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# Technical Assistance for “A Smart Network for Technology Transfer and Commercialisation with Funnel Model (SMARTNET)”

Contract No: TR14C2.2.05-04/001

EUROPEAID/140284/IH/SER/TR

**SOFTWARE DESIGN DESCRIPTIONS (SDD)**

26.06.2023

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Transfer and Commercialisation with Funnel Model  
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## Document Control and Approval Sheet

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Contractor	SwanLeuco Danışmanlık AŞ Kiliçdede Mah. Kastamonu Sok. No:6 11/54 55060 İlkadım Samsun 0362 503 55 64 <a href="mailto:okan.gumus@swanleuco.com">okan.gumus@swanleuco.com</a>

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### DISCLAIMER

This document has been produced with the technical assistance of the European Union under Technical Assistance for “A Smart Network for Technology Transfer and Commercialisation with Funnel Model (SMARTNET)” Project, Türkiye. Service Contract Number: “EUROPEAID/140284/IH/SER/TR”.

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## LIST of ABBREVIATIONS

<b>AI</b>	Artificial Intelligence
<b>API</b>	Application Programming Interface
<b>CA</b>	Contracting Authority
<b>CISOP</b>	Competitiveness and Innovation Sector Operational Programme
<b>DS</b>	Decision Support
<b>DSS</b>	Decision Support System
<b>ERA</b>	End Recipient of Assistance (Beneficiary)
<b>EUD</b>	Delegation of the European Union to Türkiye
<b>GTU</b>	Gebze Technical University
<b>HKU</b>	Hasan Kalyoncu University
<b>ICT</b>	Information and Communication Technologies
<b>IP</b>	Intellectual Property
<b>IT</b>	Information Technologies
<b>ITU</b>	Istanbul Technical University
<b>KE</b>	Key Expert
<b>MIS</b>	Management Information System
<b>ML</b>	Machine Learning
<b>MoIT/DoEUFP</b>	Ministry of Industry and Technology Directorate of EU Financial Programmes
<b>MVC</b>	Model-View-Controller Pattern
<b>OCU</b>	Operation Coordination Unit
<b>OCUD</b>	Operation Coordination Unit Director
<b>OS</b>	Operating Structure
<b>R&amp;D</b>	Research and Development
<b>RCOP</b>	Regional Competitiveness Operational Programme
<b>SDD</b>	Software Design Definitions
<b>SME</b>	Small and Medium Sized Enterprise
<b>TA</b>	Technical Assistance
<b>TAT</b>	Technical Assistance Team
<b>TDZ</b>	Technology Development Zone
<b>TNA</b>	Training Needs Assessment
<b>ToR</b>	Terms of Reference
<b>TRL</b>	Technology Readiness Level
<b>TTI</b>	Technology Transfer Intermediary
<b>TTO</b>	Technology Transfer Office
<b>YTU</b>	Yıldız Technical University

## 1. INTRODUCTION

Under Component I of the **A Smart Network for Technology Transfer and Commercialisation with Funnel Model (SMARTNET)** project, one of the primary activities is **Activity 1. Establishment of TTI Network and Development of Institutional Infrastructure** which aims to establish and operationalize **SMARTNET** by delivering training, mentoring/consulting and fundraising services to the target groups for supporting them to commercialize their technology-oriented business ideas.

**Activity A.1.1. Development of TTI Network Software Platform** focuses on the design, development, and operationalisation of the **SMARTNET Artificial Intelligence Based TTI Network Software Platform (SMARTNET Platform)**.

The **Smartnet MIS Platform** is designed as a web-based Management Information System (MIS) to serve as a comprehensive commercialization automation software and AI supported management decision support system. It aims to facilitate the coordination of technology transfer and commercialization activities while enabling efficient information flow among various stakeholders within the network. The platform consists of a set of modules tailored to address specific needs and provides a robust framework for managing and streamlining key aspects of the commercialization process.

The Smartnet MIS Platform offers a range of functionalities to support the ecosystem of Technology Transfer Intermediaries (TTIs) and stakeholders involved in entrepreneurship, mentoring, investment, and intellectual property management. By leveraging integration web services, artificial intelligence, and decision support capabilities, the platform enables seamless collaboration, data exchange, and informed decision-making.

This **Software Design Descriptions (SDD)** document outlines the detailed design of the Smartnet MIS Platform, including the architecture, functionality, and interactions of its various modules. It serves as a comprehensive reference for developers, architects, and stakeholders involved in the development and implementation of the platform.

The subsequent sections of this document will delve into the specific modules developed for the Smartnet MIS Platform, providing insights into their design, components, interfaces, and data structures. Additionally, it will cover auxiliary modules such as the Web Portal (Content Management System) and e-Learning Platform (ME-Learning) that complement the core functionality of the system.

By documenting the design decisions and providing a clear overview of the platform's structure and behavior, this Software Design Descriptions document aims to ensure a common understanding among the development team and stakeholders, facilitate effective collaboration, and guide the successful implementation and deployment of the Smartnet MIS Platform.

## 2. ARCHITECTURAL DESIGN

The architectural design of the Smartnet MIS Platform follows the Model-View-Controller (MVC) architectural pattern, providing a structured and modular approach to organizing the system's components and facilitating separation of concerns. The MVC pattern divides the application into three interconnected components: the Model, the View, and the Controller, each responsible for distinct responsibilities in the system.

**Model:**

The Model component represents the business logic and data of the Smartnet MIS Platform. It encapsulates the core functionality and data structures, including the entities, business rules, and data access layer. The Model interacts with the database and performs operations such as data retrieval, storage, and validation. It encapsulates the application's state and provides the necessary APIs for accessing and manipulating data.

**View:**

The View component focuses on the user interface and presentation layer of the Smartnet MIS Platform. It is responsible for rendering data to the users and capturing their interactions. The View provides a user-friendly interface, including forms, tables, and visual elements, allowing users to interact with the system's features. It receives user input and forwards it to the Controller for further processing. The View is designed to be modular and reusable, ensuring a consistent and intuitive user experience across different modules of the platform.

**Controller:**

The Controller acts as an intermediary between the Model and the View, facilitating the communication and coordination between the two. It receives user input from the View and orchestrates the appropriate actions in the Model to update the data or trigger specific operations. The Controller handles user requests, enforces business rules, and manages the flow of data within the system. It ensures the separation of concerns by decoupling the user interface from the underlying logic and data.

**Modules:**

The Smartnet MIS Platform is structured into different modules, each corresponding to a specific functional area. These modules include Entrepreneurs Management, Mentors Management, Investors Management, Intellectual Property (IP) Management, Integration Web Services, Artificial Intelligence and Decision Support, Standard and Custom Reporting, and System Management and Administration.

Each module has its own set of Models, Views, and Controllers, encapsulating the logic and data related to its respective functionality. This modular approach allows for flexibility, scalability, and ease of maintenance by promoting code reusability and separation of concerns.

**Technology Stack:**

The Smartnet MIS Platform is developed using C#, a widely adopted programming language for building robust and scalable web applications. It leverages the Microsoft .NET framework, providing a rich set of libraries and tools for rapid development and deployment.

The platform utilizes ASP.NET MVC framework to implement the MVC architectural pattern and facilitate the development of web-based user interfaces. For data persistence, a relational database management system (Microsoft SQL Server) is employed, ensuring efficient storage and retrieval of data. Additionally, the platform utilizes various front-end technologies such as HTML, CSS, and JavaScript to create a responsive and interactive user interface.

By adhering to the MVC architectural pattern and leveraging C# and associated technologies, the Smartnet MIS Platform achieves a modular, scalable, and maintainable architecture. The clear separation of concerns between the Model, View, and Controller components enables better code organization, facilitates independent development and testing, and enhances the overall flexibility and extensibility of the system.

### 3. DETAILED DESIGN

Throughout this section, we will present the design aspects of each module of the Smartnet MIS Platform, including the Entrepreneur, Mentors, Investors, Intellectual Property Rights (IPR), Artificial Intelligence and Decision Support, Content Management and Publishing, e-Learning, and System Management/Administration modules. We will examine the user interfaces, data structures, and interactions within and between these modules, ensuring a cohesive and intuitive user experience while facilitating efficient data management and analysis.

#### 3.1 Entrepreneurs Management Module

The Entrepreneurs Management module of the Smartnet MIS Platform provides a comprehensive set of functionalities tailored specifically for entrepreneurs. This module focuses on empowering entrepreneurs by facilitating their interaction with mentors, investors, and the system administrators, as well as offering essential tools for managing their profiles and accessing valuable resources. The detailed design of the Entrepreneurs Management module encompasses various screens, functions, and workflows to ensure a seamless and efficient user experience.

##### **Entrepreneur Registration and Authentication:**

The module begins with the Entrepreneur Registration and Authentication process. Entrepreneurs can register by providing the necessary information and creating an account in the Smartnet MIS system. Once registered, entrepreneurs can log in using their credentials and access the full range of module features.

##### **Entrepreneur Profile Management:**

Entrepreneurs have the ability to create, view and edit their Entrepreneur Profile. This profile includes detailed information about their venture, allowing entrepreneurs to showcase their business ideas, objectives, and achievements. As time progresses, the entrepreneurs can update their entrepreneur profiles, ensuring the accuracy and relevancy of the provided information.

##### **Mentor and Investor Interaction:**

The Entrepreneurs Management module facilitates the interaction of entrepreneurs with mentors and investors. Entrepreneurs can browse and list available mentors and investors within the system. They can send connection requests to mentors or investors they find suitable and receive replies in return. This functionality enables entrepreneurs to establish valuable connections and seek guidance and funding opportunities for their ventures.

##### **Communication and Messaging:**

Entrepreneurs can utilize the built-in messaging system to communicate with mentors and investors as well as the platform administrators. This feature enables entrepreneurs to ask questions, seek clarifications, and exchange information with relevant stakeholders. System administrators have access to all messaging activities, ensuring efficient communication and oversight of the platform's operations.

##### **Entrepreneur-Specific Reports and Performance Monitoring:**

The Entrepreneurs Management module provides the platform administrators with access to various reports specific to their performance and progress. Performance reports and report cards offer valuable insights into the venture ecosystems growth, achievements, and areas for improvement. By monitoring



these reports, platform administrators can assess the development of the Smartnet Ecosystem and make informed decisions regarding new strategies.

#### **Administrative Functions:**

The module also includes several administrative functions available to Smartnet Platform administrators. Administrators have the authority to manage entrepreneurs' accounts, including creating new accounts, enabling or disabling entrepreneurs, and overseeing the matchmaking process between entrepreneurs and mentors/investors. The Matchmaking Management menu allows administrators to view the history of interaction between entrepreneurs, mentors, and investors, including requests, replies, and reviews.

By incorporating these functionalities, the Entrepreneurs Management module ensures a comprehensive and user-centric approach to supporting entrepreneurs throughout their journey. From registration and profile management to mentor/investor interactions and performance monitoring, the module empowers entrepreneurs with the necessary tools and resources to thrive in their entrepreneurial endeavors.

### **3.2 Mentors Management Module**

The Mentors Management module of the Smartnet MIS Platform is designed to facilitate efficient mentorship interactions and support the growth and development of mentors. This module encompasses various screens, functions, and workflows to ensure seamless mentor registration, profile management, and mentor-mentee matching. It also provides comprehensive management functions for responsible personnel, enabling evaluation of mentor performances, generation of mentor scorecards, and other reporting capabilities.

#### **Mentor Registration and Authentication:**

The module begins with the Mentor Registration and Activation process. Mentors can register by providing the required information and creating an account within the Smartnet MIS system. Once registered, mentors can log in using their credentials and access the full range of module features.

#### **Mentor Profile Management:**

Mentors have the ability to create and manage their Mentor Profile, which highlights their expertise and experience. This profile includes detailed information about their professional background, skills, and areas of specialization. Mentors can view and edit their profiles to ensure accuracy and relevance, showcasing their strengths to entrepreneurs seeking guidance.

#### **Mentor-Entrepreneur Interaction:**

The Mentors Management module facilitates interaction between the mentors and the entrepreneurs within the platform. Mentors can browse and list available entrepreneurs within the Smartnet MIS system. They can view contact requests sent by entrepreneurs and accept or reject them, along with providing a reply. Upon accepting a contact request, mentors can score their perception of the entrepreneur and provide valuable feedback. They can also review the entrepreneurs they have accepted, aiding in the continuous improvement of the matching process.

#### **Communication and Messaging:**

Similar to the Entrepreneurs Management module, the Mentors Management module includes a built-in messaging system. Mentors can utilize this feature to communicate with entrepreneurs, system

administrators, and other stakeholders. This functionality fosters effective communication, enabling mentors to address inquiries, provide guidance, and engage in collaborative discussions.

#### **Mentor Performance Evaluation and Reporting:**

The Mentors Management module incorporates performance evaluation and reporting functions. Smartnet administrators have the responsibility to review and score Mentor Profiles to determine their eligibility for listing in the Mentors List. This evaluation process ensures that the listed mentors possess the necessary qualifications and expertise. Additionally, administrators can generate mentor scorecards and other management reports, providing insights into the performance and effectiveness of mentors within the system.

#### **Administrative Functions:**

The module also includes administrative functions available to Smartnet platform administrators. Administrators can list all registered mentors, manually create mentor accounts, and enable/disable mentor profiles. The Matchmaking Management menu allows administrators to view the history of interactions between mentors and entrepreneurs, including contact requests, replies, and reviews. Furthermore, administrators have access to all messaging activities within the system, ensuring efficient communication oversight.

By incorporating these functionalities, the Mentors Management module empowers mentors to connect with entrepreneurs, provide guidance, and contribute to their professional development.

### **3.3 Investors Management Module**

The Investors Management module of the Smartnet MIS Platform aims to facilitate the invitation, registration, and interaction of potential investors with entrepreneurs within the ecosystem. This module provides investors with the tools and functionalities to create detailed profiles, specify their investment preferences, and streamline the matching process with entrepreneurs. The module incorporates smart algorithms to match interest areas, sectors, and calculate eligibility percentages, enabling efficient and effective connections. Additionally, the module includes management screens for administrators to oversee and report on investor matchmaking activities.

#### **Investor Invitation and Activation:**

The module begins with the Investor Invitation and Activation process. Potential investors will be invited by the Platform Administrators to register and activate an investor user account. Smartnet MIS Administrators will manually enter investor accounts and send invitations to potential/eligible investors. Once the account is activated, investors can log in to the platform using their credentials.

#### **Investor Profile Management:**

Investors have the ability to create and manage their Investor Profile, which includes detailed information about their investment choices, focus sectors, interests, funds, and previous investments. This profile serves as a comprehensive overview of their investment preferences and helps streamline the matching process with entrepreneurs. Investors can view and update their profiles to ensure accuracy and relevance.

**Investor-Entrepreneur Interaction:**

The Investors Management module facilitates interaction between investors and entrepreneurs. Investors can browse and list available entrepreneurs within the Smartnet MIS Platform. Entrepreneurs can send connection requests to investors, and investors can accept or reject these requests. Once an investor accepts a connection request, they can view the full venture profile of the entrepreneur. Investors can reply to entrepreneurs' requests with their interest and further discuss potential investments. This functionality enables seamless communication and collaboration between investors and entrepreneurs.

**Smart Matching Algorithms:**

The module incorporates smart algorithms to enhance the matching process between investors and entrepreneurs. These algorithms take into account factors such as interest areas, sectors, verticals and eligibility percentages to suggest potential matches. By leveraging these algorithms, the system can efficiently identify suitable investment opportunities for investors based on their preferences. This feature streamlines the matching process, saving time and effort for both investors and entrepreneurs.

**Communication and Messaging:**

Similar to other modules, the Investors Management module includes a built-in messaging system that facilitates communication between investors, entrepreneurs, and system administrators. Investors can contact entrepreneurs to discuss investment opportunities, seek additional information, or provide feedback. System administrators have access to all messaging activities, ensuring smooth communication and overseeing the platform's operations.

**Administrative Functions:**

Administrative functions are available to Smartnet administrators within the Investors Management module. Administrators can list all registered investors, manually create investor accounts, and enable/disable investor profiles. The Matchmaking Management menu provides administrators with a comprehensive overview of the request history between entrepreneurs and investors, including replies and reviews. Additionally, administrators can monitor all messaging activities within the system, ensuring efficient communication oversight.

By incorporating these functionalities, the Investors Management module empowers investors to connect with entrepreneurs, explore investment opportunities, and contribute to their growth.

### 3.4 Intellectual Property Rights (IPR) Management Module

The Intellectual Property Rights (IPR) Management module of the Smartnet MIS Platform aims to streamline the recording, analysis, and communication of intellectual property data among stakeholders. This module provides users with the tools and functionalities to manage and analyze IP data, including patent applications and portfolio information. The module incorporates dynamic classification criteria, prepared by system administrators, to effectively organize and categorize IP data. Additionally, the module facilitates communication between users and experts, fostering collaboration and knowledge exchange.

**User Registration and Authentication:**

The IPR Management module begins with beneficiary organisation/institution registration by the Smartnet MIS Platform administrators. Potential IPR Management Module users receive invitations from

Smartnet MIS Administrators and can activate their accounts to access the platform. Once activated, users can log in using their credentials and start utilizing the module's functionalities.

#### **Institution Profile Management:**

IPR Module users have the ability to view and manage the profile of their respective institutions or organizations. The Institution Profile screen allows users to input and update detailed information about their institution and its IP portfolio, ensuring accurate representation within the platform. Users can view and modify their institution profiles as needed.

#### **Best Practices Sharing:**

The module promotes knowledge sharing and collaboration by allowing users to list and add Best Practices. Users can browse and access Best Practices uploaded by other IPR Module users within the Smartnet MIS system. They can also contribute by adding Best Practices from their own institutions, showcasing successful approaches and strategies. Users have the ability to edit and update Best Practices belonging to their respective institutions, ensuring accurate and relevant information.

#### **Portfolio Management:**

The IPR Management module enables users to manage their institution's intellectual property portfolio. Users can view, add, edit, and update various portfolio items, including "Brand", "Design", and "Patent/Useful Model" entries. This functionality allows users to maintain a comprehensive and up-to-date record of their institution's intellectual property assets. By centralizing portfolio information, the module facilitates efficient analysis and decision-making related to intellectual property management.

#### **Communication and Messaging:**

The module includes a built-in messaging system that enables communication between IPR Module users and system administrators. Users can contact system administrators for inquiries, support, or any necessary assistance via the messaging system. This feature ensures seamless communication and facilitates efficient collaboration within the platform.

#### **Administrative Functions:**

Administrative functions are available to Smartnet administrators within the IPR Management module. Administrators can list all beneficiary institutions that have access to the Smartnet MIS platform. They can add and edit beneficiary institutions, as well as create IPR Module Users for these institutions and send invitations. Administrators also have the ability to enable/disable IPR Module User accounts. Additionally, administrators can access and review institution profiles, view all Best Practices loaded within the module, and review portfolio items uploaded by users. These administrative functions enable efficient oversight and management of the IPR Management module.

By incorporating these functionalities, the IPR Management module empowers users to effectively manage their organisations intellectual property rights, analyze portfolio information, and share best practices.

### **3.5 Integration Web-Services Module**

The Integration Web-Services module of the Smartnet MIS Platform serves as a crucial component for seamless data interchange and automation tasks between the Smartnet MIS Platform and other authorized applications or systems. This module exposes a set of well-defined Application Programming

Interfaces (APIs) that enable the integration of selected functions and data between the Smartnet Platform and external systems, such as existing Technology Transfer Intermediary (TTI) systems and databases.

#### **API Design and Documentation:**

The Integration Web-Services Module provides APIs that are carefully crafted to provide a standardized and secure approach for accessing and exchanging data between the Smartnet MIS Platform and potential external systems. The API design focuses on list, get and put functionality for major entities in the system, namely Entrepreneur, Mentor, Investor and IPR Entry which ensures consistency, scalability, and flexibility in handling various integration requirements. Each comes with clear and comprehensive API documentation, outlining the endpoints, request/response formats, authentication mechanisms, and available functionalities crafted for integration with external services.

#### **Data Interchange and Integration:**

The module enables authorized applications or systems to interact with the Smartnet MIS Platform by exchanging data. Through the exposed APIs, external systems can request and retrieve data from the Smartnet MIS Platform, as well as submit data for processing. The integration capabilities allow for the seamless transfer of information between different systems, enabling efficient data synchronization and eliminating the need for manual data entry or duplication.

#### **Authentication and Authorization:**

To ensure secure and controlled access, the Integration Web-Services module implements authentication and authorization mechanisms. Authorized external applications or systems are granted access to the APIs based on predefined roles and permissions. Authentication protocols, such as OAuth or API keys, are employed to verify the identity of external systems and ensure data security. Role-based access controls are implemented to define granular permissions and restrict access to sensitive data or functionalities.

#### **Error Handling and Logging:**

The module incorporates robust error handling mechanisms to handle exceptional scenarios during data interchange. Proper error codes and messages are defined and returned to external systems to indicate the nature of the encountered issues. Additionally, comprehensive logging mechanisms are implemented to capture relevant information, including API requests, responses, and any errors or exceptions. These logs serve as valuable resources for troubleshooting, debugging, and monitoring the integration process.

#### **Integration Testing and Monitoring:**

The Integration Web-Services module undergoes thorough testing to ensure its functionality and reliability. Integration tests are conducted to verify the seamless data interchange and proper functioning of the exposed APIs. Various scenarios, including successful data retrieval, data submission, error conditions, and performance tests, are performed to validate the integration capabilities. Additionally, monitoring tools and techniques are implemented to continuously track and monitor the integration process, ensuring the stability and performance of the module.

By providing a robust and well-documented set of APIs, the Integration Web-Services module enables authorized applications and systems to seamlessly interact with the Smartnet MIS Platform. The detailed design addresses the API design, authentication and authorization mechanisms, error handling, and

integration testing aspects. This ensures secure and efficient data interchange, fosters interoperability with external systems, and enhances the overall functionality and value of the Smartnet MIS Platform within the broader technology transfer ecosystem.

### 3.6 Artificial Intelligence and Decision Support Module

The Artificial Intelligence and Decision Support module of the Smartnet MIS Platform plays a pivotal role in providing advanced machine learning (ML) and data processing algorithms to assist decision makers within the ERA (Entrepreneurship and Research Authority) and other stakeholders. The module's primary objective is to leverage the collected data from all other modules and generate valuable insights and decision proposals to identify high-quality business ideas with a higher potential for commercialization. Additionally, the module incorporates self-learning capabilities, continuously improving its performance based on past decisions and feedback.

#### **Data Processing and Analysis:**

The Artificial Intelligence and Decision Support module processes and analyzes the data collected from various modules within the Smartnet MIS Platform. This includes data related to entrepreneurs, mentors, investors, intellectual property, and other relevant information. Advanced data processing techniques, such as data cleansing, normalization, and feature engineering, are applied to ensure the quality and reliability of the data. The module employs sophisticated ML algorithms to extract meaningful patterns, correlations, and insights from the processed data.

#### **Decision Proposal Generation:**

Based on the analyzed data, the module generates decision proposals to aid decision makers in identifying high-quality business ideas with strong potential for commercialization. The ML algorithms employed in the module utilize various techniques such as supervised learning, unsupervised learning, and predictive modeling to make informed recommendations. Decision proposals may include recommendations for matching entrepreneurs with suitable mentors and investors, evaluating the viability of business ventures, or identifying potential areas of improvement for entrepreneurs.

#### **Self-Learning and Improvement:**

The Artificial Intelligence and Decision Support module incorporates self-learning capabilities to continuously improve its decision-making performance. The module analyzes the outcomes of past decisions and incorporates feedback from decision makers to refine its algorithms and models. By learning from historical data and feedback, the module becomes more adept at recognizing patterns, predicting outcomes, and providing accurate decision proposals over time. This iterative self-learning process enables the module to adapt to changing business landscapes and improve its overall performance.

#### **Integration with Other Modules:**

The module integrates seamlessly with other modules within the Smartnet MIS Platform to access and utilize the relevant data for decision support. It leverages the data collected from modules such as Entrepreneurs Management, Mentors Management, Investors Management, and Intellectual Property (IP) Management to enhance its decision-making capabilities. The integration ensures a holistic approach to decision support by incorporating data from multiple sources and modules, providing a comprehensive view of the ecosystem.

**Monitoring and Evaluation:**

The Artificial Intelligence and Decision Support module incorporates monitoring and evaluation mechanisms to assess its performance and effectiveness. The module tracks the accuracy and reliability of its decision proposals, comparing them with the “actual outcomes” and feedback from decision makers. It continuously evaluates the performance of its ML models, identifies areas for improvement, and updates its algorithms accordingly. Regular monitoring and evaluation ensure that the module remains reliable, up-to-date, and aligned with the evolving needs of the ERA and other stakeholders.

By leveraging ML algorithms and data processing techniques, the Artificial Intelligence and Decision Support module enhances the decision-making process within the Smartnet MIS Platform empowering decision makers with valuable insights and recommendations, enabling them to identify and prioritize high-potential business ideas for successful commercialization.

### 3.7 Standard and Custom Reporting Module

The Standard and Custom Reporting module of the Smartnet MIS Platform is an integrated critical component designed to facilitate the comprehensive analysis and presentation of data collected within the Smartnet MIS Platform. This module aims to provide users with rich listing, tabling, exporting, and visual analysis capabilities, enabling them to gain valuable insights from the data collected across various modules. The reporting module incorporates flexible querying functionalities, extensive filtering options, and support for multiple document formats, empowering users to generate standard and customized reports tailored to their specific requirements.

**Data Collection and Integration:**

The Standard and Custom Reporting module integrates seamlessly with the data collected from modules such as Entrepreneurs Management, Mentors Management, Investors Management, and Intellectual Property (IP) Management. It accesses the stored data and consolidates it in a centralized repository to ensure efficient data retrieval for reporting purposes. The module supports both real-time data updates and batch processing to ensure the most up-to-date information is available for reporting.

**Reporting Interface and Navigation:**

The module provides a user-friendly reporting interface that allows users to navigate through different reporting functionalities effortlessly. Users can access predefined standard reports categorized by module or create customized reports using the available query builder tools. The interface offers intuitive navigation options, allowing users to select desired data sources, apply filters, define sorting criteria, and choose display formats for generating reports.

**Querying and Filtering:**

The Standard and Custom Reporting module incorporates a powerful querying engine that enables users to extract specific data subsets for reporting. Users can define query parameters, apply various filtering criteria, and combine multiple conditions to refine the data selection process. The module supports both simple and complex queries, accommodating the diverse reporting needs of different users. Additionally, the module allows users to save their frequently used queries for future use, enhancing efficiency and productivity.

### **Reporting Formats and Exporting:**

The module provides extensive support for multiple document formats, allowing users to generate reports in formats such as PDF, Excel, CSV, or HTML. Users can choose the desired format based on their reporting requirements and the intended audience. The module ensures that the generated reports are formatted consistently, presenting the data in a clear and organized manner. Furthermore, users have the option to export the reports to external systems or share them with stakeholders through various communication channels.

### **Visual Analysis and Data Visualization:**

The Standard and Custom Reporting Module emphasizes visual analysis by incorporating data visualization techniques. Users can leverage interactive charts, graphs, and dashboards to visually represent and analyze the collected data. The module provides a range of visualization options, including bar charts, line graphs, pie charts, and heat maps, enabling users to identify patterns, trends, and correlations within the data. Visual representations enhance the readability and interpretability of the reports, facilitating better decision-making and strategic planning.

The Standard and Custom Reporting module of the Smartnet MIS Platform empowers users to generate comprehensive reports, leveraging the collected data from various modules. The detailed design focuses on data collection and integration, user-friendly reporting interface and navigation, querying and filtering capabilities, reporting formats and exporting options, and visual analysis and data visualization. By providing flexible reporting functionalities, the module facilitates data-driven decision-making, performance analysis, and monitoring within the Smartnet MIS Platform, enhancing the overall effectiveness of the system.

## **3.8 System Management and Administration Module**

The System Management and Administration module of the Smartnet MIS Platform is a crucial component designed to provide administrators with comprehensive control and management capabilities over the Smartnet MIS Platform. This module caters to personnel from the ERA and stakeholders who possess administrator-user privileges. It enables them to perform a range of administrative tasks, including role and user management, authorization management, activity logging, custom report designing, error tracking and debugging, as well as managing integration services and APIs available on the Smartnet MIS Platform.

### **Role and User Management:**

The System Management and Administration module allows administrators to define and manage roles within the system. They can create different user roles with specific privileges and assign users to these roles. The module provides a user-friendly interface for managing user accounts, including adding, modifying, and disabling user accounts. Administrators have the authority to assign role-based permissions and access levels to ensure proper system security and data confidentiality.

### **Authorization Management:**

Administrators have the ability to manage authorization rules and access control settings through the System Management and Administration Module. They can define fine-grained permissions for various system functionalities and modules based on user roles. This enables administrators to control the actions and operations that each user or user group can perform within the Smartnet MIS Platform. The



module ensures that users only have access to the functionalities relevant to their roles and responsibilities.

#### **Activity Logging and Audit Trail:**

The module includes comprehensive activity logging and audit trail functionalities. It tracks and records all user activities and system events, capturing information such as user login/logout, data modifications, and administrative actions. The logging feature helps administrators monitor system usage, troubleshoot issues, and maintain data integrity. The audit trail provides a detailed history of system activities, allowing administrators to review and analyze user interactions with the platform.

#### **Custom Report Designers:**

The System Management and Administration module provides custom report design capabilities for administrators. They can create and modify reports using intuitive report design tools, allowing them to tailor reports according to specific business requirements. Administrators can upload report templates, select data sources, apply filters, and choose display formats to generate custom reports.

#### **Error Tracking, Debugging, and System Integration Management:**

The module includes error tracking and debugging functionalities to assist administrators in identifying and resolving issues within the Smartnet MIS Platform. Administrators can access logs and error reports, track system errors, and perform debugging tasks to ensure smooth operation and optimal performance. Additionally, the module enables administrators to manage integration services and APIs available on the platform. They can configure and monitor integration services, track API usage, and manage authentication and access controls for third-party systems or applications that interact with the Smartnet MIS Platform.

The System Management and Administration module of the Smartnet MIS Platform empowers administrators with comprehensive control and management capabilities ensuring efficient system administration, robust security, and seamless integration with external systems, enhancing the overall effectiveness and reliability of the Smartnet MIS Platform.

### **3.9 Web-Portal Content Management Module**

The Web-Portal Content Management Module of the platform serves as the public-facing component of the Smartnet MIS Platform, enabling effective communication and interaction with both the general public and stakeholders. This module provides a user-friendly interface for managing and publishing media-rich content, including project activities, outputs, documents, announcements, events, calls, and calendars. It seamlessly interacts with the MIS Component to present comprehensive and engaging information about entrepreneurs, mentors, activities, best practices, funding opportunities, and more.

#### **Content Management System:**

The Web-Portal Content Management Module incorporates a robust content management system (CMS) that allows administrators to create, edit, and organize various types of content. Administrators can easily upload and publish project documents, reports, and other relevant resources. The CMS supports a range of media formats, including images, videos, and downloadable files. It also provides features for categorizing and tagging content, facilitating easy navigation and searchability.

**Interactive Presentation of Data:**

The module leverages the data collected and stored in the MIS Component to provide rich presentations and interactive displays of information. This includes showcasing details about entrepreneurs, mentors, activities, best practices, funding opportunities, and more. The module utilizes visual elements, such as charts, graphs, and infographics, to present data in an easily understandable and engaging manner. Users can interact with the presented data to explore further details and gain valuable insights.

**Events, Announcements, and Calls:**

The Web-Portal Content Management Module enables administrators to create and manage event listings, announcements, and calls for participation. They can create event calendars, specify event details, and publish event-related documents. The module also facilitates the promotion and registration of participants for events and training programs. Users visiting the platform can view upcoming events, access event-related materials, and submit applications or registrations as necessary.

**User Interaction and Feedback:**

The module includes features to facilitate user interaction and feedback. Visitors to the platform can leave comments, ask questions, or provide feedback on specific content items. Administrators can moderate and respond to user-generated content, fostering engagement and collaboration. Additionally, the module can incorporate user polls, surveys, and feedback forms to gather valuable input and insights from the platform's audience.

**Responsive Design and Accessibility:**

The Web-Portal Content Management Module adopts a responsive design approach, ensuring that the platform is accessible and optimized for various devices, including desktop computers, tablets, and mobile devices. The user interface is designed to provide a seamless and intuitive experience across different screen sizes and resolutions. Accessibility features, such as text alternatives for images, keyboard navigation support, and compliance with web accessibility standards, are implemented to ensure inclusivity and usability for all users.

The Web-Portal Content Management Module of the Smartnet MIS Platform plays a vital role in facilitating effective communication, knowledge sharing, and interaction between the Smartnet Project and its stakeholders. With a powerful content management system, interactive data presentations, event and announcement management capabilities, user interaction features, and a responsive design approach, the module empowers administrators to deliver engaging and informative content to a diverse audience. The web-portal serves as a dynamic platform that disseminates project-related information, promotes collaboration, and encourages active participation in Smartnet Projects' activities and initiatives.

### 3.10 E-Learning Module

The E-Learning module of the Smartnet MIS Platform serves as a crucial component for the commercialization acceleration system, targeting entrepreneurs and mentors. This module provides a comprehensive e-learning system that delivers customized training programs and resources to meet the specific needs of each participant. The module utilizes the ME-LEARNING framework, integrating seamlessly with the MIS Component to ensure a unified experience, single sign-on functionality, and data exchange for training completion, achievements, analytics, and other relevant information.

**Individualized Training Programs:**

The E-Learning module allows administrators to define mandatory training programs tailored to each participant's requirements. Participants, including entrepreneurs and mentors, can access their personalized training programs upon login. These programs may include a combination of self-learning modules, multimedia resources, interactive presentations, and documents. The module enables participants to progress through the training content at their own pace, providing a flexible and self-directed learning experience.

**Multimedia Learning Resources:**

To facilitate effective learning, the E-Learning module provides a wide range of multimedia resources. These resources may include video tutorials, audio recordings, interactive simulations, case studies, and e-books. Participants can access these resources within the platform and leverage various formats to enhance their understanding and knowledge acquisition. The module supports the seamless integration of multimedia content, ensuring an engaging and interactive learning environment.

**Performance Evaluation and Exams:**

The module incorporates evaluation mechanisms to assess participants' performance and knowledge retention. Participants can undergo online exams to test their comprehension and progress. The module enables the creation of exams related to both online and classroom training sessions. Exam results are recorded and stored within the MIS Component, allowing administrators to query and analyze the data. This evaluation process helps track participants' learning outcomes, identify areas for improvement, and provide valuable feedback.

**Achievement Tracking and Analytics:**

The E-Learning module tracks participants' achievements and progress throughout the training programs. It captures data on completed modules, exams, certifications, and other milestones. This information is stored within the MIS Component and can be accessed by participants and administrators. The module also provides analytics and reporting capabilities, allowing administrators to generate insights and assess the overall effectiveness of the e-learning system. Data on participant engagement, completion rates, and performance metrics can be leveraged to enhance the training programs and optimize learning outcomes.

**Seamless Integration and Single Sign-On:**

To ensure a seamless user experience, the E-Learning module integrates with the Smartnet MIS Component using a single sign-on (SSO) mechanism, eliminating the need for participants to log in separately to access the e-learning platform. The module leverages the data stored in the MIS Component, such as participant profiles and training progress, to provide a unified and consistent learning environment.

The E-Learning module of the Smartnet MIS Platform plays a pivotal role in delivering high-quality and personalized training experiences to entrepreneurs and mentors. Through its individualized training programs, multimedia learning resources, performance evaluation, achievement tracking, and seamless integration with the MIS Component, the module empowers participants to enhance their skills, knowledge, and entrepreneurial capabilities. It provides a flexible and accessible platform for continuous learning, ensuring participants are equipped with the necessary tools and expertise to thrive in the commercialization process.

## 4. INTERFACE, STRUCTURES AND INTERACTIONS

The Smartnet MIS Platform is designed to bring together entrepreneurs, mentors, investors, and administrators to create a thriving ecosystem for commercialization acceleration. The Entrepreneurs Module serves as a hub for entrepreneurs to showcase their ideas, access mentorship, and connect with potential investors. The Mentors Module facilitates mentor registration, profile management, and mentor-mentee matching, while the Investors Module enables investors to register, explore investment opportunities, and engage with entrepreneurs. The System Management/Administrative Module provides administrative control, user management, and authorization management for the entire platform.

Throughout this section, we will present the the user interface, data structures, and interactions between each of these modules of the Smartnet MIS Platform, and present the patterns in the flow of information, the exchange of data, and the role of each module in the overall functioning of the Smartnet MIS Platform.

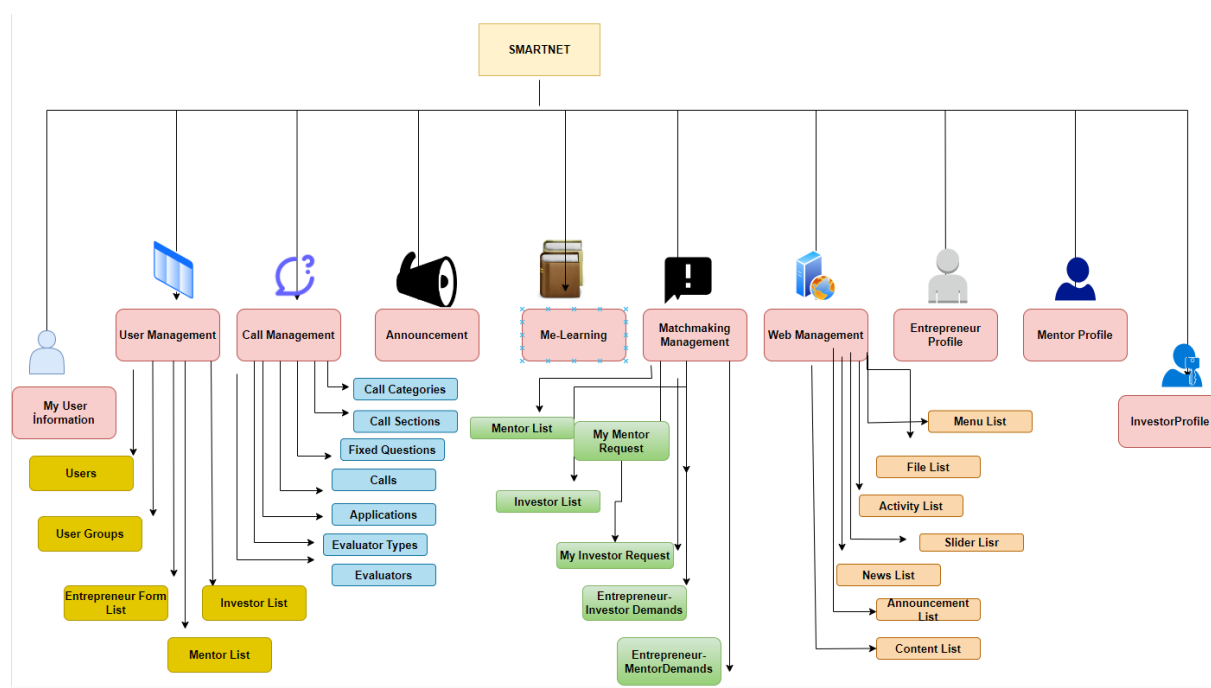


Figure 1 – General Hierarchy of SMARTNET Platform

### 4.1 Interface and Interactions between Entrepreneur Module and Mentors Module

The Entrepreneur Module and Mentors Module of the Smartnet MIS Platform have interconnected user interfaces and interactions to facilitate effective communication and collaboration between entrepreneurs and mentors. These modules provide a seamless platform for entrepreneurs to seek guidance and support from experienced mentors in their respective fields.

#### User Interface:

The Entrepreneur Module presents entrepreneurs with a user-friendly interface where they can access various features and functionalities. They can view their profile information, update their personal

details, and explore available mentors within the Mentors Module. The Entrepreneur Module provides a search feature to find mentors based on specific criteria such as industry, expertise, or availability. Entrepreneurs can initiate contact requests to mentors and engage in communication through a messaging system.

#### **Data Structures:**

The Entrepreneur Module utilizes data structures to store and manage information related to entrepreneurs and their interactions with mentors. This includes the entrepreneur's profile data, venture information, contact requests sent to mentors, and communication history. The Mentors Module also maintains a database of registered mentors, their profiles, and their availability for mentorship.

#### **Interaction: Contact Requests and Reviews:**

Entrepreneurs can browse through the mentor profiles in the Mentors Module and send contact requests to mentors they find suitable. The contact request feature allows entrepreneurs to provide a brief introduction and explain their specific needs or areas where they seek mentorship. Mentors receive these contact requests and have the option to accept or reject them. Upon acceptance, mentors can engage in communication with entrepreneurs and provide guidance and support.

As entrepreneurs receive mentorship from selected mentors, they have the opportunity to review and rate the mentors' performances. This feedback loop is crucial for evaluating mentor effectiveness and improving the overall mentorship experience. Entrepreneurs can submit their reviews and ratings through the Entrepreneur Module, providing valuable insights for both the mentors and the platform administrators.

#### **Notifications and Updates:**

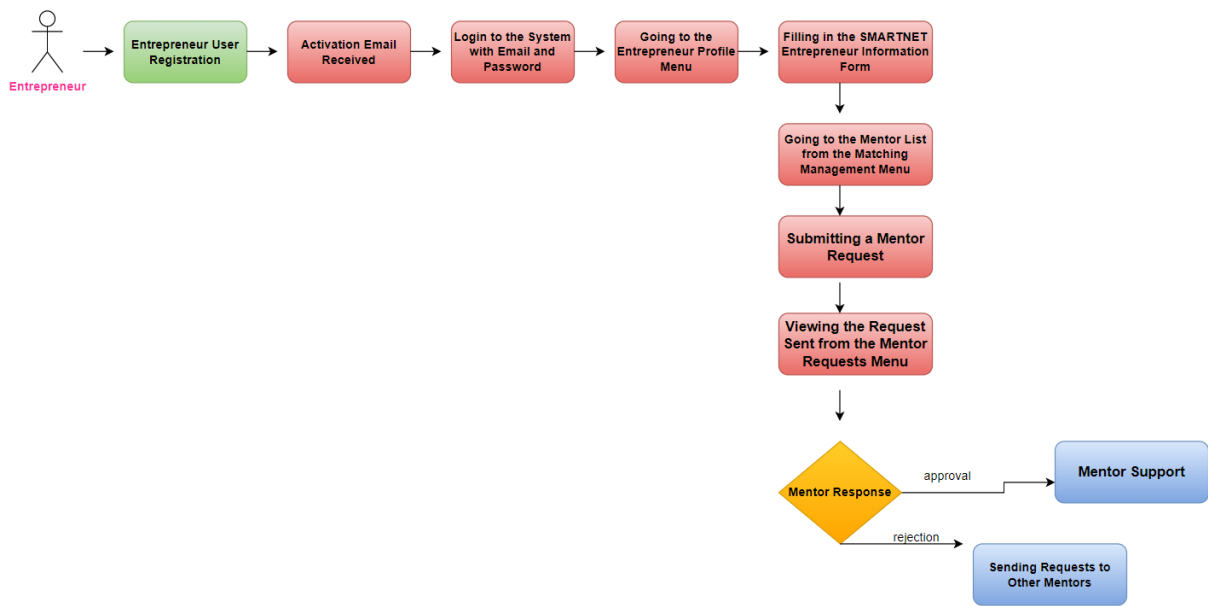
The Entrepreneur Module keeps entrepreneurs informed about the status of their contact requests and any updates from mentors. Notifications are displayed within the module's user interface to ensure entrepreneurs stay updated on the progress of their mentorship engagements. These notifications can include messages from mentors, schedule changes, or other relevant information.

#### **Profile Management:**

Both the Entrepreneur Module and Mentors Module allow users to manage their respective profiles. Entrepreneurs can update their personal information, venture information, skills, and business details to present an accurate and up-to-date representation of themselves. Similarly, mentors can edit their profiles to reflect their expertise, availability, and preferred mentoring approach. These profile management features ensure that entrepreneurs and mentors have relevant and accurate information available to facilitate successful mentorship connections.

The user interface, data structures, and interactions between the Entrepreneur Module and Mentors Module of the Smartnet MIS Platform are designed to create a seamless experience for entrepreneurs seeking mentorship. Through effective communication channels, profile management, contact requests, and review mechanisms, the platform enables entrepreneurs to connect with experienced mentors, fostering a supportive and productive environment for entrepreneurial growth and development.

**Interaction Workflow:**



*Figure 2 – Entrepreneur – Mentor Interactions Workflow*

**4.2 Interface and Interactions between Entrepreneur Module and Investors Module**

The Entrepreneur Module and Investors Module of the Smartnet MIS Platform have interconnected user interfaces and interactions to facilitate the engagement and collaboration between entrepreneurs and potential investors. These modules provide a platform for entrepreneurs to connect with investors who are interested in funding innovative business ideas.

**User Interface:**

The Entrepreneur Module provides entrepreneurs with a user-friendly interface to access various features and functionalities. Entrepreneurs can view their profile information, update their business details, and explore potential investors within the Investors Module. The user interface allows entrepreneurs to search for investors based on specific criteria such as investment focus, sector preferences, or previous investment history. They can also view investor profiles to learn more about their investment preferences and expertise.

**Data Structures:**

The Entrepreneur Module utilizes data structures to store and manage information related to entrepreneurs and their interactions with investors. This includes the entrepreneur’s business information, investment requirements, and funding requests made to investors. The Investors Module maintains a database of registered investors, their investment preferences, and previous investment records. These data structures facilitate efficient matching and communication between entrepreneurs and investors.

**Interaction: Funding Requests and Communication:**

Entrepreneurs can submit funding requests to potential investors through the Entrepreneur Module. They can provide a comprehensive overview of their business idea, funding requirements, and expected outcomes. Investors receive these funding requests and have the option to review them and decide

whether to proceed with further discussions. If investors are interested, they can initiate communication with entrepreneurs through a messaging system within the platform.

**Investor Profiles and Due Diligence:**

Investors can view the profiles of entrepreneurs who have submitted funding requests and evaluate the viability of their business ideas. They can assess factors such as market potential, business plans, and growth prospects. Investors may conduct due diligence on the entrepreneurs’ businesses, which may involve requesting additional information, financial projections, or conducting interviews. The Investors Module allows investors to track their interactions, document their evaluations, and make informed decisions about potential investments.

**Notifications and Updates:**

The Entrepreneur Module provides entrepreneurs with notifications and updates regarding the status of their funding requests. They are notified when investors express interest, request additional information, or make decisions regarding potential funding. These notifications keep entrepreneurs informed and allow them to track the progress of their funding requests. Similarly, investors receive notifications about new funding requests and can take appropriate actions based on their investment criteria.

The user interface, data structures, and interactions between the Entrepreneur Module and Investors Module of the SmartnetMIS Platform aim to facilitate efficient and transparent communication between entrepreneurs and investors. Through the platform, entrepreneurs can showcase their business ideas, while investors can explore potential investment opportunities. The ability to search for investors, submit funding requests, and engage in communication enhances the chances of successful collaborations and funding for entrepreneurs fostering a dynamic and supportive environment for entrepreneurs to connect with potential investors and secure the necessary funding for their ventures.

**Interaction Workflow:**

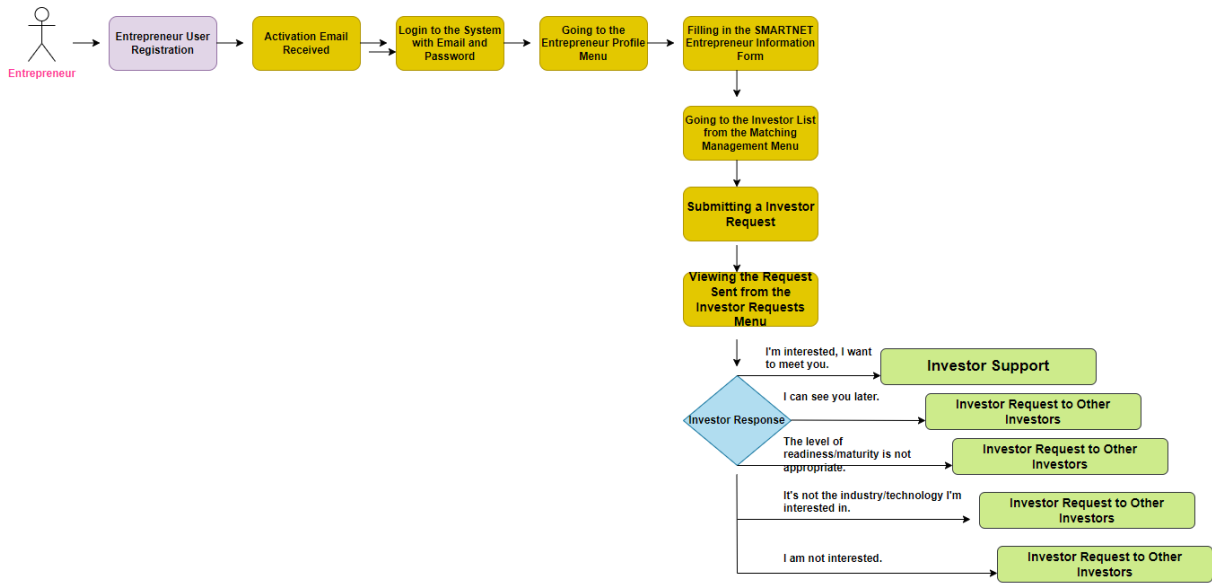


Figure 3 – Entrepreneur – Investor Interactions Workflow

### 4.3 Interface and Interactions between Entrepreneur Module and System Management/Administrative Module

The Entrepreneur Module and System Management/Administrative Module of the Smartnet MIS Platform have interconnected user interfaces and interactions that allow efficient management and administration of the platform. These modules provide administrators and system managers with the necessary tools to oversee and maintain the platform, while entrepreneurs benefit from the administrative functionalities provided. Here is a detailed description of the user interface, data structures, and interactions between these modules:

#### **User Interface:**

The Entrepreneur Module offers entrepreneurs a user-friendly interface to access various features and functionalities. Entrepreneurs can view and update their profiles, submit funding requests, and interact with mentors and potential investors. The user interface provides a clear and intuitive design that allows entrepreneurs to navigate through different sections and access relevant information easily.

#### **Data Structures:**

The Entrepreneur Module utilizes data structures to store and manage information related to entrepreneurs and their activities. This includes entrepreneur profiles, funding requests, communication history with mentors and investors, and other relevant data. The System Management/Administrative Module maintains data structures for user management, role permissions, and platform configurations. These data structures enable efficient data organization, retrieval, and analysis for administrators and system managers.

#### **Interactions: User and Role Management:**

The System Management/Administrative Module provides administrators and system managers with the ability to manage users and roles within the platform. They can create and modify user accounts, assign roles and permissions, and monitor user activities. Entrepreneurs interact with the System Management/Administrative Module when they request user account creation or require assistance with their accounts. The module allows administrators to review and process these requests efficiently.

#### **Configuration and Maintenance:**

The System Management/Administrative Module facilitates the configuration and maintenance of the Smartnet MIS Platform. Administrators can access configuration settings related to platform functionality, user roles, and system parameters. They can customize the platform based on specific requirements, manage platform updates and patches, and monitor system health. Entrepreneurs benefit indirectly from these interactions as administrators ensure the platform's stability, security, and overall performance.

#### **Support and Issue Tracking:**

Entrepreneurs can interact with the System Management/Administrative Module when they encounter technical issues or require support. The module provides a mechanism for entrepreneurs to report problems, submit support tickets, or seek assistance from the support team. Administrators can track and manage these support requests, ensuring timely resolution and providing a seamless user experience.

The user interface, data structures, and interactions between the Entrepreneur Module and System Management/Administrative Module of the Smartnet MIS Platform aim to facilitate effective



management and administration of the platform. The user interface in the Entrepreneur Module offers entrepreneurs a smooth and user-friendly experience, allowing them to focus on their business activities. The data structures enable efficient data management and retrieval, supporting administrators and system managers in their tasks. Interactions related to user and role management, platform configuration, and support ensure a well-maintained and supported platform for entrepreneurs to thrive in.

#### 4.4 Interface and Interactions between Mentor Management Module and System Management/Administrative Module

The Mentor Management Module and System Management/Administrative Module of the Smartnet MIS Platform have interconnected user interfaces and interactions that enable efficient management and administration of the platform. These modules provide administrators and system managers with the necessary tools to oversee and maintain the platform's mentor-related activities, while also providing mentors with a seamless user experience.

##### **User Interface:**

The Mentor Management Module offers mentors a user-friendly interface to access various features and functionalities. Mentors can register, log in, and update their profiles, view and accept contact requests from entrepreneurs, and access the e-learning portal. The user interface provides a clear and intuitive design that allows mentors to navigate through different sections and access relevant information easily.

##### **Data Structures:**

The Mentor Management Module utilizes data structures to store and manage mentor-related information. This includes mentor profiles, contact requests from entrepreneurs, mentor-entrepreneur interactions and reviews, and other relevant data. The System Management/Administrative Module maintains data structures for mentor management, including mentor registration, authentication, and performance evaluation. These data structures enable efficient data organization, retrieval, and analysis for administrators and system managers.

##### **Interactions: Mentor Management and Evaluation:**

The System Management/Administrative Module provides administrators and system managers with the ability to manage mentors' profiles, registrations, and evaluations. They can review and approve mentor registrations, enable/disable mentor accounts, and evaluate mentor performance. The Mentor Management Module interacts with the System Management/Administrative Module when mentors request profile updates, require assistance with their accounts, or when administrators need to review and assess mentors' profiles and performance.

##### **User and Role Management:**

The System Management/Administrative Module enables administrators and system managers to manage mentor accounts and roles within the platform. They can create and modify mentor accounts, assign roles and permissions, and monitor mentor activities. The Mentor Management Module interacts with the System Management/Administrative Module when mentors request account-related changes, access system-wide announcements and messaging, or require assistance with their accounts. The module allows administrators to efficiently handle these requests.

### System Configuration and Maintenance:

The System Management/Administrative Module facilitates the configuration and maintenance of the Smartnet MIS Platform. Administrators can access configuration settings related to mentor management, user roles, and system parameters. They can customize the platform based on specific requirements, manage platform updates and patches, and monitor system health. The Mentor Management Module benefits indirectly from these interactions as administrators ensure the stability, security, and overall performance of the platform.

The user interface, data structures, and interactions between the Mentor Management Module and System Management/Administrative Module of the Smartnet MIS Platform aim to streamline mentor management and administrative tasks. The user interface in the Mentor Management Module provides mentors with a seamless experience, allowing them to focus on their mentoring activities. The data structures enable efficient storage and retrieval of mentor-related information, supporting administrators and system managers in their tasks. Interactions related to mentor registration, profile updates, performance evaluation, and administrative support ensure a well-managed and supported platform for mentors and contribute to the success of the Smartnet MIS Platform.

### Interaction Workflow:

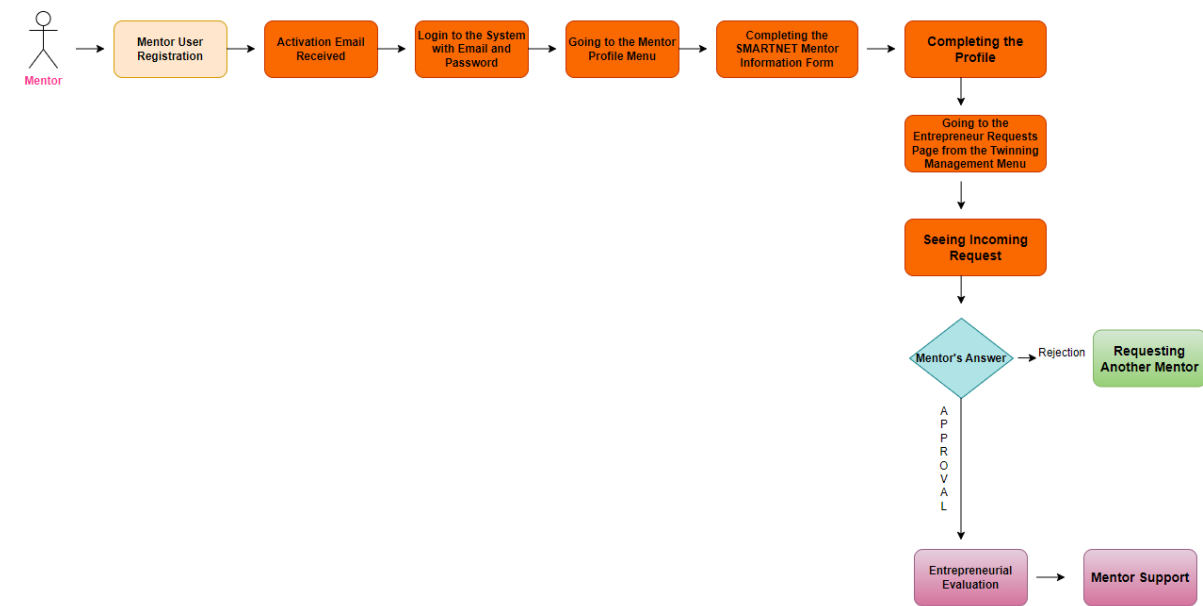


Figure 4 – Mentor Workflow

### 4.5 Interface and Interactions between Investors Management Module and the System Management/Administrative Module

The Investors Management Module and the System Management/Administrative Module of the Smartnet MIS Platform work together to facilitate efficient management and administration of investors on the platform. These modules provide administrators and system managers with the necessary tools to oversee and maintain investor-related activities, while also offering investors a seamless user experience.

**User Interface:**

The Investors Management Module offers investors a user-friendly interface to access various features and functionalities. Investors can register, log in, update their profiles, view and connect with entrepreneurs, and explore funding opportunities. The user interface is designed to be intuitive and easy to navigate, providing investors with a smooth experience while interacting with the platform.

**Data Structures:**

The Investors Management Module utilizes data structures to store and manage investor-related information. This includes investor profiles, investment preferences, previous investments, and contact history with entrepreneurs. The System Management/Administrative Module maintains data structures for investor management, including sending investor invitations, authentication, and account status. These data structures enable efficient data organization, retrieval, and analysis for administrators and system managers.

**Interactions: Investor Management and Evaluation:**

The System Management/Administrative Module allows administrators and system managers to manage investor accounts and evaluate their profiles. They can create and invite new investor accounts, enable/disable existing investor accounts, and assess investor preferences and activities. The Investors Management Module interacts with the System Management/Administrative Module when investors request profile updates or seek assistance with their accounts.

**User and Role Management:**

The System Management/Administrative Module provides administrators and system managers with the ability to manage investor accounts and roles within the platform. They can create and modify investor accounts, assign roles and permissions, and monitor investor activities. The Investors Management Module interacts with the System Management/Administrative Module when investors request account-related changes, access system-wide announcements and messaging, or require administrative support. The module allows administrators to efficiently handle these requests.

**System Configuration and Maintenance:**

The System Management/Administrative Module enables administrators and system managers to configure and maintain the Smartnet MIS Platform. They can access configuration settings related to investor management, user roles, and system parameters. Administrators can customize the platform based on specific requirements, manage platform updates and patches, and monitor system performance. The Investors Management Module benefits indirectly from these interactions as administrators ensure the stability, security, and overall effectiveness of the platform.

The user interface, data structures, and interactions between the Investors Management Module and the System Management/Administrative Module of the Smartnet MIS Platform are designed to streamline investor management and administrative tasks. The user interface in the Investors Management Module provides investors with a seamless experience, enabling them to explore and connect with entrepreneurs effectively. The data structures facilitate efficient storage and retrieval of investor-related information, supporting administrators and system managers in their tasks. Interactions related to investor registration, profile updates, performance evaluation, and administrative support ensure a well-managed and supported platform for investors, contributing to the success of the Smartnet MIS Platform.

## Interaction Workflow:

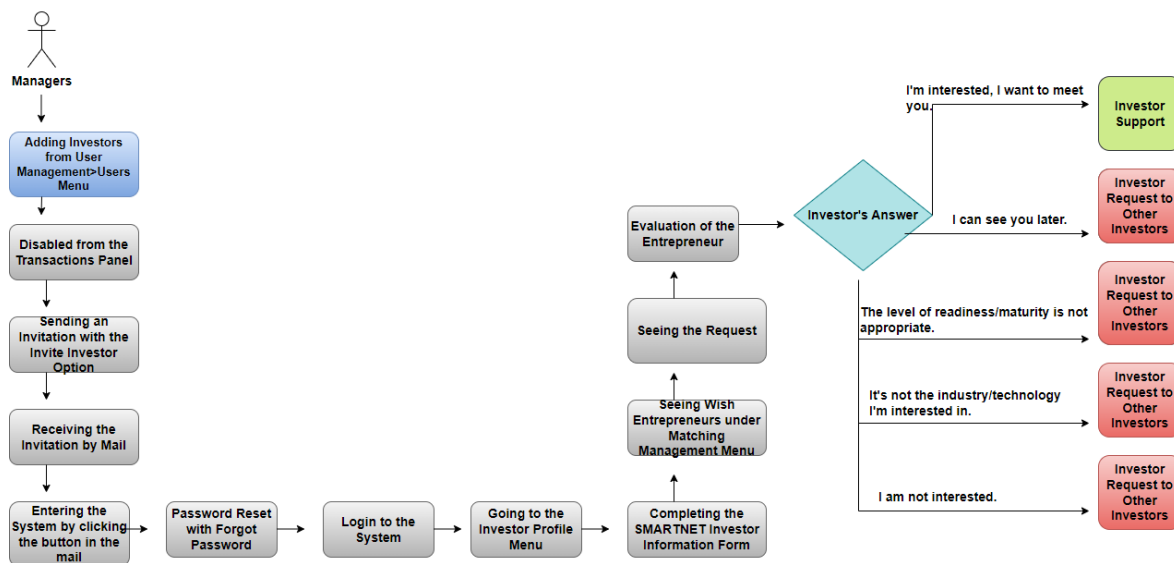


Figure 4 – Investor Workflow

## 4.6 Interface and Interactions between Intellectual Property Rights (IPR) Module and the System Management/Administrative Module

The Intellectual Property Rights (IPR) Module and the System Management/Administrative Module of the Smartnet MIS Platform work together to manage intellectual property data and provide administrative functions. These modules feature user interfaces, data structures, and interactions that support the management and administration of intellectual property rights.

### User Interface:

The IPR Module provides users with a user-friendly interface to manage intellectual property rights. Users can access their institution's profile, view and add best practices, and manage their IP portfolio. The user interface is designed to be intuitive, allowing users to easily navigate through the module and perform necessary tasks. The System Management/Administrative Module provides administrators with a separate user interface to manage the overall system, including definition of organisations/institutions for IPR Module, IPR user roles, authorizations, and system settings.

### Data Structures:

The IPR Module utilizes data structures to store and manage intellectual property data. This includes information about patents, designs, brands, and other IP assets. The module maintains data structures for portfolio items, including details such as IP registration numbers, descriptions, dates, and related documents. The System Management/Administrative Module manages data structures for user profiles, institutions, authorizations, and system configurations. These data structures enable efficient storage, retrieval, and management of intellectual property data and system-related information.

### IP Portfolio Management:

The IPR Module allows users to manage their IP portfolio within the platform. Users can add, view, and edit their portfolio items, including patents, designs, and brands. They can track the status, expiration dates, and other relevant information associated with each IP asset. The System

Management/Administrative Module provides administrators with the ability to view and manage IP portfolios across different institutions, ensuring proper oversight and control.

**Best Practice Sharing:**

The IPR Module enables users to share best practices within the platform. Users can add and view best practices that are relevant to their institution or industry. They can provide descriptions, guidelines, and supporting documents to facilitate knowledge sharing. The System Management/Administrative Module allows administrators to monitor and manage the best practices shared within the platform, ensuring their relevance and quality.

**System Administration and User Management:**

The System Management/Administrative Module allows administrators to manage the overall system and user accounts. Administrators can create and manage user roles, assign authorizations, and control access to different modules and functionalities. They can also configure system settings, including data privacy policies, integration services, and API access. The IPR Module interacts with the System Management/Administrative Module to enforce user roles, IPR user – IPR Module beneficiary institution grouping as well as permissions, and access rights within the IPR Module.

In summary, the user interface, data structures, and interactions between the Intellectual Property Rights (IPR) Module and the System Management/Administrative Module of the Smartnet MIS Platform provide a comprehensive solution for managing intellectual property data and administering the system. The user interface in the IPR Module allows users to manage their IP portfolio and share best practices. Data structures support the storage and retrieval of intellectual property information, ensuring efficient management and organization. Interactions between the modules enable system administration, user management, and control over the platform's functionality and settings. These features contribute to the overall effectiveness of the Smartnet MIS Platform in handling intellectual property rights and providing administrative oversight.

### Interaction Workflow:

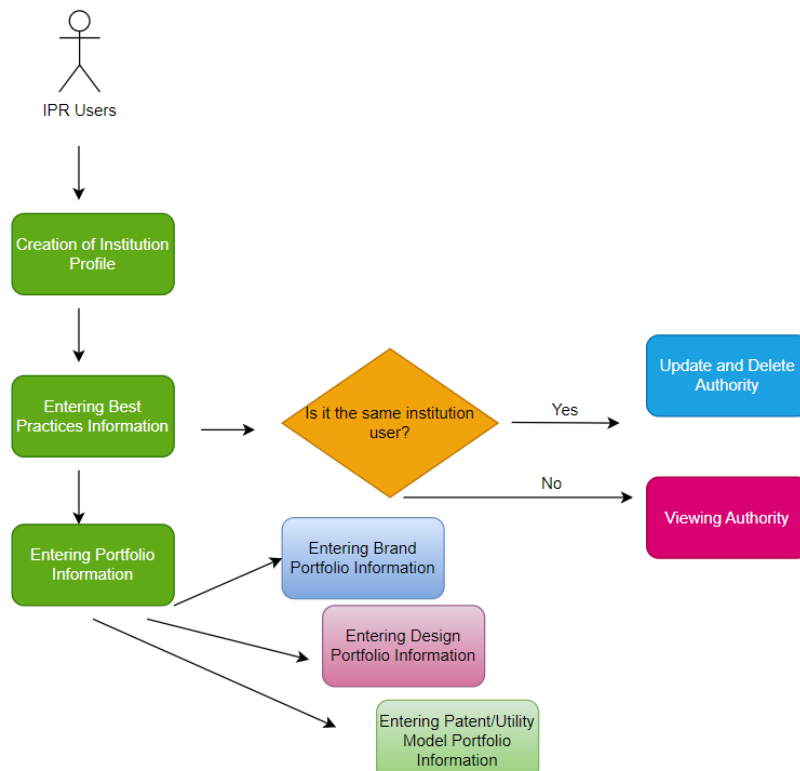


Figure 5 – IPR Module Users Workflow

## 4.7 Interface and Interactions between Entrepreneur, Mentors, and Investors Modules with the Artificial Intelligence and Decision Support (AI&DS) Module

The Entrepreneur, Mentors, and Investors Modules of the Smartnet MIS Platform interact with the Artificial Intelligence and Decision Support (AI&DS) Module to provide valuable insights and data-driven decision support to the stakeholders. These modules, along with the AI&DS Module, feature user interfaces, data structures, and interactions that facilitate the exchange of information and enable intelligent decision-making.

### User Interface:

The Entrepreneur, Mentors, and Investors Modules provide user-friendly interfaces for entrepreneurs, mentors, and investors, respectively, to interact with the platform. These interfaces allow users to access their profiles, view relevant information, and engage in various activities. The AI&DS Module may have a separate interface accessible to authorized stakeholders, such as administrators or decision-makers, to access insights, recommendations, and data analytics derived from the system.

### Data Structures:

The data structures within the Entrepreneur, Mentors, and Investors Modules capture information about entrepreneurs, mentors, and investors, respectively. These data structures include fields such as personal details, areas of expertise, investment preferences, previous experience, and project information. The AI&DS Module utilizes data structures to store and process the collected data, applying machine learning algorithms and analytical techniques to generate insights and recommendations. The

data structures within the AI&DS Module may include models, algorithms, and datasets used for decision support.

**Data Interactions:**

The Entrepreneur, Mentors, and Investors Modules interact with the AI&DS Module by exchanging relevant data for analysis and decision-making. Data collected within the Entrepreneur Module, such as project details, business plans, and entrepreneur profiles, are shared with the AI&DS Module for processing. Similarly, the Mentors and Investors Modules provide data on mentor expertise, investment preferences, and previous investments to the AI&DS Module. The AI&DS Module analyzes this data, applies machine learning techniques, and generates decision proposals, eligibility percentages, and other valuable insights to support stakeholders with potential matches as well as identifying high-quality business ideas with high potential for commercialization.

**Intelligent Decision Support:**

The AI&DS Module acts as the core component for providing intelligent decision support to stakeholders. It processes the data collected from the Entrepreneur, Mentors, and Investors Modules, applies machine learning algorithms, and generates recommendations and insights based on predefined criteria and patterns. These recommendations may include potential matches between entrepreneurs and investors, suggested mentors for specific projects, or eligibility scores for business ideas. The recommendations are then presented within the user interfaces of the respective modules, allowing stakeholders to make informed decisions.

**Iterative Learning and Improvement:**

The AI&DS Module continuously learns and improves its decision-making capabilities by analyzing the outcomes of previous decisions. It captures feedback and performance metrics from the Entrepreneur, Mentors, and Investors Modules, tracking the success rates of matches, investment outcomes, and mentor-entrepreneur relationships. This iterative learning process allows the AI&DS Module to refine its algorithms and improve the accuracy of its recommendations over time, enhancing the overall effectiveness of the Smartnet MIS Platform in facilitating successful collaborations and commercialization opportunities.

In summary, the user interface, data structures, and interactions between the Entrepreneur, Mentors, and Investors Modules with the Artificial Intelligence and Decision Support (AI&DS) Module of the Smartnet MIS Platform enable data-driven decision support and intelligent matching. The user interfaces provide stakeholders with access to their profiles, information, and relevant recommendations. The data structures capture information about entrepreneurs, mentors, and investors, which is then processed by the AI&DS Module to generate insights and recommendations. The interactions between the modules involve the exchange of data for analysis and decision-making, while the AI&DS Module continuously learns and improves its performance based on the outcomes of previous decisions. This integrated approach enhances the effectiveness of the Smartnet MIS Platform in supporting stakeholders and promoting successful collaborations and commercialization.

## 5. CONCLUSION

The completion of this Software Design Document marks a significant milestone in the development of the Smartnet MIS Platform. Through careful analysis and detailed design, the Contractor has outlined the key modules of the platform, their functionalities, and the user interfaces, data structures, and interactions that drive their seamless integration. The **Smartnet MIS Platform** is poised to revolutionize the commercialization acceleration process, bringing together entrepreneurs, mentors, investors, and administrators in a collaborative ecosystem.

The Entrepreneur Module serves as the entry point for entrepreneurs, enabling them to showcase their ideas, connect with mentors, and attract potential investors. The Mentors Module provides a platform for mentors to register, manage their profiles, and engage with entrepreneurs through mentoring and feedback. The Investors Module empowers investors to explore investment opportunities, evaluate entrepreneurs, and facilitate funding. The IPR Module allows project partners and beneficiary to manage their IP portfolio and share best practices within the platform. The System Management/Administrative Module ensures efficient administration, user management, and authorization control for the entire platform.

The user interface designs of the Smartnet MIS Platform prioritize usability, accessibility, and a seamless user experience. Intuitive navigation, clear information presentation, and interactive features enhance user engagement and streamline interactions. The data structures within the platform are carefully designed to capture and organize relevant information, enabling efficient data management, analysis, and reporting. The interactions between modules facilitate the flow of information, collaboration, and decision-making, ensuring that stakeholders can effectively leverage the platform's capabilities.

By providing a comprehensive overview of the platform's modules and their interactions, this Software Design Document lays the foundation for the successful development, implementation, and deployment of the Smartnet MIS Platform. It serves as a roadmap for the development team, guiding them in the construction of robust software components that align with the envisioned functionalities and goals of the **Smartnet Project**, bringing power of technology in facilitating entrepreneurship, mentorship, and investment by creating an environment where ideas flourish, connections are made, and commercialization becomes a reality.



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