilot 5 business requirements

Business Req. ID	Use Case ID	Business Objective	Business Requirement	Area	Type	Functionality	Priority
P5_BR1	UC1	Develop a ranking system for stocks and/or bonds based on ESG criteria, alongside fundamental and price-based factors	Rank Stocks based on their ESG scoring. Publish it globally through FAME marketplace	Analytics	Functional	User	Critical
P5_BR2	UC1	ESG Tutorials	Provide educational content explaining its ESG approach	Marketing	Functional	User	Critical
P5_BR3	UC1	ESG Ranking, Weightings and Recommendation Tables Tutorials	Introduce detailed ESG "recipe" of weights and the mechanisms that govern our recommendations	Marketing	Functional	User	Optional
P5_BR4	UC1	ESG Reporting	Introduce detailed ESG reporting and impact analysis, allowing users to select based on E,S,G criteria	Marketing, Services	Functional	User	Preferred
P5_BR5	UC1	Provide ESG table of recommendations	Allow market data to be inserted beyond price and ESG data from Bloomberg etc	Analytics	Functional	User	Preferred
P5_BR6	UC1	Provide ESG analytics on a set of listed companies from market feeds (only indicative for testing)	Allow market data to be inserted beyond price and ESG data from Bloomberg etc	Analytics	Functional	User	Critical
P5_BR7	UC1	ESG Table of Recommendations (quarterly-monthly) according to the proprietary FAME recipe of ESG weights	Allow the calculated table to be exchanged through FAME Marketplace	Marketing, Services	Functional	User	Preferred

P5_BR8	UC2	ESG-focused Model Portfolios	Create monthly ESG-powered model portfolios, offering clients a range of investment options	Marketing, Services	Functional	User, Technical	Optional
P5_BR9	UC2	ESG scoring Calculator Tool	1)Customer Questionnaire during KYC, on how 'ESG' sensitive you feel, how much E,S,G 2)Get recommendations i) the global FAME ESG recommendation for Stock Allocation ii) Your “personalized” one (if time permits)	Marketing, Services	Functional	User	Preferred
P5_BR10	UC2	Optimizing Investment Portfolio with ESG	Optimize client portfolios by considering ESG criteria and client-specific ESG preferences, resulting in more sustainable and responsible investments	Management, Marketing, Services, Sales,	Functional	User, Technical	Optional
P5_BR11	UC2	Use AI to extract sentiment and portfolio impact of our recommendation text for portfolio optimisation	Create monthly AI-powered text analysis on our ESG portfolio recommendations	Marketing, Services	Functional	User, Technical	Preferred
P5_BR12	UC2	Whitepaper: Hierarchical risk parity (HRP) algorithm	Provide educational content explaining approach Hierarchical Risk Parity (HRP) algorithm	Marketing	Functional	User	Critical
P5_BR13	UC2	Portfolio Optimization Tutorials with custom ESG weights	Provide educational content explaining Portfolio Optimization methods	Marketing	Functional	User	Critical
P5_BR14	UC2	Comparison of proprietary FAME "recipe" of ESG weights with the weights of other renowned investment organisations	Compare a list of 10 weights of ESG parameters to best-in-class paradigms around the world	Marketing, Services	Functional	Technical, Infrastructure	Optional
P5_BR15	UC2	Back-testing Analysis for ESG portfolio performance	Conduct back-testing on our ESG ranking system, ensuring that the rankings support investment rationale and the profitability of portfolios	Marketing, Services	Functional	Technical, Infrastructure	Optional
P5_BR16	UC2	Insert 3-4 indicative portfolios as testing sample from renowned global	Allow a portfolio of assets with their ISIN number or TICKER and with	Analytics	Functional	User	Critical

		investment sources (yahoo, Bloomberg, banks, investment houses etc.)	weights to be constructed. Insert examples from data feeds if possible				
P5_BR17	UC2	Provide indicative E,S,G weights of 2-3 comparative investment institutions.	Allow weights of E,S,G in various "recipes" to be held	Analytics	Functional	User	Preferred
P5_BR18	UC2	Provide indicative portfolios of "synthetic" fictional customers for testing and for FAME marketplace visitors to consult	Allow construction of a set of 4-5 portfolios of 5-10 assets each	Analytics	Functional	User	Critical
P5_BR19	UC2	Compare ESG weights of other established investment institutions that registered in FAME marketplace with the recommendation weights of FAME	Allow for 10 custom weights of E+S+G for every Asset in a portfolio	Analytics	Functional	User	Optional
P5_BR20	UC2	Explanation of ESG Reporting and Recommendations	Introduce detailed ESG reporting and impact analysis, allowing clients to track the E,S,G impacts of their investments	Marketing	Functional	User	Preferred
P5_BR21	UC2	ESG Portfolio Recommendations published through FAME to global investors	FAME marketplace can provide ESG portfolio Recommendations with custom E,S,G weights	Services	Functional	User	Preferred

4.5 Pilot 6 business requirements

The scope of Pilot 6 is to develop novel climate aware property insurance products. Hence, it will leverage the value-added datasets in FAME in order to project valuations of real-estate assets based on local-level predictions as well as to calculate climate aware VaR of entire portfolios of assets possessed by insurers, including bonds, stocks and real-estate assets. Finally, Pilot 6 will analyse different portfolios of assets in the light of climate change. In the following table, the details of the collected business requirements stemming from Pilot 6 are presented.

Table 10 - Pilot 6 business requirements

Business Req. ID	Use Case ID	Business Objective	Business Requirement	Area	Type	Functionality	Priority
P6_BR1	UC1	Supply featurised climate projections for a specific location	FAME must be able to train a statistical downscaling model that relates coarse grid climate projections to finer gird ERA5 Land data	Analysts at a Financial Services	Functional	User	Critical
P6_BR2	UC1	Supply featurised climate projections for a specific location	FAME must connect to CDS to download historical reanalysis data (ERA5 Land)	Analysts at a Financial Services	Functional	User	Critical
P6_BR3	UC1	Supply featurised climate projections for a specific location	FAME must connect to CDS (Copernicus data store) to download climate project data (CMIP5) and historical reanalysis	Analysts at a Financial Services	Functional	User	Critical
P6_BR4	UC1	Supply featurised climate projections for a specific location	FAME must be able to create ML model to downscale climate projections	Analysts at a Financial Services	Functional	User	
P6_BR5	UC1	Supply featurised climate projections for a specific location	An Analysts can find that the climate risk feature for a specific location exists	Analysts at a Financial Services	Functional	User	Critical
P6_BR6	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	An analysts can find that the model exists which allows climate risk to be calculated for a user-supplied location and asset	Analysts at a Financial Services	Functional	User	Critical
P6_BR7	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	FAME should offer value to an organization that uploads property price data	Analysts at a Financial Services	Functional	User	Optional

P6_BR8	UC1	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P6_BR9	UC1	Supply featurized climate projections for a specific location	An analyst can purchase the featurized climate projection for a specific location	Analysts at a Financial Services	Functional	User	Critical
P6_BR10	UC2	Train insurance sector professionals how to perform climate-aware Real Estate Pricing	Development of financial courses, Webinars, How-to videos, Jupyter notebooks	Insurance, Finance	Non-Functional	User	Preferred
P6_BR11	UC1	Supply featurised climate projections for a specific location	FAME must be able to take the downscaling model and future climate projections to supply a projection of changes in climate project features at any given location	Analysts at a Financial Services	Functional	User	Critical
P6_BR12	UC1	Forecasts the effect climate change will have on property prices for a specific asset and location	Historical property price information will need to be uploaded that has both prices and asset characteristics	Analysts at a Financial Services	Functional	User	Critical
P6_BR13	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	A model will need to be trained that links the downscaled climate features to fluctuations in historical property prices	Analysts at a Financial Services	Functional	User	Critical
P6_BR14	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	An analyst can purchase a projected effect on the real estate price for a supplied location and the featurized climate projection for a specific location	Analysts at a Financial Services	Functional	User	Critical
P6_BR15	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	A model will need to be trained that links the downscaled climate features to fluctuations in historical property prices that takes asset characteristics and location into account	Analysts at a Financial Services	Functional	User	Critical
P6_BR16	UC1	Forecast the effect climate change will have on property prices for a specific asset and location	A new asset and location will need to be provided, for which the model and downscaled climate features will be used to forecast property price changes	Analysts at a Financial Services	Functional	User	Critical
P6_BR17	UC2	Supply Seasonal Forecasts of Climate Risk Features	An analyst can purchase the seasonal forecast of a catalogue of climate risk features	Analysts at a Financial Services	Functional	User	Critical

P6_BR18	UC2	Supply Seasonal Forecasts of Climate Risk Features	FAME must connect to CDS to download seasonal forecasts	Analysts at a Financial Services	Functional	User	Critical
P6_BR19	UC2	Supply Seasonal Forecasts of Climate Risk Factors	FAME must connect to CDS to download ERA5 Reanalysis Data	Analysts at a Financial Services	Functional	User	Critical
P6_BR20	UC2	Supply Seasonal Forecasts of Climate Risk Factors	FAME must bias correct seasonal forecasts relative to the ERA5 data, to then derive the corrected forecasts of climate risk features	Analysts at a Financial Services	Functional	User	Critical
P6_BR21	UC2	Supply Seasonal Forecasts of Climate Risk Factors	An analyst can find that a seasonal forecast of climate risk factors exists	Analysts at a Financial Services	Functional	User	Critical
P6_BR22	UC2	Determine Risk Exposure of an Asset to Climate Risk Features	An analyst can find that a climate-aware VAR calculation for a given asset exists	Analysts at a Financial Services	Functional	User	Critical
P6_BR23	UC1	Train insurance/finance sector professionals how to climate-aware assess their portfolios	Development of financial courses, Webinars, How-to videos, Jupyter notebooks	Insurance, Finance	Non-Functional	User	Preferred
P6_BR24	UC1	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P6_BR25	UC2	Determine Risk Exposure of an Asset to Climate Risk Features	FAME must be able to download historical assets prices for e.g. a given equity	Analysts at a Financial Services	Functional	User	Critical
P6_BR26	UC2	Determine Risk Exposure of an Asset to Climate Risk Features	FAME must be able to run a quantile regression model that can determine the extent to which historical asset price volatility was correlated with climate risk features	Analysts at a Financial Services	Functional	User	Critical
P6_BR27	UC2	Determine Risk Exposure of an Asset to Climate Risk Features	FAME must be able to load up seasonal forecasts of the climate risk features and feed them through the asset-specific risk model to obtain a climate aware VAR estimate for the next six months	Analysts at a Financial Services	Functional	User	Critical
P6_BR28	UC3	Assess the climate risk exposure of a portfolio	FAME must be able to download historical prices for a portfolio of assets	Analysts at a Financial Services	Functional	User	Critical

P6_BR29	UC3	Assess the climate risk exposure of a portfolio	For each asset in the portfolio, FAME must be able to model the "risk premium" and "risk" related to climate features from (UC1)	Analysts at a Financial Services	Functional	User	Critical
P6_BR30	UC3	Assess the climate risk exposure of a portfolio	For each asset in the portfolio, FAME must be able to model the portfolio level excess return over a supplied index and risk from this portfolio related to climate risk	Analysts at a Financial Services	Functional	User	Critical
P6_BR31	UC3	Assess the climate risk exposure of a portfolio	An analyst can find that this tool exists and can upload their portfolio	Analysts at a Financial Services	Functional	User	Critical
P6_BR32	UC2	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P6_BR33	UC3	Propose climate-safe indices	FAME should allow external users access to our tools to enable them to propose new stock indices which are "climate proof"	Index Providers	Functional	User	Optional
P6_BR34	UC3	Assess the climate risk exposure of a portfolio	For a given portfolio, FAME must be able to indicate how excess returns and risk will change on account of changes in climate features	Analysts at a Financial Services	Functional	User	Critical
P6_BR35	UC3	Propose portfolio Restructuring	FAME must be able to determine which assets to drop from an existing portfolio in order to improve performance based on changes in projected climate risk features	Analysts at a Financial Services	Functional	User	Critical

4.6 Pilot 7 business requirements

The scope of Pilot 7 is to assess the quality of its different types of data assets, while using the quality assessment and the type of each data asset for pricing and trading purposes inside the FAME marketplace. To this end, the pilot will audit its assets against different characteristics, including their volume, completeness, locality and context, variety of data sources, use in industrial applications, etc, while developing different pricing schemes for trading within the FAME marketplace. Finally, the pilot aims to develop new ML models on top of existing data based on XAI and energy efficient analytics that will be traded within the marketplace. In the following table, the details of the collected business requirements stemming from Pilot 7 are presented.

Table 11 - Pilot 7 business requirements

Business Req. ID	Use Case ID	Business Objective	Business Requirement	Area	Type	Functionality	Priority
P7_BR1	UC1	Quality Assessment of (IIoT) Data Assets	Perform quantitative quality assessment of data assets considering various quality dimensions such as data accuracy, completeness, consistency, timeliness, and validity	Industrial applications, IIoT, Services	Functional	User	Preferred
P7_BR2	UC1	Indicative Pricing of Data Assets (ML Models, Labelled data) used for Maintenance	FAME should be able to assign a quality score to each asset for comparison and pricing purposes	Services	Functional	User	Preferred
P7_BR3	UC1	Indicative Pricing of Data Assets (ML Models, Labelled data) used for Maintenance	Estimate the value of each data asset based on factors such as usage, impact on business processes, accuracy, and maintenance costs. The valuation should be flexible, allowing for adjustments based on specific business requirements and market conditions	Industrial applications, IIoT, Services	Functional	User	Preferred
P7_BR4	UC1	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P7_BR5	UC1	Re-purpose/reuse/sell Data Assets for Industrial Maintenance	Develop analytical models providing operational insights on equipment used in industrial environments	Analytics, Marketing	Functional	User	Preferred
P7_BR6	UC1	Re-purpose/reuse/sell Data Assets for Industrial Maintenance	Trade of industrial data assets (i.e., sensor data, AI/ML models) through FAME	Industrial applications	Functional	User	Optional

P7_BR7	UC1	Improving Overall Equipment Effectiveness (OEE) through Predictive Maintenance	Obtain more precise predictions in the scope of preventive/predictive maintenance by developing more accurate predictive models than the existing ones. These models should ensure zero downtime, and increase overall equipment effectiveness (OEE).	Industrial applications, IIoT, Services	Functional	User	Critical
P7_BR8	UC1	Increase in the utilization of the available data assets for predictive maintenance purposes	FAME should provide tools that allow the curation of multi-type data produced from different sources	Data	Functional	User	Preferred
P7_BR9	UC1	Streamline decision-making by assessing the quality and value of data assets	Identify underutilized resources and opportunities for further investment	Management	Functional	User	Preferred
P7_BR10	UC1	Train industrial workers on how to assess and understand data produced by IoT devices and sensors	Develop relevant training materials	Training	Non-Functional	User	Preferred
P7_BR11	UC2	Increase Trustworthiness of AI models used in IoT	An Analyst can search for an XAI solution based on criteria such type of the underlying ML model and data.	Analytics, Services	Functional	User	Critical
P7_BR12	UC2	Ensure the sovereignty of the data being traded	FAME should have mechanisms to ensure data usage control policies	Governance	Functional	Infrastructure	Critical
P7_BR13	UC2	Stakeholder Interaction	FAME should allow access to the primary data assets to develop secondary data assets and applications	Services	Functional	User	Critical
P7_BR14	UC2	Increase Trustworthiness of AI models used in IoT	Develop XAI techniques for timeseries forecasting models	Analytics	Functional	User	Optional
P7_BR15	UC2	Increase Trustworthiness of AI models	FAME should provide explanations of results of AI (ML) models in proper form	Management, Services	Functional	Technical	Preferred
P7_BR16	UC2	Increase acceptance of novel AI-based systems by industrial workers	Train industrial workers on how to assess, use, and interpret the outcomes of AI/XAI Systems related to machinery health	Analytics	Non-Functional	User	Preferred
P7_BR17	UC2	Increase Trustworthiness of AI models in order to use AI	Provide explanations of results of AI (ML) models in proper form and users should be aware of those explanations and be able to use those	Training	Functional	Technical	Critical

	models in proper manner (AI Governance)	explanations in order to update their business and organizational processes

4.7 Business requirements backlog

The presented tables constitute the current version of the FAME business requirements backlog on M6. It contains all the collected and elicited business requirements stemming from the pilots of FAME. Nevertheless, as the project evolves and the pilot use cases become more mature new business requirements as well as updates on the existing ones is foreseen. These updates on the FAME business requirements backlog will be documented in the upcoming versions of the deliverable.

5 FAME Regulatory Requirements

5.1 Overview

The scope of the current section is to collect and analyze the regulatory requirements associated with the operation of FAME and its validation through its pilots. It aims to specify the regulatory requirements that will facilitate boosting the compliance of the assets shared and traded through FAME with applicable regulations in EmFi UCs. The preliminary work undertaken by M6 in this context, is associated with the higher level presentation of the core regulations that affect the implementation decisions and future operation of the FAME federated asset space, and involve:

- **GDPR**: aiming at protecting the fundamental rights of natural persons in relation to the processing of personal data.
- **PSD II**: regulating payment services and the issuance of e-money in order to protect users of such services from abuses by companies offering such services, as well as maintain the integrity of the payment service and e-money markets
- **MiFiD II**: implemented in the European Union to regulate financial markets and enhance investor protection.
- **AI ACT**: aiming at ensuring the proper functioning of the single market by creating the conditions for the development and use of trustworthy AI systems in the Union

5.2 GDPR[1]

The General Data Protection Regulation (GDPR) is a comprehensive data protection and privacy regulation implemented by the European Union (EU) on May 25, 2018. It aims to safeguard the personal data of EU citizens and residents while harmonizing data protection laws across EU member states. GDPR applies to all EU member states and organizations worldwide that process the personal data of EU citizens and residents, regardless of where the processing takes place. GDPR defines personal data as any information relating to an identified or identifiable individual, including names, addresses, email addresses, IP addresses, and more. Organizations must have a lawful basis to process personal data, such as consent, contract performance, legal obligation, vital interests, public task, or legitimate interests. GDPR grants individuals various rights over their data, including the right to access, rectify, erase, restrict processing, data portability, and object to processing. Consent must be freely given, specific, informed, and unambiguous. It should be obtained before processing personal data and can be withdrawn at any time. Organizations are required to report data breaches to the appropriate supervisory authority within 72 hours of becoming aware of them if the breach poses a risk to individuals' rights and freedoms. Some organizations must appoint a Data Protection Officer responsible for ensuring compliance with GDPR and data protection matters. Organizations transferring personal data outside the EU must ensure that the receiving country offers an adequate level of data protection or implement appropriate safeguards. Data Protection Impact Assessments (DPIAs) are necessary for high-risk processing activities to assess and mitigate potential risks to data subjects' rights and freedoms. Organizations must demonstrate compliance with GDPR by maintaining records of processing activities and implementing appropriate technical and organizational measures to protect data. Overall, GDPR is designed to enhance data protection, privacy, and transparency in the digital age, giving individuals more control over their personal data and holding organizations accountable for responsible data processing practices.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679

5.3 PSD II[2]

PSD II (Payment Services Directive II) is a regulatory framework implemented by the European Union to enhance competition, security, and innovation in the payment services industry. It builds upon the original Payment Services Directive (PSD) and was introduced on January 13, 2018. PSD II applies to all EU member states and covers various payment services, including credit transfers, direct debits, card payments, and digital payments. One of the major changes introduced by PSD II is the concept of "open banking." It mandates banks to provide third-party providers access to customer account information (with explicit customer consent) and enables them to initiate payments on behalf of customers. PSD II introduces stricter security measures for electronic payments to enhance consumer protection. Strong Customer Authentication requires customers to use at least two independent elements (e.g., password, fingerprint, or PIN) to verify their identity during online transactions. Under PSD II, merchants are prohibited from charging customers extra fees for using specific payment methods, encouraging fair competition among payment service providers. Payment service providers must implement robust security measures to prevent fraud and ensure the safety of transactions. PSD II requires clear disclosure of transaction fees and information to customers before they finalize a payment. The directive mandates clear procedures for handling customer complaints related to payment services. PSD II applies to payment services provided by non-EU firms when either the payer's or the payee's payment service provider is located within the EU. Overall, PSD II aims to promote innovation, competition, and security in the payment services market while ensuring greater protection for consumers' financial data and transactions.

5.4 MiFiD II[3]

The Market in Financial Instruments directives targets all services of financial instruments, predominantly securities, investment certificates and crypto assets. Such services include advice, brokerage, dealing, storage and financial analysis of financial instruments. The offering of financial instruments to fund own business is not covered by MIFID. MiFID II aims to improve transparency, fairness, and efficiency in financial markets while strengthening investor protection. The directive covers various financial instruments, including stocks, bonds, derivatives, and structured products, as well as investment services and activities. MiFID II places a strong emphasis on safeguarding investor interests by ensuring firms act in their best interests and provide suitable investment advice. Firms are required to report all transactions in financial instruments to regulators in a timely and accurate manner, promoting market transparency. MiFID II enhances the transparency of trading activities by requiring more pre- and post-trade information to be made publicly available. Investment firms must take all reasonable steps to achieve the best possible results for their clients when executing orders. To address conflicts of interest, MiFID II requires the separation of research costs from execution services, ensuring transparency in research charges. The directive imposes strict requirements on firms engaging in algorithmic and high-frequency trading to prevent market abuse. MiFID II introduces measures to enhance investor protection, such as product governance requirements and limiting the sale of complex financial products to retail investors. Non-EU firms providing investment services to EU clients must comply with MiFID II standards when dealing with EU financial instruments.

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2366
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0065

5.5 AI ACT[4,5]

The general objective of the proposed AI act unveiled in April 2021 is to ensure the proper functioning of the single market by creating the conditions for the development and use of trustworthy AI systems in the Union. The draft sets out a harmonised legal framework for the development, placing on the Union market, and the use of AI products and services. The AI act proposal seeks to achieve a set of specific objectives: (i) ensure that AI systems placed on the EU market are safe and respect existing EU law, (ii) ensure legal certainty to facilitate investment and innovation in AI, (iii) enhance governance and effective enforcement of EU law on fundamental rights and safety requirements applicable to AI systems, and (iv) facilitate the development of a single market for lawful, safe and trustworthy AI applications and prevent market fragmentation. The new AI framework, based on Article 114 (for the adoption of a harmonised set of requirements for AI systems) and Article 161 (for the adoption of specific rules for the processing of personal data in the context of biometric identification.) of the Treaty on the Functioning of the European Union (TFEU), enshrines a technology-neutral definition of AI systems and adopts a risk-based approach, which lays down different requirements and obligations for the development, placing on the market and use of AI systems in the EU. The proposal defines common mandatory requirements applicable to the design and development of AI systems before they are placed on the market and harmonises the way ex-post controls are conducted. The AI act complements existing and forthcoming, horizontal and sectoral EU safety regulation. The proposal complements both the sectoral product safety legislation, based on the new legislative framework (NLF) including the General Product Safety Directive, the Machinery Directive, the Medical Device Regulation and the EU framework on the approval and market surveillance of motor vehicles. The AI Act is also part of a broader EU regulatory framework comprising in addition the proposal for a new AI liability directive and the proposal for a revision of the product liability directive. The Commission proposes to follow the logic of the new legislative framework (NLF), i.e. the EU approach to ensuring a range of products comply with the applicable legislation when they are placed on the EU market through conformity assessments and the use of CE marking. The new rules would apply primarily to providers of AI systems established within the EU or in a third country placing AI systems on the EU market or putting them into service in the EU, as well as to users of AI systems located in the EU. To prevent circumvention of the regulation, the new rules would also apply to providers and users of AI systems located in a third country where the output produced by those systems is used in the EU. However, the draft regulation does not apply to AI systems developed or used exclusively for military purposes, to public authorities in a third country, nor to international organisations, or authorities using AI systems in the framework of international agreements for law enforcement and judicial cooperation.

5.6 Regulatory requirements backlog

The previous paragraphs provided a high-level presentation of the core regulations that affect the implementation decisions and future operation of the FAME federated asset space. As the project matures, these (and probably additional) regulations will be studied in more detail so as to also provide a list of solid regulatory requirements that will in turn drive the implementation and piloting activities in the project. These updates on the FAME regulatory requirements backlog will be documented in the upcoming versions of the deliverable.

[4] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf
[5] https://artificialintelligenceact.eu/the-act/

6 FAME Technical Requirements

6.1 Overview

As described in Section 2.1, the technical requirements of a system describe the technical details related to the design of the system's desired functionalities and features. The technical requirements are extracted from the analysis of the generic requirements as well as from the business requirements from a technical perspective and are accompanied by a set of success criteria that are utilised for their evaluation. The extracted technical requirements will provide the necessary input in T2.2 in which the architecture of the FAME federated asset space will be produced along with the technical specifications of the FAME components.

6.2 (Functional) Technical Requirements Backlog

In this section, the list of extracted technical requirements, based upon functional generic and business requirements of FAME is presented. The table is composed by the following information (based also in the template presented in Section 2.1):

- **Technical Requirement ID**: The unique identifier of each technical requirement is a composed by the TR acronym followed by pilot number (i.e., 1, 2, etc.) and incremental number. For example, TR101 stands for the first requirement (01) of the first pilot (TR1).
- **Priority**: The assigned priority of the technical requirement
- **As a.., I want to, So that:** The specific column define the user stories representing the technical requirement
- **Acceptance / Success Criteria:** The success criteria of the specific technical requirement.

The list of extracted technical requirements constitute the first version of the FAME (functional) technical requirements backlog on M6. As explained in the previous sections, these requirements were extracted through: 1) the analysis of the Description of Action by the consortium partners so as to safeguard that all aspired functionalities laid down in the document during the proposal conceptualization phase will be properly taken into consideration; and 2) the organised co-creation workshops where the technical partners of the consortium performed an analysis of the collected business requirements in collaboration with the demonstrator partners. It should be noted that updates and optimisations are expected as the development and piloting activities progress and these updates and optimisation will be translated into enhancements on the existing technical requirements as well as the addition of new technical requirements. The update list of technical requirements backlog will be documented in the upcoming versions of the deliverable.

Table 12 - FAME (Functional) Technical Requirements

Technical Req. ID	Priority	As a/an ..	I want to ..	So That ..	Acceptance / Success Criteria
TR001	Critical	application provider	be able to properly visualise available assets and the outputs of the analysis of the assets	I can extract useful insights based on my needs	As a user I can visualise available assets and the outputs of the analysis of the assets
TR002	Critical	all users	be able to access the assets of several marketplaces and data spaces using a single sign-on mechanism	I do not have to log in to each discrete marketplace and data space to identify and obtain the assets of interest	As I user I am able to identify and obtain assets that are hosted in different marketplaces and data spaces without having to log in to each marketplace and data space independently.
TR003	Critical	Application provider / data provider	be able to manage and enforce access and visibility restrictions on my assets, based on defined criteria (including e.g., organization type, user role, locality etc.).	I can ensure the sovereignty of the data being traded and I can restrict access to my assets to organizations and individuals based upon regulatory and other constraints	As a user I can restrict access to my assets to a specific group of organizations and individuals, defining the corresponding asset access policies.
TR004	Critical	data analyst / researcher	be able to filter, identify and discover assets that are hosted in different marketplaces, data spaces etc. that are useful for me, without having to search each marketplace, data space etc. individually.	I can perform my tasks more quickly and with less effort.	As a user I can filter, identify, and discover assets that are hosted in different marketplaces.
TR005	Critical	data analyst / researcher	be able to acquire and (locally) download discovered assets that are hosted in different marketplaces, data spaces etc..	I can use them both online and/or offline/locally to perform my tasks	As a user I can acquire and (locally) download discovered assets so that I can use them both online and/or offline/locally to perform my tasks
TR006	Critical	data provider	be able to transform my assets to standard EmFi ontologies and models	I add value to my assets making them more easily linkable with other assets complying with ontologies from the finance sector	As a user I can model and transform my assets to standard EmFi ontologies and models
TR007	Critical	Application provider, data provider, regulator	be able to define security and privacy policies	I can safeguard the compliance of my assets with applicable security and privacy	As a user I can define security and privacy policies that will boost the compliance of my assets with

				regulations (e.g., PSDII, GDPR, etc.).	applicable security and privacy regulations (e.g., PSDII, GDPR, etc.).
TR008	Critical	data provider / researcher	be able to trace an asset and attest its provenance	I can safeguard my IPRs and trace back the original owner of an asset	As a user I can trace an asset and attest its provenance
TR009	Optional	data provider / researcher	be able to query the metadata of the assets included in the catalogue, including data assets statistics (usage, downloads)	I can identify suitable assets and/or track the usage of data assets	As a user I can identify suitable assets and/or track the usage of data assets
TR010	Critical	data provider / researcher	be able to activate different schemes for different users, communities, collections of data assets and other granularities	I can facilitate their monetization exploiting different trading schemes	As a user I can activate different schemes for different users, communities, collections of data assets and other granularities
TR011	Critical	Application provider, data provider	be able to get dynamic asset price suggestions according to the demand and be presented with different monetization options regarding my assets	I can review my assets' price estimates and be able to trade and monetize my assets more efficiently.	As a user I can receive price suggestions and monetization options for my assets
TR012	Critical	Application provider, data provider	be able to trade my assets in a secure and traceable manner, exploiting different asset trading, pricing, and monetization schemes	I can monetize my assets efficiently and securely	As a user I can trade my assets in a secure and traceable manner, exploiting different asset trading, pricing, and monetization schemes
TR013	Critical	Application provider, data provider	be able to trade my assets using secure contracts building upon one common trading instrument (e.g., tokens)	I can sell or exchange my assets in a secure and trustworthy manner	As a user I can create secure and trustworthy contracts to trade my assets using one common trading instrument
TR014	Critical	Data analyst, researcher	be able to perform semantic search queries	I can retrieve relevant results from various distributed repositories	As a user searching for information across federated assets, I receive search results ranked based on relevance and significance to the user's query
TR015	Critical	Data analyst, researcher	be able to see the results of assets I am searching for, ranked based upon their relevance	I can more easily select the assets that more relevant for the tasks I wish to accomplish	As a user I can see the results of assets I am searching for, ranked based upon their relevance.
TR016	Critical	Data analyst, researcher	be able to identify and acquire AI/ML techniques for EmFi use cases	I do not need to create models to resolve problems in the domain, that have already been created by other researchers.	As a user I can identify and acquire AI/ML techniques for EmFi use cases

TR017	Critical	Data analyst, researcher	be able to train, customize and run (federated) AI-based analytics services hosted on federated / cloud infrastructures	I can execute my analytics tasks without having to maintain the corresponding infrastructure	As a user I can train, customize, and run (federated) AI-based analytics services hosted on federated / cloud infrastructures
TR018	Critical	Data analyst, researcher	be able to identify (and execute) (federated) AI-based models for EmFi use case that are appropriate for supporting incremental analytics	I can capitalize upon state-of-the-art technologies to extract insights	As a user I can identify (and execute) (federated) AI-based models for EmFi use case that are appropriate for supporting incremental analytics.
TR019	Critical	researcher	be able to identify and acquire AI/ML techniques for EmFi use cases that can be explained	I can better understand the results of my analysis.	As a user I can identify and acquire AI/ML techniques for EmFi use cases that can be explained
TR020	Critical	researcher	Be able to review the scores of different explainability models	I can compare alternative approaches and choose the one that is more appropriate for my needs	As a user I can review the scores of different explainability models and choose the one that is more appropriate for my needs evaluating performance vs. explainability trade-offs
TR021	Critical	researcher	be able to receive explanations considering and analysing different contextual information and internal processes	I can better understand the results of my analysis and experiment with customizing different parameters	As a user receive explanations considering and analysing different contextual information and internal processes and get a more in depth understanding of the results of my analyses.
TR022	Critical	All roles	Be able to register myself and/or my organization	I am able to use FAME and identify federated assets and trade my own assets	As a user I can register myself and/or my organization and use FAME
TR023	Critical	Application provider, data provider	Be able to upload my assets on the marketplace to facilitate their trading	I can monetize my assets	As a user I can upload my assets on the marketplace
TR024	Optional	data analyst	be able to receive suggestions on similar assets when I am searching for an asset	I can get recommendations on relevant assets	As a user I can receive recommendations for assets relevant to the ones I am searching for.
TR025	Preferred	data analyst	be able to communicate with asset owners towards requesting similar and/or enhanced and/or customized / personalized assets	I can get access to potentially new data assets that I am interested in	As a user I can communicate with asset owners and request new and/or additional assets

TR026	Preferred	data analyst	to be able to review and comment on a data asset	I can leave feedback for both the asset owners and for the other asset consumers	As a user I can review and comment on a data asset
TR027	Critical	Application provider, data provider	Be able to curate my assets on the marketplace, including updating, cleaning, anonymizing, transforming them etc.	I increase their quality and thus value	As a user I can curate my assets
TR028	Preferred	application provider, educator, financial organization	Be able to provide educational content to my customers, employees etc. through e.g., training courses, webinars, white papers etc	I can provide training material for finance sector enthusiasts and/or professionals, and indirectly further increase the value of my assets	As a user I can upload and/or provide educational content and related training material.
TR101	Preferred	application provider	be able to request a trial version of the data asset	I evaluate it and decide to purchase it later	As a user I can request and get access to a trial version of the data asset via a sample
TR102	Critical	data provider	be able to trade produced data assets	I can monetize the produced by FAME results	As a user I can trade in FAME marketplace my data assets that are produced through FAME tools
TR103	Critical	data provider	be able to replicate a data asset	I can create different versions of the data assets I own	As a user I can create a copy of my data asset and create a new version of it
TR104	Critical	data provider	have a version control of my data assets	I can track changes on my data assets	As a user I am able to create, management and check the different versions of my data assets
TR105	Critical	data analyst	search and explore the data assets of the marketplace via an intelligent way (i.e. filters, keywords, metadata, word combination)	I can easily and effectively discover what I am interested in	As a user I can search and discover data assets using multiple search ways
TR106	Preferred	data analyst	be able to discuss, review and comment on a data asset	I decide if I will purchase the data asset	As a user I can review and comment on a data asset
TR107	Preferred	data provider	be able to automatically update data assets with new data via a streaming mechanism	I can create a new version of my data asset	As a user I am able to upload new data via new streaming data on my data assets and create a new version of it
TR108	Optional	data provider	be able to automatically update data assets with new data via a file upload mechanism	I can create a new version of my data asset	As a user I am able to upload new data via new files on my data assets and create a new version of it

TR109	Optional	data provider	be able to identify, alter and mask client sensitive information on upload	I can protect sensitive information of my data asset	As a user I am able to perform anonymisation on my data assets
TR110	Critical	data provider	be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions	As a user I can set the preferred access usage policies to my data assets
TR111	Preferred	educator	be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals	As a user I can upload training material and make it available to interested parties
TR112	Preferred	financial organization	be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals	As a user I can find training material for the finance sector professional
TR113	Optional	data provider	to be able to find data assets statistics (usage, downloads)	I can track the usage of my data assets	As a user I can see the data usage statistics of my data assets
TR114	Optional	data provider	be able to keep track of the changes performed on my data asset	I can have an overview of the changes performed on each version of my data asset	As a user I am able to view the changes performed on my data assets on each version
TR115	Preferred	data analyst	be able to purchase a selected portion of a dataset (e.g. a selected portion or percentage) on a different price	I can purchase only the part of the dataset that I am interested in	As a user I am able to request and purchase only the part of the dataset that I am interested in
TR116	Preferred	data analyst	be able to contact a specific organisation/entity to request for an additional data asset (not currently listed in the marketplace)	I can get access to potentially new data assets that I am interested in	As a user I am able to contact any other organisation and request for additional data assets
TR117	Optional	data provider	be able to get suggestions on the price for my data asset based on the prices of similar data assets	I can get a recommendation on what the candidate price of my data asset could be	As a user I get recommendations on the pricing of my data assets based on similar data assets on the marketplace
TR118	Optional	data analyst	be able to receive recommendations on similar assets when I am searching a data asset	I can get recommendations for relevant data assets	As a user when I am searching a data asset I get recommendation for similar data assets
TR119	Critical	data provider	be able to trade my assets on the marketplace and track their trade statistics	I can monetize my assets and have a clear view of their trade statistics	As a user I can trade my assets on the marketplace and check how many times they are purchased by other users
TR120	Preferred	software developer	to be able to export the purchase data assets	I can use them locally	As a user I am able to export the purchased data assets in order to use them locally

TR201	Critical	data analyst	be able to train a ML model in FAME	I extract behavioural patterns	As a user I can train a ML model to analyse my assets and extract behavioural patterns
TR202	Preferred	data provider	be able to get rewards in tokens for sharing my assets	I can spend the tokens on FAME to buy assets or services	As a user I get rewards for sharing the assets in FAME so that I can use to buy services or other assets
TR203	Preferred	data provider	be able to offer of my assets only to registered users	I can limit the access to them	As a user I am able to protect my assets from being offered to unregistered users
TR204	Preferred	data provider	be to define the appropriate access policies on my assets	I can define who can have view my listed assets	As a user I am able to configure the desired access policies for the permission to a user to view my assets
TR205	Critical	software developer	to be able to access tutorials, Webinars, How-to videos, online training sessions	I can find training material for the IT personnel	As a user I can find training material for the IT personnel
TR206	Preferred	data analyst	be able to train a ML model in FAME	I perform outlier detection analysis	As a user I can train a ML model to perform outlier detection analysis
TR207	Critical	data provider	be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions	As a user I can set the preferred access usage policies to my data assets
TR208	Critical	application provider	be able to correlate and filter data and properly visualise them	I can extract useful insights based on my needs	As a user I am able to create visualisations from correlated or filtered data to extract insights
TR209	Critical	data provider	be able to perform What-If analysis	I can compare the produced results	As a user I am able to perform What-if analysis scenarios and compare the results
TR210	Preferred	data analyst	be able to train a ML model with historical data	I can generate demand predictions	As a user I am able to train a ML model with historical data in order to generate demand forecast
TR211	Preferred	data analyst	be able to train a ML model	I can produce dynamic pricing suggestions	As a user I am able to train a ML model with my assets in order to generate dynamic pricing suggestions
TR212	Critical	application provider	process the results of an analysis	I can produce a custom report	As a user I am able to create custom reports based on the results of my executed analysis

TR501	Critical	data analyst	be able to train ML algorithm on FAME	I can utilise it to perform a sorting analysis	As a user I am able to train ML algorithm within FAME in order to execute an analysis
TR502	Critical	data analyst	be able to upload a ML model on FAME	I can utilise it to perform a sorting analysis	As a user I am able to upload ML model within FAME in order to execute an analysis
TR503	Critical	application provider	be able to trade the results of an execute analysis in the FAME Marketplace under different pricing policies	I can monetize my asset or publish them	As a user I am able to trade my produced assets within FAME marketplace
TR504	Critical	educator	be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals	As a user I can upload training material and make it available to interested parties
TR505	Critical	educator	be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals	As a user I can find training material for the finance sector professional
TR506	Critical	data analyst	be able to set the input parameters of a ML algorithm	I can execute the algorithm with specific input	As a user I am able to set the input parameters and execute the algorithm
TR507	Preferred	financial organization	be able to process the results produced by an algorithm execution	I can generate custom reports	As a user I am able to process the results and produce reports
TR508	Preferred	data provider	be able to upload new assets in FAME	I publish it in FAME	As a user I am able to upload new assets in FAME
TR509	Preferred	data provider	be able to pull data from an API	I save it as a new asset in FAME	As a user I am able to configure FAME to pull data from an API and store it as a new asset
TR510	Preferred	data provider	be able to append new data on my data asset	I can create a new version of my data asset	As a user I am able to append new data and a new version of my asset is created
TR511	Preferred	data provider	be able to update (replace) my data asset	I can modify my data asset	As a user I am able to update my data asset by replacing it.
TR512	Preferred	data analyst	be able to schedule the periodic execution of a ML algorithm	I can periodically produce results	As a user I am able to schedule the execution of an ML algorithm and store the results
TR513	Critical	data analyst	be able to execute NLP algorithms	I can perform text analysis	As a user I am able to perform text analysis with the use of NLP algorithms

TR514	Critical	data analyst	be able to create a pipeline of trained ML models	I can execute multiple ML models sequentially	As a user I am able to execute multiple ML models as a chain
TR515	Optional	financial organization	be able to perform comparison analysis	I can compare my own results with 3rd parties	As a user I am able to compare my results with results from 3rd parties
TR601	Critical	data analyst	be able to train supervised ML models	I can perform analysis and correlation of my data assets	As a user I am able to train a supervised ML Model and use it to perform an analysis of my data assets
TR602	Critical	data analyst	be able to get data (through API or connector) from CDS to FAME	I can use them to perform an analysis	As a user I am able to fetch data from CDS and include them in my analysis
TR603	Critical	data analyst	be able to execute a trained ML model using specific features	I can get the results for specific features	As a user I am able to executed a trained model selecting the features that will be used as input and get the corresponding results
TR604	Critical	data analyst	be able to search for ML models in the marketplace	I can purchase them to perform an analysis	As a user I am able to search a trained ML model from the marketplace to perform an analysis
TR605	Critical	data provider	be able to upload my data assets and trade them	I can monetize my data assets	As a user I am able to upload my data asset in the FAME marketplace
TR606	Critical	data analyst	be able to purchase data assets from the marketplace	I can use them to perform an analysis	As a user I am able to purchase data assets based on my preferences and use them in my analysis
TR607	Critical	data provider	be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions	As a user I can set the preferred access usage policies to my data assets
TR608	Preferred	educator	be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals	As a user I can upload training material and make it available to interested parties
TR609	Preferred	financial organization	be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals	As a user I can find training material for the finance sector professional
TR610	Critical	data analyst	be able to download a purchased data asset	I can use them to exploit them locally	As a user I can download a purchased data asset locally on my system.
TR611	Critical	data analyst	be able to create a pipeline of trained ML models	I can execute multiple ML models sequentially	As a user I am able to execute multiple ML models as a chain

TR612	Optional	data analyst	be able to trade the results of my analysis in the marketplace	I can monetize the results of my performed analysis	As a user I am able to trade my results in the FAME marketplace
TR613	Optional	financial organization	be able to purchase results or reports from performed analysis from the marketplace	I can exploit them	As a user I am able to purchase results or reports from FAME marketplace
TR614	Preferred	application provider	be able to publish a service on the FAME catalogue	I can get requests from potential customers for specific analysis at a specific price	As a user I am able to publish a service on FAME marketplace that performs an analysis on demand and on a specific price
TR615	Critical	data analyst	be able to purchase ML models in the marketplace	I can use them to perform an analysis	As a user I am able to purchase a trained ML model from the marketplace and use it to perform an analysis
TR616	Critical	data provider	be able to trade my data assets	I can monetize my data assets	As a user I am able to trade my data assets in the FAME marketplace
TR701	Preferred	data provider	be able to assess the quality of my data assets	I can validate their applicability for predictive analytics	As a user I am able to asset the quality of my assets using metrics / quality dimension (completeness, timeliness, validity, etc.)
TR702	Preferred	data provider	be able to assign a quality score to each of my data assets	I can compare them among them and give them a price	As a user I can assign a quality score comparison between raw and processed data
TR703	Preferred	data provider	be able to estimate the worth of each data asset used for maintenance	I can assign them an indicative pricing	Provision of a model/calculation based on the effort spent for the QA process (WP4 to assist in defining specific pricing models)
TR704	Preferred	data provider	be able to compare the performance of new analytical models against the existing ones already in use	I can identify the most performant model for further usage	FAME offers the tools to compare the models in use with the suggested new models e.g. by selecting specific periods in the time series and comparing results in order to assess their performance
TR705	Preferred	data provider	be able to make my industrial data assets available through FAME under my preferred license schemes	I can re-purpose/reuse/sell data assets for industrial maintenance	As a user during dataset uploading process, I am be able to select from a list various relevant licensing schemes

TR706	Critical	software developer	be able to use tools that FAME has to offer to achieve more trusted prediction results	I can analyze IIoT datasets in a trusted manner	As a user I am able to use trusted analytics and energy-efficiency tools to process federated datasets stored in the infrastructure and provide trusted insights
TR707	Preferred	data analyst	be able to use tools available in FAME catalogue in order to facilitate data/analytic-related tasks	I can increase the utilization of proprietary data assets	As a user I am able to use the search engine to provide me relevant results based on keywords and metadata
TR708	Preferred	data provider	be provided with the means to create/upload/share/index/find training materials	I can train industrial workers on how to assess and understand data produced by IIoT devices and sensors	As a user I am offered the means to create/upload/share training materials, facilitate the indexing, finding of relevant training materials
TR709	Critical	data provider	be able to allow analysts to search for available XAI solutions based on criteria such as the type of the underlying ML model and data	I can increase the trustworthiness of the current AI models used in IIoT	As a user I am able to find the available of XAI solutions for timeseries DL models in the FAME catalogue
TR710	Critical	data provider	be able to have access to the existing data assets	I can develop secondary (derivative) data assets and applications	As a user I am facilitated to access and use existing assets in order to develop secondary ones
TR711	Optional	researcher	be able to identify end-user XAI techniques for timeseries forecasting models	I can increase the trustworthiness of AI models used in IIoT	As a user I am able to find and utilize XAI techniques to increase the trustworthiness of the AI models
TR712	Preferred	researcher	be able to produce explanations of the results of AI (ML) models in proper form	I can increase the trustworthiness of AI models	As a user I am able to provide a high level explanation understandable to non-technical users (which can be acted upon)
TR713	Preferred	data provider	be able to train industrial workers on how to assess, use and interpret the outcomes of AI/XAI systems related to machinery health	I can increase the acceptance of novel AI-based systems by industrial workers	As a user I am offered the means to create/upload/index/find training materials
TR714	Critical	researcher	be able to evaluate XAI models applied on timeseries forecasting models	I can compare different XAI solutions applied on the same forecasting model	As a user I am able to use the trusted analytics tools which provide an explainability score for a given XAI model
TR715	Critical	data provider	be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions	As a user I can set the preferred access usage policies to my data assets

6.3 Mapping of Business Requirements to Technical Requirements

The performed for the extraction of the technical requirements cannot be viewed independently from the collected business requirements that were presented in Section 3. As described in the adopted requirement methodology in Section 2, the technical requirements co-creation workshops that were organised after the business requirements co-creation workshops took as input the list of business requirements that were collected and ensured that all of them were firstly analysed and then translated into a set of technical requirements per business requirement.

The following table present the mapping between the elicited business requirements and the extracted technical requirements. The particular backlog constitutes a confirmation that all business requirements were taken into consideration and will be used to monitor the progress of the development activities in respect to the business needs of the demonstrator partners.

Table 13 - Mapped business requirements to technical requirements

Business Req. ID	Technical Req. ID	Similar to	Priority	As a/an ..	I want to ..	So That ..
GR_001	TR001	TR208	Critical	application provider	to be able to properly visualise available assets and the outputs of the analysis of the assets	I can extract useful insights based on my needs
GR_002	TR002	N/A	Critical	all users	be able to access the assets of several marketplaces and data spaces using a single sign-on mechanism	I do not have to log in to each discrete marketplace and data space to identify and obtain the assets of interest
GR_004	TR003	TR110, TR207, TR607, TR715	Critical	Application provider / data provider	be able to manage and enforce access and visibility restrictions on my assets, based on defined criteria (including e.g., organization type, user role, locality etc.).	I can ensure the sovereignty of the data being traded and I can restrict access to my assets to organizations and individuals based upon regulatory and other constraints
GR_008	TR004	TR105, TR709	Critical	data analyst / researcher	be able to identify and discover assets that are hosted in different marketplaces, data spaces etc. that are useful for me, without having to search each marketplace, data space etc. individually.	I can perform my tasks more quickly and with less effort.

GR_009	TR005	TR120, TR602, TR610, TR710	Critical	data analyst / researcher	be able to acquire and (locally) download discovered assets that are hosted in different marketplaces, data spaces etc..	I can use them both online and/or offline/locally to perform my tasks
GR_010	TR006	N/A	Critical	data provider	Be able to transform my assets to standard EmFi ontologies and models	I add value to my assets making them more easily linkable with other assets complying with ontologies from the finance sector
GR_011	TR007	TR109, TR110, TR114	Critical	Application provider, data provider, regulator	be able to define security and privacy policies	I can safeguard the compliance of my assets with applicable security and privacy regulations (e.g. PSDII, GDPR, etc.).
GR_012	TR008	N/A	Critical	data provider / researcher	be able to trace an asset and attest its provenance	I can safeguard my IPRs and trace back the original owner of an asset
GR_013	TR009	TR113	Critical	data provider / researcher	to be able to query the metadata of the assets included in the catalogue, including data assets statistics (usage, downloads)	I can identify suitable assets and/or track the usage of data assets
GR_014	TR010	TR115	Critical	data provider / researcher	be able to activate different schemes for different users, communities, collections of data assets and other granularities	I can facilitate their monetization exploiting different trading schemes
GR_015	TR011	TR117, TR703	Critical	Application provider, data provider	be able to get dynamic asset price suggestions according to the demand and be presented with different monetization options regarding my assets	I can review my assets' price estimates and be able to trade and monetize my assets more efficiently.
GR_016a	TR012	TR102, TR119, TR503, TR605, TR612, TR616, TR705	Critical	Application provider, data provider	be able to trade my assets in a secure and traceable manner, exploiting different asset trading, pricing, and monetization schemes	I can monetize my assets efficiently and securely
GR_017a	TR013	N/A	Critical	Application provider, data provider	be able to trade my assets using secure contracts building upon one common trading instrument (e.g., tokens)	I can sell or exchange my assets in a secure and trustworthy manner

GR_018	TR014	TR008, TR034, TR105, TR709	Critical	Data analyst, researcher	be able to perform semantic search queries	I can retrieve relevant results from various distributed repositories
GR_019	TR015	N/A	Critical	Data analyst, researcher	be able to see the results of assets I am searching for, ranked based upon their relevance	I can more easily select the assets that more relevant for the tasks I wish to accomplish
GR_021	TR016	N/A	Critical	researcher	be able to identify and acquire AI/ML techniques for EmFi use cases	I do not need to create models to resolve problems in the domain, that have already been created by other researchers.
GR_022	TR017	TR513, TR601	Critical	researcher	be able to train, customize and run (federated) AI-based analytics services hosted on federated / cloud infrastructures	I can execute my analytics tasks without having to maintain the corresponding infrastructure
GR_023	TR018	N/A	Critical	researcher	be able to identify (and execute) (federated) AI-based models for EmFi use case that are appropriate for supporting incremental analytics	I can capitalize upon state-of-the-art technologies to extract insights
GR_024	TR019	TR711, TR712, TR714	Critical	researcher	be able to identify and acquire AI/ML techniques for EmFi use cases that can be explained	I can better understand the results of my analysis.
GR_025	TR020	N/A	Critical	researcher	Be able to review the scores of different explainability models	I can compare alternative approaches and choose the one that is more appropriate for my needs
GR_026	TR021	N/A	Critical	researcher	be able to receive explanations considering and analysing different contextual information and internal processes	I can better understand the results of my analysis and experiment with customizing different parameters
GR_032	TR022	TR203	Critical	All roles	Be able to register myself and/or my organization	I am able to use FAME and identify federated assets and trade my own assets
GR_033	TR023	TR108, TR605	Critical	Application provider, data provider	Be able to upload my assets on the marketplace to facilitate their trading	I can monetize my assets

GR_034	TR024	TR118	Optional	data analyst	to be able to receive suggestions on similar assets when I am searching for an asset	I can get recommendations on relevant assets
GR_035	TR025	TR116	Preferred	data analyst	to be able to communicate with asset owners towards requesting similar and/or enhanced and/or customized / personalized assets	I can get access to potentially new data assets that I am interested in
GR_036	TR026	TR106	Preferred	data analyst	to be able to review and comment on a data asset	I can leave feedback for both the asset owners and for the other asset consumers
GR_037	TR027	TR102, TR108, TR109, TR707	Critical	Application provider, data provider	Be able to curate my assets on the marketplace, including updating, cleaning, anonymizing, transforming them etc.	I increase their quality and thus value
GR_038	TR028	TR205, TR504, TR505	Preferred	application provider, educator, financial organization	Be able to provide educational content to my customers, employees etc. through e.g., training courses, webinars, white papers etc	I can provide training material for finance sector enthusiasts and/or professionals, and indirectly further increase the value of my assets
P1_BR1	TR101	N/A	Preferred	application provider	be able to request a trial version of the data asset	I evaluate it and decide to purchase it later on
P1_BR2	TR102	N/A	Critical	data provider	be able to trade produced data assets	I can monetize the produced by FAME results
P1_BR3	TR103	N/A	Critical	data provider	be able to replicate a data asset	I can create different versions of the data assets I own
P1_BR3	TR104	N/A	Critical	data provider	have a version control of my data assets	I can track changes on my data assets
P1_BR4, P1_BR23	TR105	N/A	Critical	data analyst	search and explore the data assets of the marketplace via an intelligent way (i.e. filters, keywords, metadata, word combination)	I can easily and effectively discover what I am interested in
P1_BR5, P1_BR25	TR106	N/A	Preferred	data analyst	to be able to discuss, review and comment on a data asset	I decide if I will purchase the data asset
P1_BR5, P1_BR25	TR107	N/A	Preferred	data provider	to be able to automatically update data assets with new data via a streaming mechanism	I can create a new version of my data asset

P1_BR6, P1_BR19, P1_BR27	TR108	N/A	Optional	data provider	to be able to automatically update data assets with new data via a file upload mechanism	I can create a new version of my data asset
P1_BR7, P1_BR14, P1_BR28	TR109	N/A	Optional	data provider	to be able to identify, alter and mask client sensitive information on upload	I can protect sensitive information of my data asset
P1_BR8, P1_BR13, P1_BR28	TR110	N/A	Critical	data provider	to be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions
P1_BR9	TR111	N/A	Preferred	educator	to be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals
P1_BR9	TR112	N/A	Preferred	financial organization	to be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals
P1_BR11, P1_BR20, P1_BR21	TR113	N/A	Optional	data provider	to be able to find data assets statistics (usage, downloads)	I can track the usage of my data assets
P1_BR12	TR114	N/A	Optional	data provider	to be able to keep track of the changes performed on my data asset	I can have an overview of the changes performed on each version of my data asset
P1_BR15	TR115	N/A	Preferred	data analyst	to be able to purchase a selected portion of a dataset (e.g. a selected portion or percentage) on a different price	I can purchase only the part of the dataset that I am interested in
P1_BR16	TR116	N/A	Preferred	data analyst	to be able to contact a specific organisation/entity to request for an additional data asset (not currently listed in the marketplace)	I can get access to potentially new data assets that I am interested in
P1_BR17	TR117	N/A	Optional	data provider	to be able to get suggestions on the price for my data asset based on the prices of similar data assets	I can get a recommendation on what the candidate price of my data asset could be
P1_BR18	TR118	N/A	Optional	data analyst	to be able to receive recommendations on similar assets when I am searching a data asset	I can get recommendations for relevant data assets
P1_BR21, P1_BR22	TR119	N/A	Critical	data provider	to be able to trade my assets on the marketplace and track their trade statistics	I can monetize my assets and have a clear view of their trade statistics

P1_BR24, P1_BR26	TR120	N/A	Preferred	software developer	to be able to export the purchase data assets	I can use them locally
P2_BR1, P2_BR6, P2_BR11	TR201	N/A	Critical	data analyst	be able to train a ML model in FAME	I extract behavioural patterns
P2_BR2, P2_BR4, P2_BR10	TR202	N/A	Preferred	data provider	be able to get rewards in tokens for sharing my assets	I can spend the tokens on FAMEto buy assets or services
P2_BR2, P2_BR4, P2_BR10	TR203	N/A	Preferred	data provider	be able to offer of my assets only to registered users	I can limit the access to them
P2_BR2	TR204	N/A	Preferred	data provider	be to define the appropriate access policies on my assets	I can define who can have view my listed assets
P2_BR3	TR205	N/A	Critical	software developer	to be able to access tutorials, Webinars, How-to videos, online training sessions	I can find training material for the IT personnel
P2_BR5	TR206	N/A	Preferred	data analyst	be able to train a ML model in FAME	I perform outlier detection analysis
P2_BR7, P2_BR15	TR207	N/A	Critical	data provider	to be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions
P2_BR8	TR208	N/A	Critical	application provider	to be able to correlate and filter data and properly visualise them	I can extract useful insights based on my needs
P2_BR9	TR209	N/A	Critical	data provider	to be able to perform What-If analysis	I can compare the produced results
P2_BR12	TR210	N/A	Preferred	data analyst	to be able to train a ML model with historical data	I can generate demand predictions
P2_BR14	TR211	N/A	Preferred	data analyst	to be able to train a ML model	I can produce dynamic pricing suggestions
P2_BR1	TR212	N/A	Critical	application provider	to process the results of an analysis	I can produce a custom report
P5_BR1, P5_BR10	TR501	N/A	Critical	data analyst	be able to train ML algorithm on FAME	I can utilise it to perform a sorting analysis

P5_BR1, P5_BR10	TR502	N/A	Critical	data analyst	be able to upload a ML model on FAME	I can utilise it to perform a sorting analysis
P5_BR1, P5_BR7, P5_BR21	TR503	N/A	Critical	application provider	be able to trade the results of an execute analysis in the FAME Marketplace under different pricing policies	I can monetize my asset or publish them
P5_BR2, P5_BR12, P5_BR13	TR504	N/A	Critical	educator	to be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals
P5_BR2, P5_BR12, P5_BR13	TR505	N/A	Critical	educator	to be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals
P5_BR3, P5_BR9, P5_BR10, P5_BR17, P5_BR18, P5_BR19	TR506	N/A	Critical	data analyst	to be able to set the input parameters of a ML algorithm	I can execute the algorithm with specific input
P5_BR4, P5_BR8, P5_BR9, P5_BR15, P5_BR16, P5_BR20	TR507	N/A	Preferred	financial organization	to be able to process the results produced by an algorithm execution	I can generate custom reports
P5_BR5, P5_BR6	TR508	N/A	Preferred	data provider	to be able to upload new assets in FAME	I publish it in FAME
P5_BR5, P5_BR6	TR509	N/A	Preferred	data provider	to be able to pull data from an API	I save it as a new asset in FAME
P5_BR5, P5_BR6	TR510	N/A	Preferred	data provider	to be able to append new data on my data asset	I can create a new version of my data asset
P5_BR5, P5_BR6	TR511	N/A	Preferred	data provider	to be able to update (replace) my data asset	I can modify my data asset
P5_BR8	TR512	N/A	Preferred	data analyst	to be able to schedule the periodic execution of a ML algorithm	I can periodically produce results
P5_BR11	TR513	N/A	Critical	data analyst	to be able to execute NLP algorithms	I can perform text analysis
P5_BR1, P5_BR10, P5_BR3, P5_BR9	TR514	N/A	Critical	data analyst	to be able to create a pipeline of trained ML models	I can execute multiple ML models sequentially

P5_BR14, P5_BR20	TR515	N/A	Optional	financial organization	to be able to perform comparison analysis	I can compare my own results with 3rd parties
P6_BR1, P6_BR4, P6_BR13, P6_BR15, P6_BR20, P6_BR22, P6_BR26, P6_BR29, P6_BR30	TR601	N/A	Critical	data analyst	be able to train supervised ML models	I can perform analysis and correlation of my data assets
P6_BR2, P6_BR3, P6_BR18, P6_BR19	TR602	N/A	Critical	data analyst	be able to get data (through API or connector) from CDS to FAME	I can use them to perform an analysis
P6_BR5, P6_BR6, P6_BR9, P6_BR11, P6_BR16, P6_BR21, P6_BR22, P6_BR27	TR603	N/A	Critical	data analyst	be able to execute a trained ML model using specific features	I can get the results for specific features
P6_BR6, P6_BR21, P6_BR31	TR604	N/A	Critical	data analyst	be able to search for ML models in the marketplace	I can purchase them to perform an analysis
P6_BR7, P6_BR12	TR605	N/A	Critical	data provider	be able to upload my data assets and trade them	I can monetize my data assets
P6_BR7, P6_BR14, P6_BR17, P6_BR22	TR606	N/A	Critical	data analyst	be able to purchase data assets from the marketplace	I can use them to perform an analysis
P6_BR8, P6_BR24, P6_BR32	TR607	N/A	Critical	data provider	to be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions

P6_BR10, P6_BR23	TR608	N/A	Preferred	educator	to be able to upload tutorials, Webinars, How-to videos, Jupyter notebooks	I can upload training material for finance sector professionals
P6_BR10, P6_BR23	TR609	N/A	Preferred	financial organization	to be able to access tutorials, Webinars, How-to videos, Jupyter notebooks	I can find training material for finance sector professionals
P6_BR25, P6_BR28	TR610	N/A	Critical	data analyst	to be able to download a purchased data asset	I can use them to exploit them locally
P6_BR27	TR611	N/A	Critical	data analyst	to be able to create a pipeline of trained ML models	I can execute multiple ML models sequentially
P6_BR33	TR612	N/A	Optional	data analyst	to be able to trade the results of my analysis in the marketplace	I can monetize the results of my performed analysis
P6_BR33	TR613	N/A	Optional	financial organization	to be able to purchase results or reports from performed analysis from the marketplace	I can exploit them
P6_BR33, P6_BR34, P6_BR35	TR614	N/A	Preferred	application provider	to be able to publish a service on the FAME catalogue	I can get requests from potential customers for specific analysis at a specific price
P6_BR6, P6_BR21, P6_BR31	TR615	N/A	Critical	data analyst	be able to purchase ML models in the marketplace	I can use them to perform an analysis
P6_BR7, P6_BR12	TR616	N/A	Critical	data provider	be able to trade my data assets	I can monetize my data assets
P7_BR1	TR701	N/A	Preferred	data provider	be able to assess the quality of my data assets	I can validate their applicability for predictive analytics
P7_BR2	TR702	N/A	Preferred	data provider	be able to assign a quality score to each of my data assets	I can compare them among them and give them a price
P7_BR3	TR703	N/A	Preferred	data provider	be able to estimate the worth of each data asset used for maintenance	I can assign them an indicative pricing
P7_BR5	TR704	N/A	Preferred	data provider	be able to compare the performance of new analytical models against the existing ones already in use	I can identify the most performant model for further usage
P7_BR6	TR705	N/A	Preferred	data provider	be able to make my industrial data assets available through FAME under my preferred license schemes	I can re-purpose/reuse/sell data assets for industrial maintenance

P7_BR7	TR706	N/A	Critical	software developer	be able to use tools that FAME has to offer to achieve more trusted prediction results	I can analyze IIoT datasets in a trusted manner
P7_BR8	TR707	N/A	Preferred	data analyst	be able to use tools available in FAME catalogue in order to facilitate data/analytic-related tasks	I can increase the utilization of proprietary data assets
P7_BR10	TR708	N/A	Preferred	data provider	to be provided with the means to create/upload/share/index/find training materials	I can train industrial workers on how to assess and understand data produced by IIoT devices and sensors
P7_BR11	TR709	N/A	Critical	data provider	be able to allow analysts to search for available XAI solutions based on criteria such as the type of the underlying ML model and data	I can increase the trustworthiness of the current AI models used in IIoT
P7_BR13	TR710	N/A	Critical	data provider	be able to have access to the existing data assets	I can develop secondary (derivative) data assets and applications
P7_BR14	TR711	N/A	Optional	researcher	be able to identify end-user XAI techniques for timeseries forecasting models	I can increase the trustworthiness of AI models used in IIoT
P7_BR15	TR712	N/A	Preferred	researcher	be able to produce explanations of the results of AI (ML) models in proper form	I can increase the trustworthiness of AI models
P7_BR16	TR713	N/A	Preferred	data provider	be able to train industrial workers on how to assess, use and interpret the outcomes of AI/XAI systems related to machinery health	I can increase the acceptance of novel AI-based systems by industrial workers
P7_BR17	TR714	N/A	Critical	researcher	be able to evaluate XAI models applied on timeseries forecasting models	I can compare different XAI solutions applied on the same forecasting model
P7_BR4, P7_BR12	TR715	N/A	Critical	data provider	be able to configure and set the access usage policies on my data assets	I can define who can have access to my data assets and under which conditions

6.4 (Non-Functional) Technical Requirements Backlog

In this section, the list of extracted technical requirements, based upon non-functional generic and business requirements of FAME is presented. The table is composed by the following information (based also in the template presented in Section 3.1):

- **Requirement ID**: The unique identifier of each business requirement is a composed by the pilot number (i.e., P1, P2, etc.) and incremental number.
- **System Requirement**: The description of the requirement the system needs to address.
- **Type**: Functional or Non-functional requirement type.
- **Functionality**: The category of the business need.
- **Priority**: The assigned priority of the requirement.

The list of extracted (non-functional) technical requirements constitute the first version of the FAME (non-functional) technical requirements backlog on M6. Updates and optimisations are expected as the development and piloting activities progress and these updates and optimisation will be translated into enhancements on the existing technical requirements as well as the addition of new technical requirements. The update list of technical requirements backlog will be documented in the upcoming versions of the deliverable.

Table 14 - FAME (Non-Functional) Technical Requirements

Req. ID	Technical Req. ID	System Requirement	System Requirement Description	Assoc. Task	Type	Functionality	Priority
GR_003	TR901	Support interfaces for data assets trading, pricing, and data policy management	Develop and/or enhance interfaces to support interfaces for data assets trading, pricing and data policy management based on various data exchange models and ontologies.	T3.1	Non-Functional	Technical, Infrastructure	Critical
GR_005	TR902	Support access to external asset policies	Support access to the security policies of the underlying data marketplaces and data spaces.	T3.2	Non-Functional	Technical	Critical
GR_006	TR903	Support consolidation of asset access policies	Support the consolidation of asset access policies at the level of the FAME federated asset space.	T3.2	Non-Functional	Technical	Critical
GR_007	TR904	Support mapping of external asset access policies to FAME asset access policies	Support the mapping of FAME policies to the lower-level policies of the underlying providers.	T3.2	Non-Functional	Technical	Critical
GR_016b	TR905	Support trading and pricing of data assets	Design and implement a blockchain infrastructure which will facilitate the trading of (federated) assets, including support for (dynamic) asset trading, pricing, and monetization schemes.	T4.3	Non-Functional	Technical, Infrastructure	Critical

GR_017b	TR906	Support token-based configurability of tokens	Design and implement programmable and configurable Smart Contracts enabling encoding hybrid trading and pricing rules based on tokens.	T4.3	Non-Functional	Technical, Infrastructure	Critical
GR_020	TR907	Support operational and governance models	Implement the technical infrastructure for supporting the specified Operational and governance models, including support for users' registration, management of subscriptions, management of pay-as-you-go, Data-as-a-Service schemes and more.	T4.5	Non-Functional	Technical, Infrastructure	Critical
GR_027	TR908	Support Incremental Analytics	Support Incremental Analytics, providing mechanisms that incrementally and continually compute (real-time / run-time) analytical results over previously computed snapshots of queries.	T5.3	Non-Functional	Technical, Infrastructure	Critical
GR_028	TR910	Support Energy Efficient Analytics	Support the decomposition of AI/ML techniques in a series of incremental queries, being energy efficient, since they perform a small part of the query operation which reduces I/O and data transfer operations., while at the same time keeping track of the CO2 benefit of the incremental analytics.	T5.3	Non-Functional	Technical, Infrastructure	Critical
GR_029	TR911	Support profiling techniques for cloud/ edge computing applications	Support the assignment of cloud edge applications in different profiles, such as real-time applications, low latency applications, applications requiring many data points, batch processing applications and more.	T5.4	Non-Functional	Technical, Infrastructure	Critical
GR_030	TR912	Support the deployment of configurations that optimize CO2 emissions	Based on the assignment of cloud edge applications in different profiles provide deployment configurations that optimize CO2 emissions without compromising the functionality and the expected performance of the UC.	T5.4	Non-Functional	Technical, Infrastructure	Critical
GR_031	TR913	Support federated machine learning scenarios	Implement a Federated Machine Learning Infrastructure, which will be destined to support privacy friendly and energy efficient data sharing in federated learning scenarios where many different nodes (e.g., marketplaces) contribute assets.	T5.5	Non-Functional	Technical, Infrastructure	Critical

7 Conclusions

D2.1 represents the initial release in a series of documents that document the outcomes of Task 2.1, entitled “Requirements, Specifications, and Co-Creation”. It is a dynamic document that will undergo regular updates throughout the task's duration, capturing changes in the elicitation and analysis of various types of requirements—functional or non-functional, related to business, technical, or regulatory aspects. D2.1 serves as a comprehensive account of the requirements elicitation methodology employed to gather business, technical, and regulatory requirements for the FAME federated asset space.

Section 2 of the document detailed the implementation of this methodology within the context of FAME. The requirement engineering framework adopted for the project was based on the Agile Scrum methodology. To elicit the Generic Requirements, the primary approach used was the Document Analysis methodology. For the Pilot Specific Requirements, Co-Creation Workshops were utilized, with a focus on using User Stories. Each demonstrator participated in a co-creation workshop where both the demonstrator and technical partners collaboratively analyzed business requirements and formulated the corresponding technical requirements. The document has outlined a total of 38 Generic Requirements, which are intended to be supported by the FAME federated asset space. These requirements encompass both functional and non-functional aspects and originate mainly from the FAME Description of Action, as well as functionalities existing in established marketplaces external to the project. These requirements may be updated or refined as the project progresses, and any changes will be documented in subsequent versions of the deliverable.

Furthermore, the document has outlined a total of 116 Business (Pilot-Specific) Requirements, primarily derived from the FAME project pilots. Like the Generic Requirements, these Business Requirements may also undergo updates or refinements during the project, which will be reflected in future versions of the deliverable.

Within section 4, the document highlighted key regulations, such as GDPR, PSD II, MiFiD II, and AI ACT, that significantly impact the implementation and future operation of the FAME federated asset space. The regulatory requirements obtained will be integrated into the second version of the deliverable.

Lastly, the document outlined the technical requirements, both functional (106 in total) and non-functional (13 in total), which were identified through the analysis of the generic requirements and business requirements. Like the other types of requirements, these technical requirements may evolve during the project, and any updates will be documented in upcoming versions of the deliverable.

Table 15 – Conclusions

Objectives	Comment
Define a requirements elicitation methodology towards eliciting the business, technical and regulatory requirements of the FAME federated asset space.	The requirement engineering framework adopted was based on the Agile Scrum methodology. To elicit the Generic Requirements, the primary approach used was the Document Analysis methodology. For the Pilot Specific Requirements, Co-Creation Workshops were utilized, with a focus on using User Stories.
Elicit Generic Requirements that the FAME federated asset space will need to support, including both functional and non-functional requirements.	A total of 38 Generic Requirements including both functional and non-functional requirements that the FAME federated asset space will need to support, have been elicited.
Elicit Business (Pilot-Specific) Requirements that the FAME federated asset space will need to support.	A total of 116 Business (Pilot-Specific) Requirements that the FAME federated asset space will need to support, have been elicited.
Elicit Regulatory Requirements that the FAME federated asset space will need to support.	The document focuses on GDPR, PSD II, MiFiD II, and AI ACT, while the elicited regulatory requirements will be included in the second version of the deliverable.
Elicit (functional and non-functional) technical requirements that the FAME federated asset space will need to support.	A total of 119 (Functional and Non-Functional) Technical Requirements including both functional and non-functional requirements that the FAME federated asset space will need to support, have been elicited.

Table 16 – KPIs

KPI	Value	Comment
KPI 1: Generic Requirements elicited	38	These requirements may undergo updates or refinements during the project, which will be reflected in future versions of the deliverable
KPI 2: Business (Pilot-Specific) Requirements elicited	116	These requirements may undergo updates or refinements during the project, which will be reflected in future versions of the deliverable
KPI 3: Business (Pilot-Specific) Requirements elicited	N/A	The elicited regulatory requirements will be included in the second version of the deliverable
KPI 4: (Functional and Non-Functional) Technical Requirements elicited	119	These requirements may undergo updates or refinements during the project, which will be reflected in future versions of the deliverable

References

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