

# **Software Requirements Specification**

## **for Consortia Management System**

**Version 1.0**

**Prepared by**

**Narjes Alsaad 202162050**

**Renad Alqahtani 202169930**

**Sara Alsaleem 202175390**

**Sadeem Alotaibi 202170990**

**Wala Aljobran 202154190**

# Table of Contents

1. Introduction:	3
1.1. Objective of this Document:	3
1.2. Glossary:	3
1.3. References:	3
2. Domaine Description:	4
3. Overall Description:	5
3.1. Stakeholders and Their Goals:	5
3.2. System Scope:	7
3.2.1 Dependencies and Anticipated Interactions:	7
3.3. Main User Stories:	8
3.3.1. Negative User Story:	12
3.4. Preliminary Requirements:	13
3.4.1 Requirements:	13
3.4.2 Attributes and Traceability:	17
3.4.3 Verification:	20
3.5. Risks:	24
4. Interface prototypes:	25
4.1. Login interface:	25
4.2. Homepage interface:	26
4.3. Dashboard interface:	27
4.4. submit proposal interface:	28
4.5. Project Evaluation:	29
4.6 Proposal Evaluation:	30
5. Requirements Validation:	31
6. Description of group and roles:	<b>33</b>

# 1. Introduction:

## 1.1. Objective of this Document:

The objective of this Software Requirements Specification (SRS) document is to outline the requirements for developing a Consortia Management System (IPMS) tailored to meet the needs of industry partnerships at KFUPM. This document will define the essential features and functionalities necessary to effectively manage consortiums, outline the scope and dependencies of the system, and provide user stories that guide development efforts. The aim of this document is to provide an in-depth analysis of the complete Consortia Management System, ensuring that the final product effectively manages industry partnerships and R&D consortia, addressing existing communication, document management, and tracking challenges.

## 1.2. Glossary:

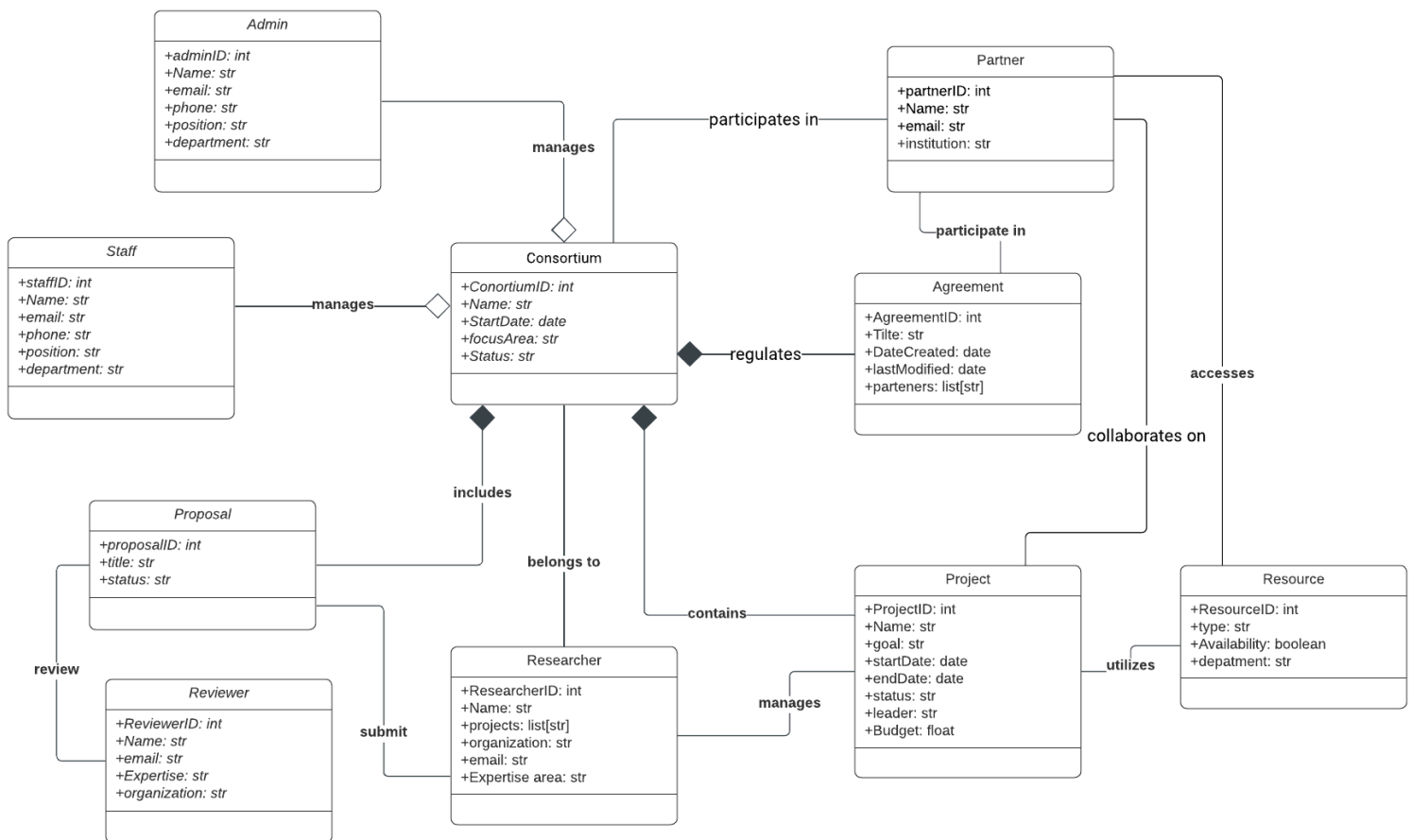
- **IPMS: Consortia Management System**
- **KFUPM: King Fahd University of Petroleum and Minerals**
- **R&D: Research and Development**
- **UML: Unified Modeling Language**

## 1.3. References:

- [1] ISO/IEEE/IEC 29148:2018
- [2] [A guide to Effective Collaboration and Learning in Consortia](#)
- [3] [King Fahd University of Petroleum & Minerals](#)

## 2. Domaine Description:

In the following UML class diagram, we will provide an overview of the Consortia Management System's key entities, relationships, and attributes.



### **3. Overall Description:**

#### **3.1. Stakeholders and Their Goals:**

Understanding the objectives of stakeholders is crucial in the development process to ensure that the system meets their needs and promotes successful consortium operations. Below are some stakeholders and their goals:

##### **1- Researchers:**

**G01:** Easy access to consortium resources, including documents, guidelines, and communication channels.

**G02:** Foster collaboration with other researchers and partners within the consortium.

**G03:** Effortless submission of consortium proposals with clear guidelines and requirements.

**G04:** Maintain a track of proposals' progress and receive timely updates.

##### **2- Contract and legal teams:**

**G05:** Efficient review and approval processes for agreements and research Proposals.

##### **3- End users:**

**G06:** Continuous availability and reliability of the system for all users.

**G07:** Experience a user-friendly interface and efficient task completion within the system.

**G08:** Simple and secure user authentication processes.

**G09:** Facilitate Data Accessibility and Interoperability.

**G10:** Easily update and maintain personal profiles within the system.

##### **4- KFUPM:**

**G11:** Smooth operations and continuous support for industry partnerships and research consortiums.

**G12:** Attract and retain stakeholders, including universities, government entities, and companies, to participate actively in consortia programs.

##### **5- Consortia Partners (Companies , Universities, Government Entities):**

**G13:** Effective management of consortium agreement renewals.

**G14:** Enhanced collaboration with industry and government partners.

## **6- Consortium administrators:**

**G15:** Active monitoring of the progress and performance of consortium projects.

**G16:** Enhance Project Management Efficiency and Team Collaboration.

**G17:** Keep consortium members informed about consortium updates, deadlines, and changes.

**G18:** Ensure efficient management of consortium agreements and proposals.

**G19:** Streamline notification and announcement processes.

**G20:** Enhance Collaboration and Feedback Mechanisms within the Consortium.

**G21:** Ensure Controlled and Secure User Access within the Consortium.

## **7- System Developers:**

**G22:** Maintain system security and compliance, and ensure accurate permissions for users.

**G23:** Maintain a reliable and robust system with minimal downtime.

**G24:** Ensure the system can scale to accommodate increasing numbers of users and projects without performance degradation.

## **8- Financial Department:**

**G25:** Ensure Effective Financial Management and Transparency.

**G26:** Ensure efficient data exchange for budget information.

## **3.2 System Scope:**

The Consortia Management System consists of several functionalities that facilitate the effective management of KFUPM's research consortia. As part of its scope, the system streamlines the creation, review, and management of agreements and facilitates submissions, evaluations, and selection of proposals for research. In addition to tracking consortium progress, status, and outcomes, the system provides reporting and analytics tools that allow for insights into collaboration effectiveness, resource utilization, and research outcomes. The system also facilitates communication and collaboration among consortium members, researchers, and stakeholders. However, legal advice on partnership agreements, such as understanding legal terms, complying with regulations, and protecting intellectual property, is outside the scope of the Consortium Management System. Also, the system does not handle financial transactions or accounting processes related to budget management, which are handled by separate financial systems. Furthermore, the system is not designed to manage the operational aspects of research projects, as it primarily facilitates administrative and collaborative aspects of research consortia, such as the management of agreements and proposals, and the tracking of the overall progress and outcome of the projects.

### **3.2.1 Dependencies and Anticipated Interactions:**

- The system needs to be integrated with KFUPM's current login system to handle authentication to ensure secure access to the Consortia Management System and streamline user authentication processes.
- The system needs to be integrated with email systems to automate the sending of notifications, receive responses, and track communication history within the system.
- The system needs to be integrated with financial systems for managing funding, budgeting, and financial reporting related to consortium activities, by exchanging data about funding information, update budget allocations, and financial transactions.
- The system needs to be integrated with the PURE system to facilitate the exchange of research project information, such as project details, duration, outcomes, and any other relevant data necessary for effective management of consortium activities and reporting.

### 3.3. Main User Stories:

User stories define key features and interactions of the consortium management system, guiding its development. Each user story explains how users use the system to fulfill their objectives, ensuring a tailored and intuitive experience. The following are some of the user stories:

ID	User Story Description
US01	As a project manager, I want to track the progress of projects, in order to monitor the time and budget spent on each project.
US02	As a reviewer, I want to evaluate research proposals, in order to select the most promising ones for funding and support.
US03	As a researcher, I want to submit research proposals, in order to consider my projects for funding and collaboration opportunities.
US04	As an administrator, I want to manage consortia agreements with all participating partners, in order to streamline communication and foster productive relationships throughout the project duration.
US05	As an administrator, I want to post calls for proposals, in order to gather submissions addressing targeted research areas.
US06	As a project manager, I want to receive timely notifications about any updates or changes to project deadlines, in order to efficiently manage my team's workload and ensure timely project delivery.
US07	As an administrator, I want to monitor the progress and key metrics of all consortium agreements, in order to make informed decisions.



<b>US08</b>	As an administrator, I want to be able to assign different permission levels to consortium members based on their roles, in order to ensure appropriate access and security.
<b>US09</b>	As a reviewer, I want to be able to provide feedback and rate proposals directly within the system, in order to facilitate the decision-making process.
<b>US10</b>	As an administrator, I want to add new users to the system, in order to facilitate collaboration and expand the consortium's network of participants.
<b>US11</b>	As a researcher, I want to access specialized resources for my research projects, in order to enhance the quality and scope of my research and accelerate innovation within the consortium.
<b>US12</b>	As a consortium member, I want to communicate with other users within the platform, in order to collaborate effectively without relying on external email.
<b>US13</b>	As an administrator, I want to control the timing parameters for sending notifications, in order to enhance user experience by delivering messages at optimal times.
<b>US14</b>	As a user, I want the system to recover from faults and return to normal operation in a short period of time, in order to minimize interruptions to my work.
<b>US15</b>	As an administrator, I want to track and record the time spent by each party during the agreement review, in order to monitor progress and improve workflow efficiency.
<b>US16</b>	As a system administrator, I want the system to be able to handle multiple transactions during peak loads, in order to maintain performance stability and ensure uninterrupted service for users.

<b>US17</b>	As a person who has an account in KFUPM systems, I want the system to) integrate with KFUPM's login system, in order to streamline access using my existing credentials
<b>US18</b>	As a project manager, I want to track the allocation and remaining budget for each project, in order to manage financial resources effectively.
<b>US19</b>	As a partner, I want to approve partnership agreements through the system, in order to streamline the approval process and foster efficient decision-making.
<b>US20</b>	As an administrator, I want version tracking for agreements and proposals, in order to monitor changes and ensure accountability in the negotiation process.
<b>US21</b>	As an administrator, I want the system to pass annual security assessments, in order to keep sensitive data secure and maintain user and partner trust.
<b>US22</b>	As a user, I want a secure login process with password verification, in order to ensure the security of my account and data.
<b>US23</b>	As a user, I want the system available whenever I need it, in order to maintain productivity and accomplish my tasks.
<b>US24</b>	As a new user, I want to complete my tasks as quickly as possible, in order to achieve my objectives more quickly and efficiently,
<b>US25</b>	As an administrator, I want to approve the registration of external users, in order to control access to the system and ensure security

<b>US26</b>	As an administrator, I want to send memos or messages notifying recipients of their awarded status, in order to ensure timely communication of outcomes and foster positive engagement.
<b>US27</b>	As a user, I want to export data in various formats (e.g., CSV, PDF), in order to share it with colleagues, and create reports efficiently.
<b>US28</b>	As a partner, I want to receive reminders for agreement renewals, in order to avoid missing important deadlines.
<b>US29</b>	As a project manager, I want access to project-related information, in order to manage and monitor the project effectively.
<b>US30</b>	As a developer, I want a high level of unit testing, in order to ensure the reliability of the software, catch bugs early in the development process, and facilitate easier maintenance.
<b>US31</b>	As an administrator, I want to send invitations to potential partners, in order to expand our network and foster collaboration opportunities
<b>US32</b>	As an administrator, I want the system to keep a record of negotiation history, in order to reference past communications and decisions.
<b>US33</b>	As a project manager, I want to assign specific responsibilities to team members, in order to ensure efficient task distribution and project completion.
<b>US34</b>	As a user, I want the ability to edit and update my profile information, in order to ensure that my profile reflects accurate and up-to-date information about myself and my role within the consortium.

<b>US35</b>	As a financial administrator, I want the system to smoothly integrate with our department's financial systems, in order to ensure accurate financial tracking and reporting across both systems.
<b>US36</b>	As a user, I want to be able to quickly search for specific agreements, proposals, or documents within the system, in order to find relevant information quickly and streamline my workflow.
<b>US37</b>	As a researcher, I want the ability to resubmit my proposals, in order to address any deficiencies and increase my chances of getting funded.

### 3.3.1. Negative User Story:

<b>ID</b>	<b>Description</b>
<b>NUS01</b>	As a consortium administrator, I don't want the system to fail to integrate with the PURE system, in order to prevent data inconsistencies in managing research projects across platforms.
<b>NUS02</b>	As a project manager, I don't want the system to have a slow response time for loading project-related data, in order to efficiently oversee project progress and make informed decisions.
<b>NUS03</b>	As an administrator, I don't want the system to restrict the customization of proposal templates, in order to ensure flexibility in adapting to diverse project requirements and formats.

### 3.4. Preliminary Requirements:

#### 3.4.1 Requirements:

The Requirements Table provides a detailed description of each requirement, detailing the specific functionality or feature needed to implement the consortium management system. The table serves as the foundation for all analysis, verification, and traceability activities that follow.

ID	Requirement Title	Requirement
R01	User Permission Management	The consortium management system shall assign permissions to users based on their roles and responsibilities within the consortium management process, with an accuracy rate of 99% at least.
R02	Communication Facilitation	The consortium management system shall facilitate communication within the platform among users.
R03	Data Export	The consortium management system shall support the export of data in various formats.
R04	Fault Recovery	The consortium management system shall be capable of recovering from faults and returning to normal operation within a maximum of 30 seconds.
R05	Response Time	The consortium management system shall have a response time of less than 2 seconds for loading user interactions.
R06	Reporting Capabilities	The consortium management system shall provide authorized users to generate detailed reports on the status of ongoing projects and tasks completed.
R07	Review Tracking	The consortium management system shall track and record the time spent by each team/party during the agreement review, identifying when and who modified the contract.
R08	Direct Proposal Evaluation	The consortium management system shall allow reviewers to evaluate proposals directly through the system.
R09	Transaction Rate	The consortium management shall maintain a minimum transaction rate of 100 requests per second during peak loads.

<b>R10</b>	Automatic Notifications	The consortium management system shall send users automatic notifications regarding updates, deadlines, and changes within the consortium.
<b>R11</b>	Collaborative Document Editing	The consortium management system shall provide a feature for collaborative editing of documents related to consortia agreements.
<b>R12</b>	KFUPM Login System Integration	The consortium management system shall be integrated with KFUPM's login system.
<b>R13</b>	Resource Access Management	The consortium management system shall allow users to access resources.
<b>R14</b>	Budget Tracking	The consortium management system shall track the allocation and remaining budget for each project.
<b>R15</b>	Customizable Proposal Templates	The consortium management system shall allow administrators to customize proposal templates according to the specific requirements of each call for proposals.
<b>R16</b>	Agreement Approval	The consortium management system shall enable authorized users to approve partnership agreements.
<b>R17</b>	PURE Integration	The consortium management system shall integrate with the PURE system.
<b>R18</b>	Version Tracking	The consortium management system shall support version tracking of agreements and proposals.
<b>R19</b>	Comprehensive Dashboard	The consortium management system shall provide a comprehensive dashboard that displays the status of agreements.
<b>R20</b>	Add Users	The consortium management system shall provide administrators with the ability to add selected users to the system.
<b>R21</b>	Security Assessments	The consortium management system shall pass annual security assessments conducted by independent auditors with a minimum score of 95%.
<b>R22</b>	Code Coverage	The consortium management system shall maintain a codebase with a minimum code coverage of 90% for unit tests.

<b>R23</b>	System Availability	The consortium management system shall have an uptime of at least 99.9% over a year.
<b>R24</b>	Task Completion for New Users	The consortium management system shall allow new users to complete their tasks in less than 30 minutes.
<b>R25</b>	Proposal Submission	The consortium management system shall enable users to submit their proposals through the system.
<b>R26</b>	Negotiation History	The consortium management system shall keep a record of negotiation history between consortium members continuously, such as monthly or yearly.
<b>R27</b>	Award Notifications	The consortium management system shall send memos or messages to notify recipients of their awarded status.
<b>R28</b>	Notification Timing Control	The consortium management system shall allow administrators to control the timing parameters for sending notifications.
<b>R29</b>	Agreement Renewal Reminders	The consortium management system shall provide reminders for agreement renewals.
<b>R30</b>	Proposal Feedback	The consortium management system shall enable reviewers to provide feedback and ratings on research proposals.
<b>R31</b>	Access Project Information	The consortium management system shall allow project managers to have access to project-related information.
<b>R32</b>	User Authentication	The consortium management system shall provide user authentication through a secure login process, including password verification.

<b>R33</b>	Partner Invitations	The consortium management system shall send invitations to interested potential partners.
<b>R34</b>	Call for Proposals	The consortium management system shall enable administrators to create calls for proposals.
<b>R35</b>	External User Registration	The consortium management system shall require the approval of administrators to register external users.
<b>R36</b>	Task Assignments	The consortium management system shall allow project managers to assign responsibilities to team members.
<b>R37</b>	User Profile Management	The consortium management system shall allow users to edit their profiles within the system.
<b>R38</b>	Financial System Integration	The consortium management system shall integrate seamlessly with the financial department's systems.
<b>R39</b>	Search Functionality	The consortium management system shall provide search functionality that allows users to quickly locate specific agreements, proposals, or documents based on keywords or criteria.
<b>R40</b>	Proposal Resubmission	The consortium management system shall allow resubmission of proposals.

[Table1: Requirements Table]



### 3.4.2 Attributes and Traceability:

In this table, we dive into the detailed attributes of the preliminary requirements (refer to Table1: Requirements Table), while also establishing traceability to the project goals and user stories. This detailed documentation helps us gain a deeper understanding of the context and significance of each requirement, allowing us to prioritize effectively, allocate resources and align with project goals.

<b>Req. ID</b>	<b>Difficulty</b>	<b>Source</b>	<b>Importance</b>	<b>Type</b>	<b>Goal</b>	<b>User Story</b>
<b>R01</b>	Medium	Internal	Medium	Non-functional requirement (Security)	G21,G22	US08
<b>R02</b>	Low	External	High	Functional requirement	G02	US12
<b>R03</b>	Medium	Internal	Low	Functional requirement	G09	US27
<b>R04</b>	High	Internal	High	Non-functional requirement (availability)	G11	US14
<b>R05</b>	High	Internal	High	Non-functional requirement (usability)	G07	NUS02
<b>R06</b>	Medium	External	High	Functional requirement	G16	US01
<b>R07</b>	High	Internal	Medium	Functional requirement	G05	US15
<b>R08</b>	Medium	Internal	Low	Functional requirement	G18	US02
<b>R09</b>	High	Internal	Medium	Non-functional requirement (performance)	G23	US16
<b>R10</b>	Medium	External	High	Functional requirement	G17	US06
<b>R11</b>	Medium	External	High	Functional requirement	G20	US04
<b>R12</b>	Medium	External	High	Non- functional requirement (Interoperability)	G08	US17
<b>R13</b>	Low	External	High	Functional requirement	G01	US11
<b>R14</b>	Medium	Internal	High	Functional requirement	G25,G26	U18

<b>R15</b>	Medium	Internal	Medium	Functional requirement	G18	NUS03
<b>R16</b>	Medium	External	High	Functional requirement	G05	US19
<b>R17</b>	High	External	High	Non- functional requirement (Interoperability)	G16	NUS01
<b>R18</b>	Medium	Internal	Medium	Functional requirement	G04	US20
<b>R19</b>	Medium	Internal	Medium	Functional requirement	G15	US07
<b>R20</b>	Low	External	High	Functional requirement	G21	US10
<b>R21</b>	High	Internal	High	Non-functional requirement (security)	G22	US21
<b>R22</b>	High	Internal	Medium	Non-functional requirement (security)	G24	US30
<b>R23</b>	High	Internal	High	Non-functional requirement (availability)	G06, G23	US23
<b>R24</b>	Medium	Internal	Low	Non-functional requirement (usability)	G07	US24
<b>R25</b>	Medium	External	High	Functional requirement	G03	US03
<b>R26</b>	Medium	External	Medium	Functional requirement	G14	US32
<b>R27</b>	Medium	External	High	Functional requirement	G04	US26
<b>R28</b>	Medium	Internal	Low	Functional requirement	G19	US13
<b>R29</b>	Low	External	Medium	Functional requirement	G13	US28
<b>R30</b>	Medium	External	High	Functional requirement	G20	US09
<b>R31</b>	Medium	Internal	High	Functional requirement	G16	US29
<b>R32</b>	Medium	Internal	High	Functional requirement	G08	US22
<b>R33</b>	Medium	Internal	High	Functional requirement	G12	US31

<b>R34</b>	Medium	External	High	Functional requirement	G19	US05
<b>R35</b>	Medium	External	High	Functional requirement	G21	US25
<b>R36</b>	Low	Internal	Medium	Functional requirement	G16	US33
<b>R37</b>	Low	Internal	Medium	Functional requirement	G10	US34
<b>R38</b>	High	External	High	Non- functional requirement (Interoperability)	G26	US35
<b>R39</b>	Medium	Internal	Medium	Functional requirement	G09	US36
<b>R40</b>	Low	Internal	Medium	Functional requirement	G03	US37

[Table2: Attributes and Traceability Table]

We have employed Helix ALM to create a comprehensive traceability matrix for the requirements. This tool helps in tracking and managing the relationships between requirements, user stories, project goals, and other attributes. Using the following URL link and the provided username and password will allow you to navigate through the detailed traceability information on the traceability matrix.

**URL link:** <https://tryhelixalm.perforce.com/ttweb>

**Username:** D.Malak

**Password:** M12

### 3.4.3 Verification:

Verification is a crucial aspect of requirement validation, ensuring that the developed system meets the specified criteria and user expectations. In this table, we outline the verification methods and provide detailed explanations for each preliminary requirement (refer to Table1: Requirements Table). In this way, we are able to thoroughly assess and validate each requirement, reducing risks and ensuring a robust consortium management system.

Req. ID	Verification method	Explanation
R01	Inspection	Perform regular audits of user permissions and compare them to defined roles and responsibilities to identify any discrepancies.
R02	Test	Test the communication features within the platform to ensure that users can effectively communicate through the system.
R03	Test	Test the system's export functionality by exporting data in different formats such as CSV, Excel, PDF, etc.
R04	Test	Measure the time it takes for the system to recover and return to normal operation to ensure that it does not exceed the 30-second limit.
R05	Test	Measure the system's response time for loading user interactions to ensure the system responds in less than 2 sec.
R06	Demonstration	Demonstrate the functionality for generating detailed reports on project status within the system.
R07	Analysis	Analyze the system's logs to ensure that it accurately tracks and records the time spent by each party during the agreement review process.
R08	Demonstration	Demonstrate the functionality of the system to allow reviewers to access and evaluate proposals directly within the platform.
R09	Test	Test under peak load conditions to verify that the system can handle a transaction rate of at least 100 requests per second.

<b>R10</b>	Test	Test the notifications under different scenarios, such as different types of updates and changes and network conditions.
<b>R11</b>	Demonstration	Demonstrate the collaborative editing feature within the system by inviting multiple users to edit an agreement in parallel.
<b>R12</b>	Analysis	Analyze the integration implementation to ensure that it securely handles user authentication data and complies with KFUPM's security standards.
<b>R13</b>	Demonstration	Demonstrate how users can access resources within the consortium management system.
<b>R14</b>	Analysis	Analyze the system's budget tracking functionality to ensure it accurately tracks the allocation and remaining budget for each project.
<b>R15</b>	Demonstration	Demonstrate how to customize proposal templates within the system to align with the specific requirements of each call for proposals.
<b>R16</b>	Demonstration	Demonstrate how to approve pending partnership agreements in the system.
<b>R17</b>	Analysis	Analyze the integration implementation to ensure accurate data exchange.
<b>R18</b>	Test	Test that the versioning functionality accurately captures changes by editing and updating agreements and proposals in test scenarios.
<b>R19</b>	Demonstration	Demonstrate how users can access, navigate through agreement statuses, and interpret the displayed information from the dashboard.
<b>R20</b>	Tset	Test scenarios that include adding users with different roles and permissions to ensure flexibility and accuracy in user management.
<b>R20</b>	Test	Test scenarios that include adding users with different roles and permissions to ensure flexibility and accuracy in user management.
<b>R21</b>	Analysis	Examination of security policies, configurations, and procedures to make sure they align with industry standards and regulations.
<b>R22</b>	Test	Ensure that 90% code coverage is maintained by running unit tests on the codebase.
<b>R23</b>	Test	Calculate the uptime percentage over a year, then compare the calculated

		percentage with the required percentage (99.9%).
<b>R24</b>	Test	Test the system with new users and determine how long it takes them to complete their tasks.
<b>R25</b>	Demonstration	Demonstrate the functionality of the system for users to submit proposals via the user interface.
<b>R26</b>	Inception	Check the system's database to ensure that negotiation history records are being captured and stored continuously.
<b>R27</b>	Test	Check if the system generates and sends memos or messages to notify recipients of their award status.
<b>R28</b>	Demonstration	Demonstrate the functionality of the system for configuring and adjusting timing parameters for sending notifications.
<b>R29</b>	Test	Test the generation and sending of agreement renewal reminders, ensuring that they are sent before renewal deadline and reach the intended stakeholder.
<b>R30</b>	Demonstration	Demonstrate how reviewers can access research proposals, submit feedback/comments, and assign ratings through the system.
<b>R31</b>	Inception	Ensure that project managers have appropriate access rights to view project-related information by inspecting the system's access control mechanisms.
<b>R32</b>	Test	Test cases will simulate valid and invalid login attempts, checking the system's ability to authenticate users securely and validate passwords accurately.
<b>R33</b>	Demonstration	Demonstrate the functionality of sending invitations to potential partners.
<b>R34</b>	Inception	Inspection of the administrative interface to ensure that admins can create proposal calls, set deadlines, define evaluation criteria, and designate thematic areas.
<b>R35</b>	Demonstration	Demonstrate how to register external users and how administrators must approve their registrations before access is granted.
<b>R36</b>	Demonstration	Demonstrate how team members are assigned responsibilities by project managers.
<b>R37</b>	Inception	Ensuring user profiles have editable fields and that users can successfully update their data.

<b>R38</b>	Analysis	Analyze the integration implementation or data flow, compatibility, and any potential issues.
<b>R39</b>	Test	Perform search tests to verify that the system retrieves relevant agreements, proposals, or documents accurately and efficiently.
<b>R40</b>	Analysis	Analyze how well the system allows users to resubmit proposals and ensure that the process is intuitive.

[Table 3: Verification Method Table]

### **3.5. Risks:**

Identifying and addressing potential risks is essential for managing challenges and ensuring the successful implementation of the consortium management system. Here, we outline potential risks and their consequences in the development of the consortium management system:

1. Scope expansion
  - Consequence: Excessive requirements, leading to delays, higher costs, and dissatisfied stakeholders.
2. Lack of stakeholder involvement
  - Consequence: Low adoption rates due to not fully meeting stakeholders' expectations.
3. Integrating the consortium management system with existing systems such as KFUPM's login system and PURE profiling system
  - Consequence: create technical challenges, reducing the functionality and usability of the system.
4. Insufficient user adoption
  - Consequence: Users may not want to switch from existing manual processes to the new system, which will lead to lower system utilization and the failure of the project.
5. Data security breach
  - Consequence: Access to sensitive data could compromise system integrity and confidentiality, resulting in legal and reputational consequences.
6. Lack of a consistent and standardized agreement review process
  - Consequences: An inefficient and time-consuming review process due to lack of standardized procedures and traceability, as well as an increased risk of errors, omissions, and inconsistencies.
7. Limited access to specialized resources and expertise:
  - Consequences: impact consortium collaboration and innovation, increasing consortium members' costs and duplication of effort in acquiring and managing specialized resources.



## 4. Interface prototypes:

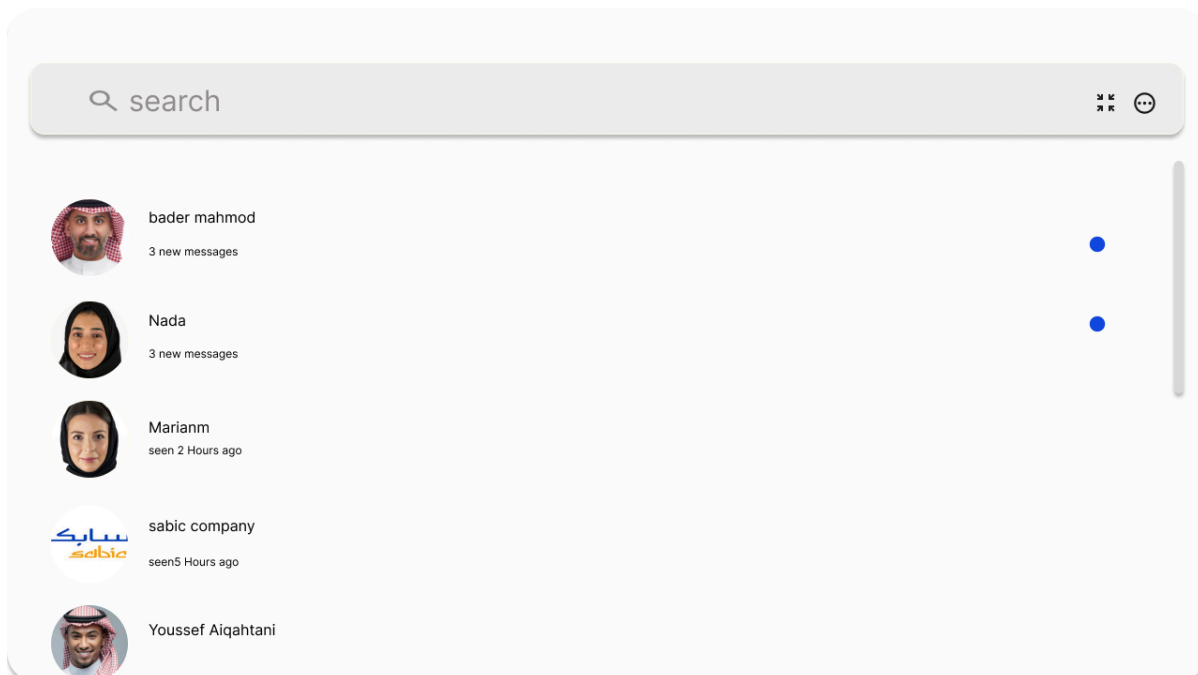
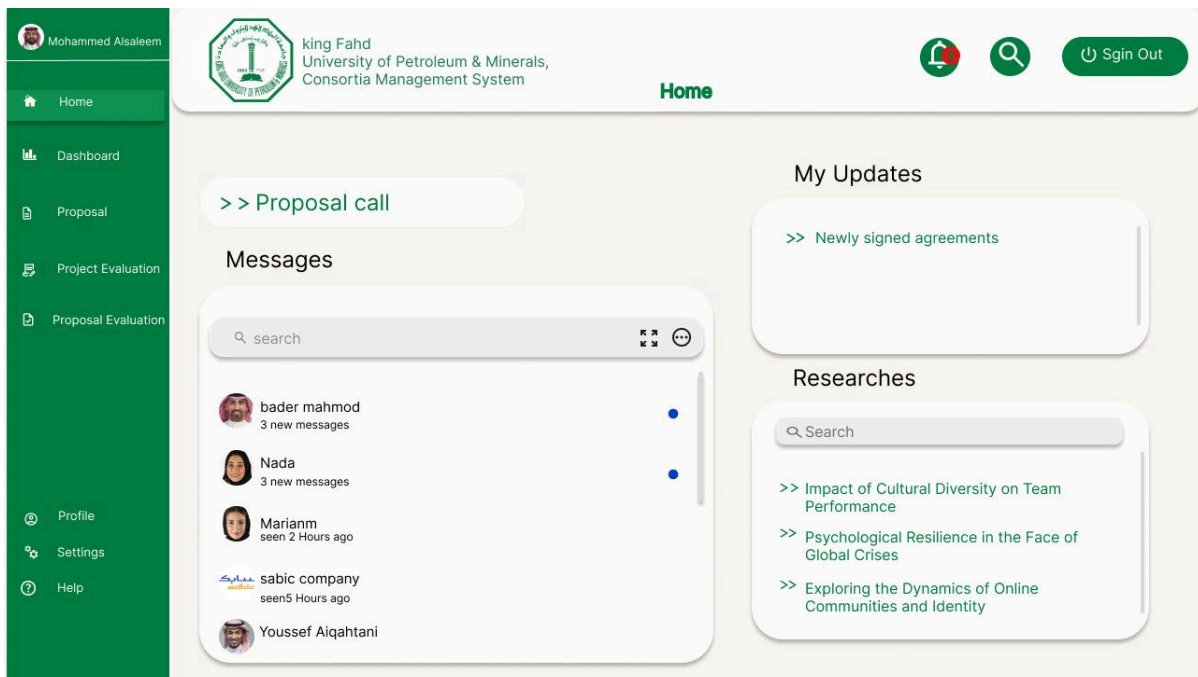
### 4.1. Login interface:

This prototype presents the login interface for the consortium management system. The screen is designed to allow users to securely access their accounts by logging in with their KFUPM credentials or through a personal account they have created. In this interface, the primary objective is to ensure that users can authenticate themselves with ease and security, so they can access resources and features tailored to their role.

The login interface is divided into two main sections. The left section has a dark green background and features the King Fahd University of Petroleum & Minerals logo at the top, followed by the university's name in Arabic and English. Below this, the text 'Consortia Management System' is displayed in a large, white, serif font. At the bottom of this section, there is a link that says 'Need help?'. The right section has a light beige background and is titled 'Login' in a bold, black, sans-serif font. It contains two input fields: one for 'Username' with a placeholder 'Enter your username' and a user icon, and another for 'Password' with a placeholder 'Enter your password' and a lock icon. Below the password field is a link that says 'Forgot Password?'. At the bottom of the right section, there is a green button labeled 'LOGIN' and a link that says 'Not a Member? Sign Up'.

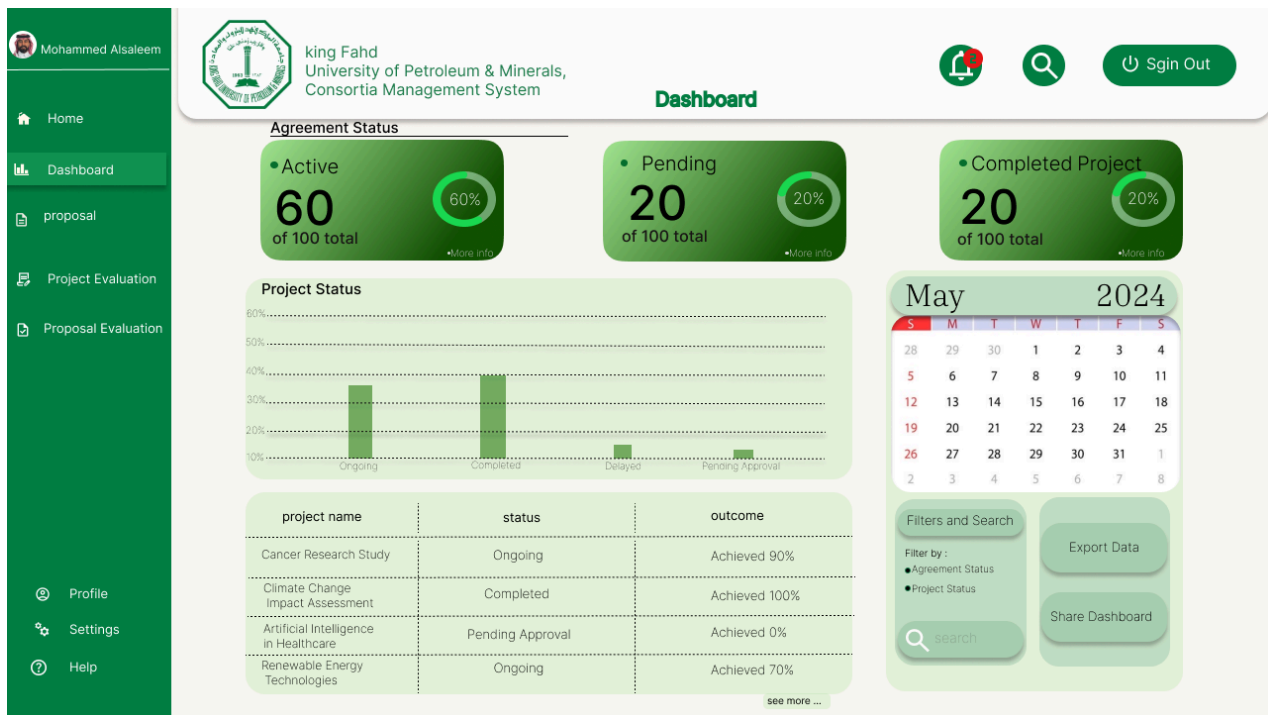
## 4.2. Homepage interface:

This prototype presents the Homepage for the consortium management system. The page is designed to facilitate access to the most important features, data, and navigation paths. In navigation bar, displays the avatar with the user name and dynamic links to primary sections such as dashboard, proposal, and project evaluation. At the bottom there are icons to modify the personal page and settings, and to add higher quality, there is a help icon. Pages in the middle presents the latest updates, all research, proposals call button, to alert about the new topic of proposals. You can communicate with other members. If you want more space for conversations, you can press the zoom button and it will fill the screen.



### 4.3. Dashboard interface:

This prototype presents the Dashboard interface for the consortium management system. The screen is designed to allow the user to see a dashboard that shows statistics on the agreements status and the status of projects, and also the ability to search for them. In addition, show the results of project outcomes. In this interface, the primary objective is to ensure that users can see the status of agreements and the results of project outcomes.



#### 4.4. submit proposal interface:

This prototype presents the Proposal Submission interface for the research project management system. The screen is designed to guide researchers through answering essential questions, including the research title/topic, objectives, team members, methodology, resources, results & impact, dissemination plan, timeline, and budget. The interface provides a structured format for researchers to input key information required for submitting a comprehensive research proposal.

**king Fahd University of Petroleum & Minerals, Consortia Management System**

**Proposal**

1. Research topic/title:  
Enter your Research topic/title

2. Objectives:  
Enter your Objectives:

3. Team Members:  
Choose your team member:

4. Methodology:  
Enter your Methodology:

5. Resources:  
Choose your resources:

6. Result & impact:  
Enter your Result & impact :

7. Dissemination:  
Enter your Dissemination :

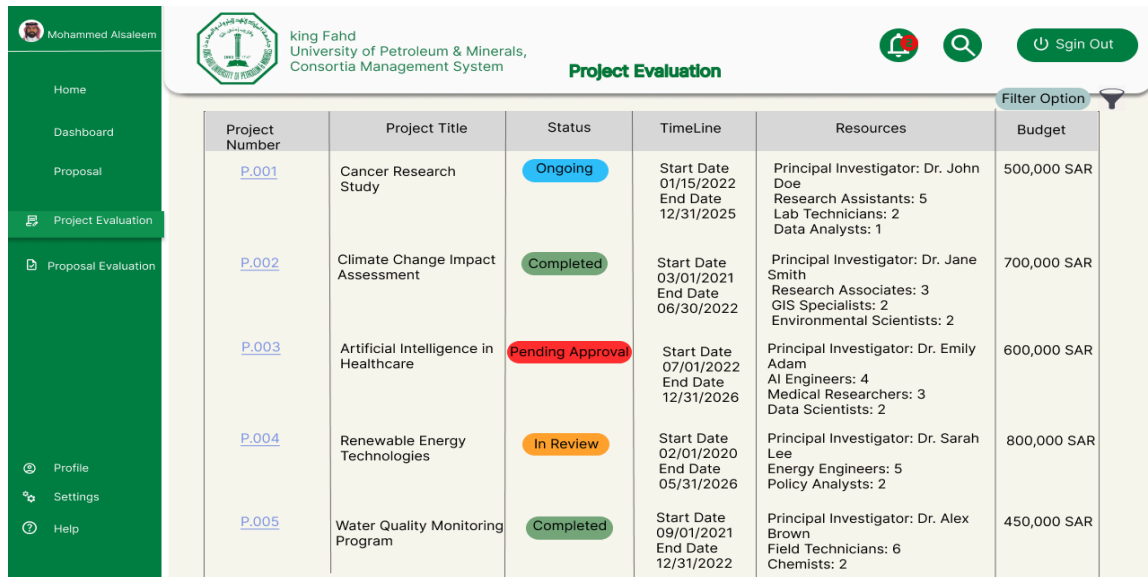
8. Timeline: (select from the calendar)  
Form: To:

9. Budget:  
Enter your Budget:

**Submit**

## 4.5. Project Evaluation:

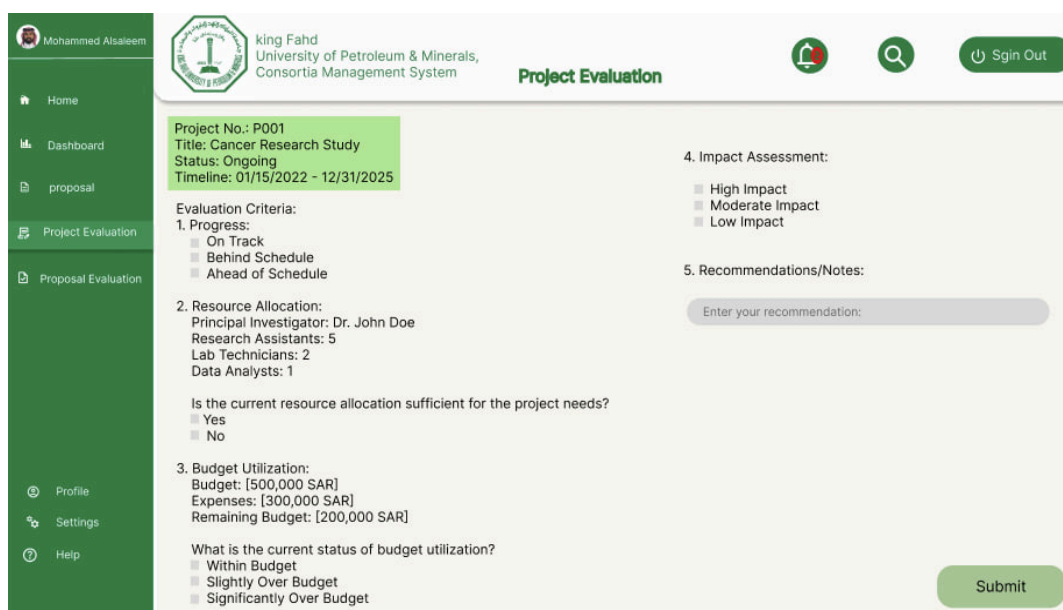
The Project Evaluation interface features a user-friendly table displaying project numbers, titles, status, timelines, resources, and budgets. Managers can easily select a project for evaluation, allowing for efficient assessment and monitoring of project progress and performance, with the ability to filter, sort, and search projects based on various criteria.



The screenshot shows the Project Evaluation interface. On the left is a green sidebar with navigation links: Home, Dashboard, Proposal, Project Evaluation (selected), Proposal Evaluation, Profile, Settings, and Help. The top header includes the user's name (Mohammed Alsalem), the King Fahd University of Petroleum & Minerals logo, the text "king Fahd University of Petroleum & Minerals, Consortia Management System", and the title "Project Evaluation". There are also icons for notifications, search, and a "Sgin Out" button. Below the header is a table with columns: Project Number, Project Title, Status, TimeLine, Resources, and Budget. The table lists five projects with their respective details and status indicators.

Project Number	Project Title	Status	TimeLine	Resources	Budget
<a href="#">P.001</a>	Cancer Research Study	Ongoing	Start Date: 01/15/2022 End Date: 12/31/2025	Principal Investigator: Dr. John Doe Research Assistants: 5 Lab Technicians: 2 Data Analysts: 1	500,000 SAR
<a href="#">P.002</a>	Climate Change Impact Assessment	Completed	Start Date: 03/01/2021 End Date: 06/30/2022	Principal Investigator: Dr. Jane Smith Research Associates: 3 GIS Specialists: 2 Environmental Scientists: 2	700,000 SAR
<a href="#">P.003</a>	Artificial Intelligence in Healthcare	Pending Approval	Start Date: 07/01/2022 End Date: 12/31/2026	Principal Investigator: Dr. Emily Adam AI Engineers: 4 Medical Researchers: 3 Data Scientists: 2	600,000 SAR
<a href="#">P.004</a>	Renewable Energy Technologies	In Review	Start Date: 02/01/2020 End Date: 05/31/2026	Principal Investigator: Dr. Sarah Lee Energy Engineers: 5 Policy Analysts: 2	800,000 SAR
<a href="#">P.005</a>	Water Quality Monitoring Program	Completed	Start Date: 09/01/2021 End Date: 12/31/2022	Principal Investigator: Dr. Alex Brown Field Technicians: 6 Chemists: 2	450,000 SAR

This prototype presents the Project Evaluation interface for the research project management system. The screen is designed to display project details and guide managers through a series of questions to assess the project's performance. After selecting a project to evaluate, managers are presented with evaluation criteria, including progress (on track, behind schedule, or ahead of schedule). They are also prompted to evaluate resource allocation and determine if it is sufficient for the project. The interface showcases budget utilization, showing the total budget, expenses, and remaining budget, and managers are asked to assess the budget status (within budget, slightly over budget, or significantly over budget). Additionally, managers are prompted to assess the impact of the project (high impact, moderate impact, or low impact) and provide any recommendations or notes they may have.



The screenshot shows the Project Evaluation form for Project P001. The sidebar and header are the same as in the previous screenshot. The form displays the project details: Project No.: P001, Title: Cancer Research Study, Status: Ongoing, and Timeline: 01/15/2022 - 12/31/2025. It then presents five evaluation criteria: 1. Progress (On Track, Behind Schedule, Ahead of Schedule), 2. Resource Allocation (Principal Investigator: Dr. John Doe, Research Assistants: 5, Lab Technicians: 2, Data Analysts: 1, and a question about resource sufficiency), 3. Budget Utilization (Budget: 500,000 SAR, Expenses: 300,000 SAR, Remaining Budget: 200,000 SAR, and a question about budget status), 4. Impact Assessment (High Impact, Moderate Impact, Low Impact), and 5. Recommendations/Notes (a text input field). A "Submit" button is at the bottom right.

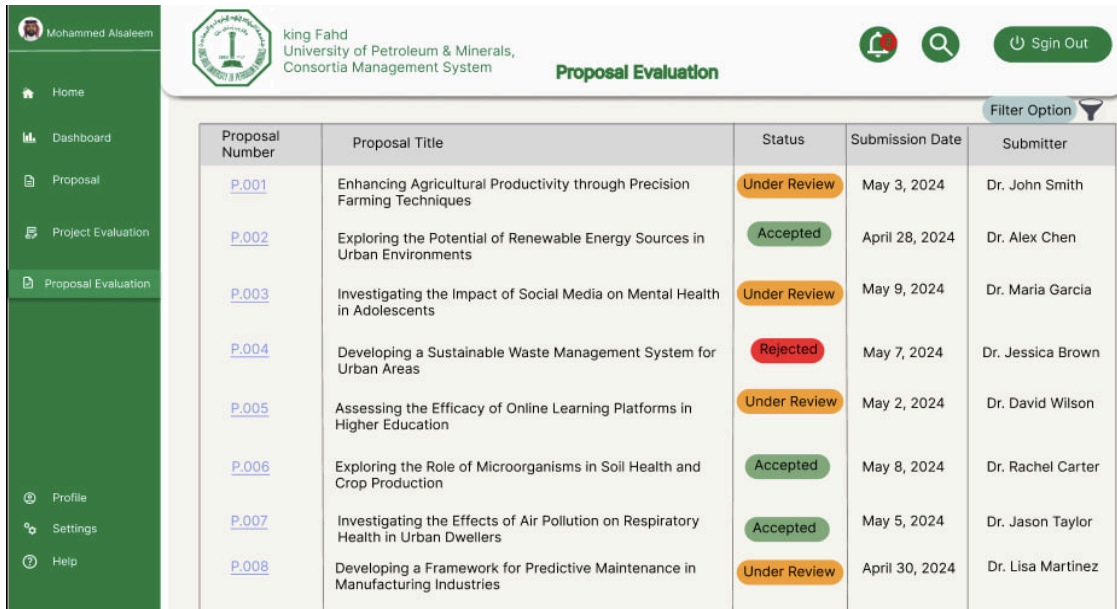
Project No.: P001  
Title: Cancer Research Study  
Status: Ongoing  
Timeline: 01/15/2022 - 12/31/2025

Evaluation Criteria:

- Progress:
  - ☐ On Track
  - ☐ Behind Schedule
  - ☐ Ahead of Schedule
- Resource Allocation:  
Principal Investigator: Dr. John Doe  
Research Assistants: 5  
Lab Technicians: 2  
Data Analysts: 1  
  
Is the current resource allocation sufficient for the project needs?  
☐ Yes  
☐ No
- Budget Utilization:  
Budget: [500,000 SAR]  
Expenses: [300,000 SAR]  
Remaining Budget: [200,000 SAR]  
  
What is the current status of budget utilization?  
☐ Within Budget  
☐ Slightly Over Budget  
☐ Significantly Over Budget
- Impact Assessment:
  - ☐ High Impact
  - ☐ Moderate Impact
  - ☐ Low Impact
- Recommendations/Notes:

## 4.6 Proposal Evaluation:

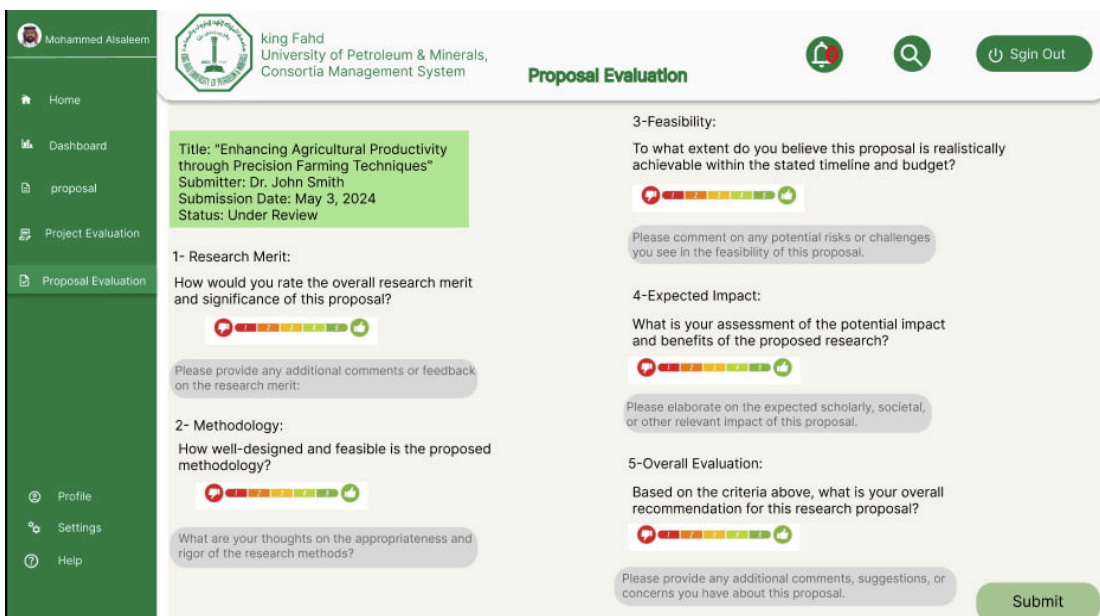
The Proposal Evaluation interface features a user-friendly table displaying proposal numbers, titles, status, submission date, and submitter. Managers can easily select a proposal for evaluation, allowing for efficient review and assessment of submitted research proposals, with the ability to filter, sort, and search projects based on various criteria.



The screenshot displays the 'Proposal Evaluation' interface. On the left is a green sidebar with navigation links: Home, Dashboard, Proposal, Project Evaluation, and Proposal Evaluation (selected). Below these are Profile, Settings, and Help. The main header shows the user 'Mohammed Alsalem', the institution 'king Fahd University of Petroleum & Minerals, Consortia Management System', and a 'Proposal Evaluation' title. A 'Filter Option' dropdown is present. The main content is a table with five columns: Proposal Number, Proposal Title, Status, Submission Date, and Submitter. The table lists eight proposals with statuses ranging from 'Under Review' to 'Rejected'.

Proposal Number	Proposal Title	Status	Submission Date	Submitter
<a href="#">P.001</a>	Enhancing Agricultural Productivity through Precision Farming Techniques	Under Review	May 3, 2024	Dr. John Smith
<a href="#">P.002</a>	Exploring the Potential of Renewable Energy Sources in Urban Environments	Accepted	April 28, 2024	Dr. Alex Chen
<a href="#">P.003</a>	Investigating the Impact of Social Media on Mental Health in Adolescents	Under Review	May 9, 2024	Dr. Maria Garcia
<a href="#">P.004</a>	Developing a Sustainable Waste Management System for Urban Areas	Rejected	May 7, 2024	Dr. Jessica Brown
<a href="#">P.005</a>	Assessing the Efficacy of Online Learning Platforms in Higher Education	Under Review	May 2, 2024	Dr. David Willson
<a href="#">P.006</a>	Exploring the Role of Microorganisms in Soil Health and Crop Production	Accepted	May 8, 2024	Dr. Rachel Carter
<a href="#">P.007</a>	Investigating the Effects of Air Pollution on Respiratory Health in Urban Dwellers	Accepted	May 5, 2024	Dr. Jason Taylor
<a href="#">P.008</a>	Developing a Framework for Predictive Maintenance in Manufacturing Industries	Under Review	April 30, 2024	Dr. Lisa Martinez

This prototype presents the Proposal Evaluation interface for the research project management system. The screen is designed to guide managers through a structured process of reviewing and assessing research proposals submitted by researchers. The interface provides predefined evaluation criteria, including research merit, methodology, feasibility, and expected impact. Managers can assign numerical scores on a scale (e.g., 1-5 or 1-10) for each criterion, as well as provide qualitative feedback and comments. The interface also includes an overall evaluation section, where managers can give a recommendation on the proposal and add any additional comments or concerns. The goal of this interface is to establish a consistent and transparent evaluation process, enable collaborative review among multiple stakeholders, and support data-driven decision-making for allocating research funding and resources.



The screenshot shows the detailed 'Proposal Evaluation' form. The left sidebar is identical to the previous screenshot. The main header includes the user name, institution, and 'Proposal Evaluation' title. The form is divided into several sections for evaluation. The first section, '1- Research Merit', asks for a rating and includes a comment box. The second, '2- Methodology', asks for a rating and a comment box. The third, '3- Feasibility', asks for a rating and a comment box. The fourth, '4- Expected Impact', asks for a rating and a comment box. The fifth, '5- Overall Evaluation', asks for a rating and a comment box. A 'Submit' button is at the bottom right.

**Title:** "Enhancing Agricultural Productivity through Precision Farming Techniques"  
**Submitter:** Dr. John Smith  
**Submission Date:** May 3, 2024  
**Status:** Under Review

**1- Research Merit:**  
How would you rate the overall research merit and significance of this proposal?  
Please provide any additional comments or feedback on the research merit:

**2- Methodology:**  
How well-designed and feasible is the proposed methodology?  
What are your thoughts on the appropriateness and rigor of the research methods?

**3- Feasibility:**  
To what extent do you believe this proposal is realistically achievable within the stated timeline and budget?  
Please comment on any potential risks or challenges you see in the feasibility of this proposal.

**4- Expected Impact:**  
What is your assessment of the potential impact and benefits of the proposed research?  
Please elaborate on the expected scholarly, societal, or other relevant impact of this proposal.

**5- Overall Evaluation:**  
Based on the criteria above, what is your overall recommendation for this research proposal?  
Please provide any additional comments, suggestions, or concerns you have about this proposal.

**Submit**

## 5. Requirements Validation:

To ensure the quality and accuracy of our requirements and specifications, we employ several validation techniques including traceability matrices, prototyping, and checklists. These techniques help us to confirm that all requirements are complete, clear, and aligned with stakeholder goals.

### 1. Traceability Matrices:

We used traceability matrices to ensure that all requirements are covered and linked to specific stakeholder goals. This helps in maintaining a clear relationship between requirements and their sources, ensuring that nothing is missed. Please refer to [Table 2: Attributes and Traceability Table] for a detailed view of how requirements are mapped to goals.

### 2. Prototyping:

We developed prototypes to gather stakeholder feedback and validate requirements. One of the interviews consisted of presenting prototypes to stakeholders and collecting feedback. By interacting with a preliminary version of the system, stakeholders are able to provide valuable insights and identify potential issues at early stages.

### 3. Checklists:

The checklist ensures that requirements are thorough and adhere to quality standards by verifying them against predefined criteria. Below is the detailed requirements checklist used for our validation process.

#### Requirements Checklist:

##### 1. Completeness

1.1. Are all required features and functionalities specified?

1.2. Are all stakeholder needs addressed?

1.3. Are there no missing elements that could impact the system's performance or usability?

##### 2. Clarity

2.1. Is each requirement clearly stated without ambiguity?

2.2. Are the terms and definitions used in the requirements consistent and understandable?

2.3. Is each requirement easily understandable by all stakeholders?

2.4. Are there no vague terms like "fast," "easy," or "optimal" without defining them?

### **3. Consistency**

- 3.1.** Are there any conflicting requirements?
- 3.2.** Do the requirements align with the overall system goals and objectives?
- 3.3.** Are all requirements consistent with each other?

### **4. Testability**

- 4.1.** Are there clear criteria for verifying the fulfillment of each requirement?
- 4.2.** Is it possible to measure whether each requirement has been met?

### **5. Traceability**

- 5.1.** Is each requirement traceable to specific stakeholder needs or goals?
- 5.2.** Is each requirement linked to specific user stories?

### **6. Necessity**

- 6.1.** Does each requirement contribute to the overall objectives of the system?
- 6.2.** Are there any superfluous requirements that do not add value?
- 6.3.** Are all requirements essential and justifiable?

### **7. Compliance**

- 7.1.** Do the requirements comply with relevant standards and regulations?

Using this checklist, we can ensure that requirements and specifications are of high quality and ready for implementation. Using these validation processes ensures that potential problems are identified and mitigated early, enhancing the overall performance of the consortium management system.



## 6. Description of group and roles:

In the table below, you will find information about each member who contributed to the development of the requirements document and their contribution.

<b>Name</b>	<b>Percentage of work completed</b>
Sarah Alsaleem	20%
Narjes Alsaad	20%
Sadeem Alotaibi	20%
Renad Alqahtani	20%
Wala Aljobran	20%