Platform for
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D4.2 Report on PiPPi Platform system requirements and evaluation metrics

PiPPi

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Table of content

Table of content 2

Executive Summary 4

List of Abbreviations 5

Glossary 6

List of Figures 9

List of Tables 10

Introduction 11

1. Applied Design Thinking Methods to Enrich User Requirements 13

Remembering Previous Activities 13

1.1. Personas 14

Results 14

1.2. Scenarios and User Journey Maps 22

Results 22

2. Implementation-Specific Preparations 41

Purpose 41

Methods and Materials 41

Results 42

3. PiPPi Platform System Requirements Described through the Use Cases 42

Purpose 42

Methods and Material 42

Results 45

Final Version of Use Cases 45

Roles and Permissions 47

Technical Specification of the PiPPi Platform 49

Validation of Requirements' Plan 53

Purpose 53

Methods and Materials 53

Reviewing Requirements 53

Acceptance Criteria 54

Discussion and Conclusions 57

References 58

Appendix 60
Use Cases 60
Registration 60
UC-1 Register to the PiPPi Platform 60
Unmet Needs 62
Ideas 70
Topics 74
Users / Organizations 75
Training material 79
Acceptance Tests 80
Feature: Register to the PIPPI platform 80
Feature: Publish an Unmet Need 82
Feature: Search for Unmet Needs 84
Feature: Change status of Unmet Need 86
Feature: Ask to join external private forum 86
Feature: Edit Unmet Need 87
Feature: Post comment on an Unmet Need 87
Feature: Like an Unmet Need 89
Feature: Like an Unmet Need 91
Feature: Add Idea to an Unmet Need 92
Feature: Search for Ideas 94
Feature: Post comment on an Idea 95
Feature: Like an Idea 97
Feature: Search for Topics 99
Feature: Edit profile 99
Feature: Search for Users/Organizations 101
Feature: Set notification preferences 103
Feature: View training materials 103

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Executive Summary

Eliciting, documenting, and validating requirements are worthwhile activities for developing high-quality Software (Wiegers & Beatty, 2013). In addition, Design Thinking (DT) and Agile methodologies for the requirements elicitation, and the SW implementation processes, are gaining greater importance (Husaria & Guerreiro, 2020), (Hehn & Uebernickel, 2018). In our fast-evolving world, researchers and developers seek flexible methodologies more than ever. Therefore, DT and Agile methodologies were applied for the PiPPi Platform requirements elicitation and SW development. The present Deliverable, which ground its roots on D4.5 “Towards The PiPPi Platform: Background Analyses and Preliminary Work”, presents: (i) the outcomes of DT activities done to iterate the elicited PiPPi Platform requirements, (ii) the process of implementation-specific preparations made with the subcontracted external developer – from now on called the Developer, (iii) the process with results of use case methodology, and finally (iv) the validation plan outlined to reduce risks and increase flexibility. To briefly emphasize, the main output of this work is to present the PiPPi Platform User-Requirements through use cases and the out stemming evaluation metrics of performances for the future Platform testing and validation (Ospedale San Raffaele et al., 2021) (Task 4.4).

List of Abbreviations

BR	Business Requirement
CoP	Community of Practice
DoW	Document of Work
DoA	Document of Actions
DT	Design Thinking
EU	European Union
EUHA	European University Hospital Alliance
GEO	Group on Earth Observations
PCP	Pre-Commercial Procurement
PPI	Public Procurement of Innovation
SH	Stakeholder
SW	Software
UN	Unified Nation
UX	User Experience
WP	Work Package

Glossary

This glossary contains standardized terminology concerning the PiPPi Project, as well as the PiPPi Platform Context, and provides simple explanations. Thus, the reader will fully understand the contents of the topics. The terms have either been perfected over time during partner discussions or specified in the Document of Work.

Acceptance Criteria: Conditions that a software product must satisfy to be accepted by a user, customer, or other stakeholder (Wiegers & Beatty, 2013).

Acceptance Test: A test that evaluates anticipated usage scenarios to determine the software's acceptability. Used in agile development both to express details about a user story and to determine whether a user story is fully and correctly implemented (Wiegers & Beatty, 2013).

Agile Development: A term used for software development methods characterized by continuous collaboration between developers and customers, limited documentation of requirements in the form of user stories and corresponding acceptance tests, and rapid and frequent delivery of small increments of useful functionality (Wiegers & Beatty, 2013).

Best practices: Methods and tools that produce superior results to those achieved by current solutions.

Community of practices (CoP): Stands for the groups of people who value the same topics, collaborate to learn and build up on each other's knowledge (Koeglreiter & Torlina, 2011).

Guideline: A piece of information intended to advise PiPPi Platform users on what are CoP, PCP, PPI and how should they be performed.

Idea: The key insights and/or ongoing research related to a specific unmet need. It could involve different kinds of data (e.g., quotes, photos, screenshots of websites or videos, statistics, articles, etc.), and enables users to identify the important and priority opportunity areas to be continued with a PCP/PPI to solve an unmet need after the CoP process. Idea could, for example, be an existing technological product/service in the market, or a relevant project, possibly in a different setting than the linked unmet need. So, the product/service could be beneficial to a totally new application.

Pre-Commercial Procurement (PCP): An approach to public procurement of research and development (R&D) services. Pre-Commercial Procurement (PCP) assists the industry with the demand side to create innovative solutions for the public sector (*Pre-Commercial Procurement | Shaping Europe's Digital Future*, n.d.).

Procurement of Innovation: An approach to enable the rapid development of public services, by creating new market opportunities for companies in Europe (The European Commission, 2017).

PiPPi Platform: The web application that makes the functionalities of PIPPI accessible to the PIPPI user-base through a web browser.

Public Procurement of Innovative Solutions (PPI): Public Procurement of Innovative solutions (PPI) supports the wide diffusion of innovative solutions on the market with the quality and price needed for mass-market deployment. This allows the public sector to improve public services with better value for money (*Public Procurement of Innovative Solutions | Shaping Europe's Digital Future*, n.d.).

Regulations: The meaning of the term Regulations used in the current document is the specific regulations on PCP, PPI and CoP at regional, national, or European levels.

Stakeholder: An individual, group, or organization that is actively involved in a project, is affected by its process or outcome, or can influence its process or outcome (Wiegers & Beatty, 2013).

System: The layer of software and hardware that is necessary to run the PiPPi Platform and that lies beneath it.

Unmet Need: An unfulfilled necessity related to the health sector that the stakeholders are facing and that requires digital innovations. It represents an issue that impedes the optimal functioning of healthcare delivery.

Use Case: A description of a set of logically related possible interactions between an actor and a system that results in an outcome that provides value to the actor. Can encompass multiple scenarios (Wiegers & Beatty, 2013).

User: A customer who will interact with a system either directly or indirectly (for example, by using outputs from the system but not generating those outputs personally). Also called end user (Wiegers & Beatty, 2013).

User Requirement: A goal or task that specific classes of users must be able to perform with a system, or a desired product attribute. Use cases, user stories, and scenarios are common ways to represent user requirements (Wiegers & Beatty, 2013).
User Story: A format to capture user requirements on agile projects in the form of one or two sentences that articulate a user need or describe a unit of desired functionality, as well as stating the benefit of the functionality to the user (Wiegers & Beatty, 2013).
Validation: The process of evaluating a project deliverable to determine whether it satisfies customer needs. Often stated as “Are we building the right product?” (Wiegers & Beatty, 2013).

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List of Figures

Figure 1 - Persona 1 15
Figure 2 - Persona 2 16
Figure 3 - Persona 3 17
Figure 4 - Persona 4 18
Figure 5 - Persona 5 19
Figure 6 - Persona 6 20
Figure 7 - Persona 7 21
Figure 8 - User Journey Map 1a 25
Figure 9 - User Journey Map 1b 26
Figure 10 - User Journey Map 1c 27
Figure 11 - User Journey Map 1d 28
Figure 12 - User Journey Map 2a 32
Figure 13 - User Journey Map 2b 33
Figure 14 - User Journey Map 2c 34
Figure 15 - User Journey Map 3a 38
Figure 16 - User Journey Map 3b 39
Figure 17 - User Journey Map 3c 40
Figure 18 – PiPPi Platform framweork 49

List of Tables

Table 1 - Scenario 1 24
Table 2 - Scenario 2 31
Table 3 - Scenario 3 37
Table 4 - Use Case specification template 44
Table 5 - Example Use Case - Publish an Unmet Need 46
Table 7 - Roles and Permissions Matrix 47
Table 8 - Roles that Stakeholder and Subcategories can have 49
Table 9 - Acceptance Criteria via User Stories 55

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Introduction

As the healthcare sector undergoes a digital transformation, the value of procuring innovative solutions increments for the entire Healthcare ecosystem. To accelerate the transformation, are encouraged valuable collaborations where the industry designs and co-produces technological solutions with the Stakeholders of Healthcare addressing their specific Unmet Needs.

In other words, all players of the healthcare sector will have more meaningful and satisfying experiences if healthcare Stakeholders work on the Unmet Needs and are allowed to match and collaborate to seek innovative solutions. Therefore, the PiPPi project acts as a melting pot to address this challenge. It brings together a group of European university hospitals, and other entities active in the healthcare sector, by creating a cross-border Community of Practice to achieve innovation procurement for healthcare.

The present document is written to complement Deliverable 4.5 “Towards the PiPPi Platform: background analyses and preliminary work”, which presented the WP4 activities carried out from March 2020 to May 2021 to elicit the PiPPi Platform Preliminary Use Cases, which carved the ground the PiPPi Platform implementation.

As introduced in D4.5, various user-driven design methodologies were applied to elicit the PiPPi Platform system requirements in the best possible way. In this document, the results of these activities are presented including: (i) Personas symbolizing PiPPi Platform users of different SH Categories, (ii) various scenarios to present the envisioned PiPPi experience by narrating relevant stories of use, (iii) and User Journey Maps (UJM) created based on the Scenarios to visually illustrate the entire user experience.

Thereafter, the Implementation-Specific Preparations are explained which was performed to create a common language between the PiPPi WP4 team and the developers. The project team dedicated time reviewing the requirements, knowing that this investment would shorten and facilitate the platform implementation process.

In addition, the present document describes the complete versions of PiPPi Platform Use Cases together with the Validation Activities plan, framed using the Acceptance Criteria method. A use cases document was built, to be continuously iterated and improved with ideas of PiPPi Project partners and external stakeholders on whether the use cases meet the user's needs and provide value to the user. To guarantee a higher quality Platform, and user satisfaction, the team outlined specific acceptance criteria based on the elicited requirements, to validate the functionalities of the PiPPi Platform with the internal and external Stakeholders. The results of this validation activities will be described in the final project Deliverable 4.4 "Results on validation by use-cases".

1. Applied Design Thinking Methods to Enrich User Requirements

Lately, awareness and application of Design Thinking (DT) have been increasing as a method to enhance the User Experience (UX) while interacting with Software (Canedo et al., 2020). The WP4 team adopted Design Thinking Methods to create innovative solutions to release the PiPPi Platform's future users' most pressing problems and deliver to them their most desired benefits. In detail, the DT Methods of Personas, Scenarios, and User Journey Maps were collaboratively applied with partners. This chapter demonstrates how these DT Methods were applied to alleviate the challenges of the Requirements Elicitation process.

Remembering Previous Activities

The activities carried out in the Workshops Series with WP2/3/5/6 described in Deliverable 4.5 (please see Chapter 2.6) are summarized in this section, for the sake of clarity, together with their outcomes, not yet shown in D4.5. Thanks to these Workshops the WP4 team aimed to (i) start a tight cooperation with those PiPPi WPs working specifically on Stakeholders, Challenges, and CoP Process, (ii) get onto the same page on the PiPPi Platform Requirements, and (iii) build empathy with diverse PiPPi CoP Stakeholders. A rounded approach was embraced through the commitment of diverse WP's points of views.

A total of 3 workshops were held. The first workshop was held on Friday 3/12/2021. During the workshop, the WP4 team shared their studies on the SH which was done according to the Document of Work, Stakeholder Interactions, and WP2 definitions. Thereupon, participants' feedback on the SH analysis was collected. Following this, the Persona tool was introduced as a fictional profile representing a particular Stakeholder Group (Stickdorn, 2018). Subsequently, the participants co-created Personas for each SH Category.

In the second workshop, held on Monday 3/22/2021, the WP4 team presented the Personas designed in the last Workshop and later improved, and received idea from the participants. Afterward, the WP4 team explained the tool of Scenario as, a specific interaction between a user and a system to accomplish some goal(s) (Wiegers & Beatty, 2013). Consequently, during the exercises of smaller co-working groups, the

participants explored the value Personas are trying to achieve. Then they have Identified the interactions between the users and the system that will allow users to complete each task.

In the third workshop, which was held on Tuesday 3/30/2021, the co-created scenarios were presented. The participants discussed these outcomes and the WP4 team shared also the User Journeys that is the visualization of the process in which a user goes through to accomplish a goal, associated with these scenarios, and collected partners' feedback (Stickdorn, 2018).

1.1. Personas

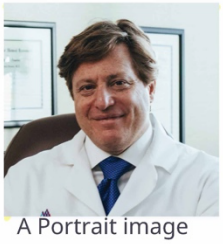
Results

Whereas not all the Workshop participants initially had any experience with the Persona tool, a shared understanding was reached among the WP's even after the first workshop. Participants got the most out of this first collaborative session by co-creating Personas for each SH Category, thereby gaining a better understanding of the needs of different user groups of the PiPPi Platform.

After the workshop, the WP4 team detailed the Personas in the light of the discussions, made the necessary adjustments, and rendered them clear and presentable. These versions were also validated by the WP's in the next workshop and developed if necessary. The results of this workshop were a total of 7 Personas which are presented as follows.

Persona 1

Antonio Moratti	Hospital / Healthcare Provider
Persona Name	Stakeholder Category

52	Male	Surgeon and Oncologist	
Age	Sex	Occupation	A Portrait image

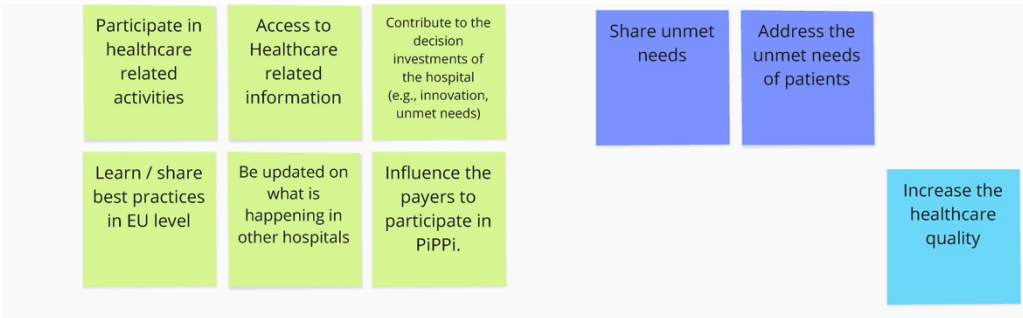
Italian	Married, 2 daughters
Nationality	Marital Status

"I am a perfectionist, and I often demand too much from myself. Therefore, I desire to achieve a work-life balance."

Quote

He **works** at a large university hospital and a private clinic. **Specifically**, he is working on immunotherapy treatments for lung cancer. He **is** thoughtful, analytical, confident, calm, collaborative, creative, friendly, humorous, wise, and dynamic. He **likes** work-related activities that foster learning and personal development. He **can** work long hours, often under pressure. However, he **expects** support for time-consuming activities (e.g., bureaucratic works). His **motivations** are patient relationships and intellectual stimulation. While his **goals** involve promoting and maintaining patients' health. He easily incorporates technology into his work to meet clinical objectives, but not so much that he loses himself in the details.
He started to do more virtual consults with patients **due to the Covid-19**. The effects of Covid-19 on him are stress due to inadequate knowledge about the virus, the continuous care of patients with Covid-19, fear of being infected and infecting his family. Hence, he feels the **need** to be updated more frequently on news and research publications
Lack of time is his biggest **frustration**. Therefore, he does not have time to discover new communities or platforms aimed to benefit healthcare. He would rather **prefer** a platform that is self-explanatory and has been installed by someone else.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)



Reasons to use PiPPi Platform

Figure 1 - Persona 1

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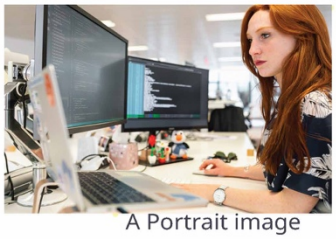
Persona 2

Raquel Morandi	Industry - SME
Persona Name	Stakeholder Category

40	Female	Engineer - R&D expert
Age	Sex	Occupation

Spain	Single
Nationality	Marital Status



A Portrait image

"I really like to use my knowledge in technology and with the help of healthcare professionals resolve the patients problems."

Quote

Raquel works in the R&D unit of a SME **specialised in wearable sensors for sports** but she is asked from her CEO to look at possible opportunities in the Healthcare market.
She's **passionate about her job,** and a very **curios person**; whatever is connected with technological innovation is a new challenge and she digs into it with enthusiasm. She's also expert in handling large datasets and performing high level data analyses.
She really **trusts in the ability of technology** to make the difference in our lives, especially as a mean to help people in need. But, for the healthcare side, she finds very difficult to access the right people to discuss with and finding cooperation opportunities.
She would like to **develop the lacking technology /products** suitable for unmet needs in the Covid-19 Pandemic.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)

Finding good partners in the healthcare sector (means having a trusted solution)	Have more information about the needs that the market has	Find a Hospital to make a pilot	Contacts with the Healthcare providers	Network with other industry complementary partners
Understanding if her products are good as they are or need further elaboration on the basis of the needs of this new market	Validate her solution with the right people	Understanding of the healthcare system	Information for her "readapting product" strategy	Industry Trends

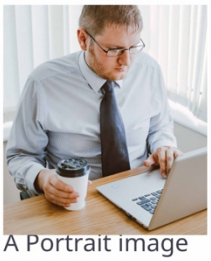
Reasons to use PiPPi Platform

Figure 2 - Persona 2

Persona 3

Michael Freeze	Enablers
Persona Name	Stakeholder Category

37	Male	Employee in consulting agency
Age	Sex	Occupation



A Portrait image

German	Married and has 4 kids
Nationality	Marital Status

"I would like to contribute to make innovation in the healthcare sector"

Quote

Michael is a **big time associate** from Deloitte consulting headquarters. He's connected to the business world, skilled speaker, social influencer, active publisher of innovations papers, multilevel expertise, comercial understanding and change management skills. The agency that he is working has a **health and technology as strategic elements in their business plan.**
He has worked with big public and private hospitals and he is aware of their internal processes and complications in procurement. According to his **high level capabilities to reach key players in the business world**, recently he has been commissioned by his managing director to find new opportunities in healthcare and Industry sector. He has a very tight agenda so he is searching for a solution to enable him find the suitable tool.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)

They need to understand the healthcare and Industry world

They have a good connection with the private sector but it's difficult to contact the public one

They are enablers of high level consortiums

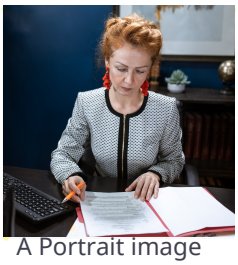
They have the expertise to establish studies on cost-effectiveness which hospitals usually do not have.

Reasons to use PiPPi Platform

Figure 3 - Persona 3

Persona 4

Christina Hoelscher	Research and Innovation Community
Persona Name	Stakeholder Category

42	Female	Lung Cancer Researcher	
Age	Sex	Occupation	A Portrait image

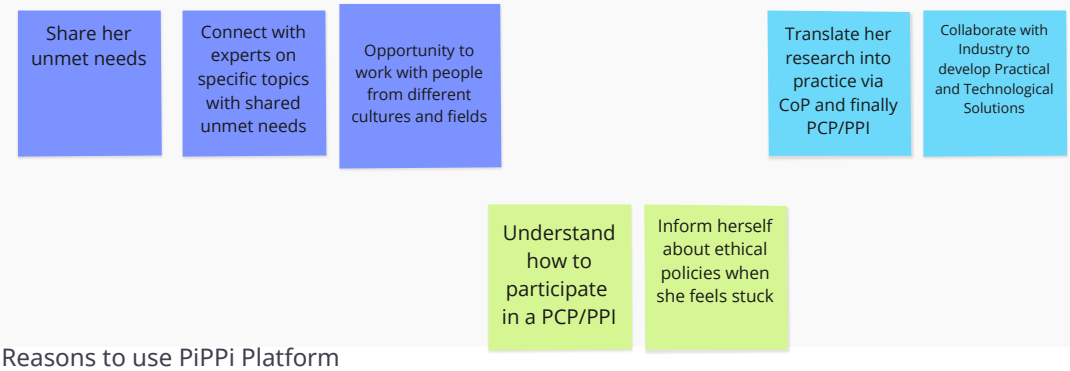
German	Single
Nationality	Marital Status

"I would like to translate my research into the clinical practice, hence help lung cancer patients live longer, fuller lives."

Quote

She is working on **treatments for lung cancer**, in collaboration with an institute for Cancer. She has been one of the recipients of the research grant awarded by a Lung Cancer Foundation. Her investigations aim at improving access to prevention and treatment of patients. **She's** curious, hard-working, multilingual and has significant experience in bi-lingual interactions. **She needs to** access to specific expertise, get support to deepen her researches through multi-professional working teams to identify opportunities. **She would like to** learn more about recent technologies such as immunotherapy, which is a cancer treatment that helps the immune system fight cancer. **She needs** relevant data, patient needs, the experiences of patients, methodologies used for patient care. **She expects** to access and share research data and training herself on PPI/PCP. **Her motivations** are to enhance patient care, more specifically, help lung cancer patients live longer, fuller lives. Nevertheless, **she feels frustrated** when she can't access specific patient data related to her research. Her additional frustrations include being faced with ethical implications of using particular data, not being able to reach valuable Stakeholders that share the same unmet needs. Consequently, not being able to address her unmet needs is demotivating.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)



Reasons to use PiPPi Platform

Figure 4 - Persona 4

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Persona 5

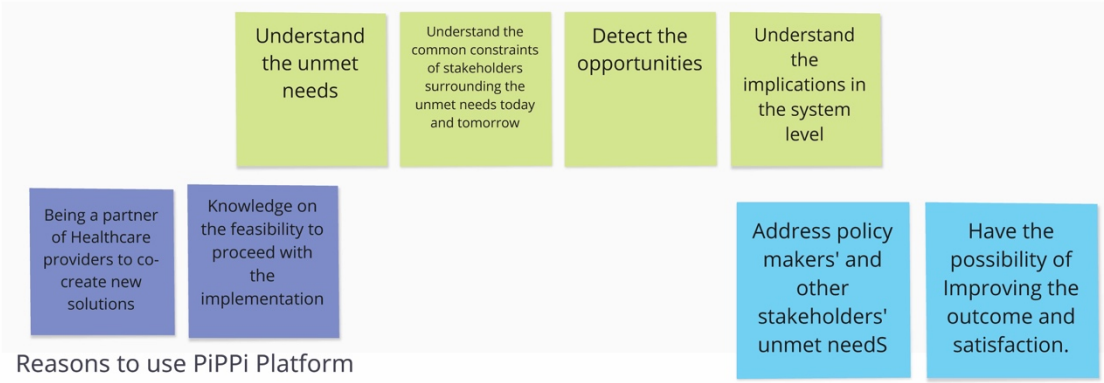
Cecilia Nieminen		Policy makers	
Persona Name		Stakeholder Category	
56	Female	Employee in the Ministry of Health	
Age	Sex	Occupation	A Portrait Image
Finn		Married, with two children	
Nationality		Marital Status	

"I hope that the Health Minister will be re-elected again and we will be able to show positive impacts on society in our elected time!"

Quote

She assists establishing policies for healthcare, allocating grants and periodically evaluating services to ensure correspondence to national goals.
She would like to to detect, grasp the unmet needs of different SH categories in society through fast and simple descriptions. **She lacks** the knowledge of feasibility. **She needs** to see the implications of the decisions at the systems level. **She expects** to access unmet needs of specific nation and regions.
What worries her is the high cost of healthcare labor, the difficulty of generating sufficient revenue as informal economies grow, and as population aging leads to high dependency ratios.
She feels frustrated about sacrificing equity, quality, or efficiency of access to health care for the sake of managing expenditure growth.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)



Reasons to use PiPPi Platform

Figure 5 - Persona 5

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Persona 6

Antonia Fumagali	Expert patient - part of association
Persona Name	Stakeholder Category

75	Female	Retired accountant	
Age	Sex	Occupation	A Portrait image

Italian	Widow without any child
Nationality	Marital Status

"I would like to be like a bridge between healthcare and Industry sector to inform them what is my real need."

Quote

15 years ago she discovered that **she has a chronic disease**, Diabetes. In the beginning as she didn't know a lot about this disease the situation was so complicated for her. She is a very **curious person** and she likes to learn everything, she did all the needed researches and she **learnt how to monitor her diabetes**.
She has lots of free time, she is **good with technologies** and she has Facebook so she is **connected to an association** for diabetes patient and trying to find new solution regarding to her problems. Recently she's seen an evolution in treatment and quality of life. She **feels proud** of being part of something like this. She would like to find more opportunities / association related to her disease and participate to their studies. She **needs** continuous monitoring of her disease by her doctor as she's going through difficult experiences due to the side effects of the medicines and when she eats specific foods. She would like to be able to ask nutritional information to her doctor frequently.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)

She wants to be part of the process of innovation in healthcare and seeks for a recognition of that

She wants to be inform about new trends and solutions in the healthcare sector

She wants to inform healthcare sector the real needs of a diabetes person

Reasons to use PiPPi Platform

Figure 6 - Persona 6

Persona 7

Antonia Fumagali	Expert patient - part of association
Persona Name	Stakeholder Category

75	Female	Retired accountant	
Age	Sex	Occupation	A Portrait image

Italian	Widow without any child
Nationality	Marital Status

"I would like to be like a bridge between healthcare and Industry sector to inform them what is my real need."

Quote

15 years ago she discovered that **she has a chronic disease**, Diabetes. In the beginning as she didn't know a lot about this disease the situation was so complicated for her. She is a very **curious person** and she likes to learn everything, she did all the needed researches and she **learnt how to monitor her diabetes**.
She has lots of free time, she is **good with technologies** and she has Facebook so she is **connected to an association** for diabetes patient and trying to find new solution regarding to her problems. Recently she's seen an evolution in treatment and quality of life. She **feels proud** of being part of something like this. She would like to find more opportunities / association related to her disease and participate to their studies. She **needs** continuous monitoring of her disease by her doctor as she's going through difficult experiences due to the side effects of the medicines and when she eats specific foods. She would like to be able to ask nutritional information to her doctor frequently.

Description (may include: characteristics, personality, attitudes, interests, skills, needs, expectations, motivations, goals, frustrations, brands or technologies the persona likes, or background stories)

She wants to be part of the process of innovation in healthcare and seeks for a recognition of that

She wants to be inform about new trends and solutions in the healthcare sector

She wants to inform healthcare sector the real needs of a diabetes person

Reasons to use PiPPi Platform

Figure 7 - Persona 7

1.2. Scenarios and User Journey Maps

Results

The Scenarios were written under the three main Digital Challenges that resulted from the work of WP5. These challenges are introduced and summarized as follows.

- *Digital Challenge 1 - Standardized Health Data Integration Platform*. To enable data flow through the health data infrastructure, it is necessary to bring the variety of available healthcare data into proper formats to be analyzed. Consequently, the collected data can be used for research and reporting purposes.
- *Digital Challenge 2 - Visualization of Aggregated Diagnostic Patient Data*. In response to the overwhelming raw form data (e.g., unstructured texts collected in the electronic health record), the intention is the application of innovative visualizing systems to advance clinical decision-making and research.
- *Digital Challenge 3 - Monitoring and Early Detection of deterioration of Patients within Intensive Care as well as Cardio-vascular conditions*. Patients deteriorate for numerous reasons, monitoring and predicting different kinds of deteriorations through the use of advanced technical telemedicine solutions, including AI, is essential.

During the second workshop, the scenario that was prepared beforehand by the WP4 team as an example, in the context of Challenge 3, was presented to the participants. The rationale behind choosing specifically Challenge 3 to be used in the example, was that it was already being worked on under WP5 leadership, and Partners already had a shared understanding of it. Afterward, the participants worked in two separate groups and wrote two Scenarios: the first group about Challenge 1 and the second group about Challenge 2. These were furtherly detailed after the Workshop. The final versions were presented to the participants at the last workshop of the series, where participants' feedbacks were collected, and the Scenarios updated accordingly. The current description follows in the next pages. Please note that in every Scenario Table, are reported also the specific Use Cases number pointing at a particular interaction between the users and the Platform. The corresponding detailed description is reported in Appendix.

The WP4 team drew the User Journey Maps (UJM) according to the co-created Scenarios to represent the entire user experience including emotional flows. Then they described these UJM's in detail and received feedback during the last workshop and made necessary modifications. The final versions of these UJMs are presented below.

Scenario 1 and UJM 1

<table>
<tr><td colspan="2">Challenge 1: Standardized Health Data Integration Platform</td></tr>
<tr><td rowspan="4">Included Personas</td><td>Healthcare Provider</td></tr>
<tr><td>Researchers</td></tr>
<tr><td>Payers</td></tr>
<tr><td>Policymakers</td></tr>
<tr><td colspan="2">Scenario:</td></tr>
<tr><td colspan="2">Steven is working as a Clinical Informatics Researcher in the Healthcare Innovation Department of one of the biggest public hospitals in the Netherland, which is a member of the European University Hospital Alliance (EUHA). His department, since a long time ago, was receiving complaints from physicians who cannot access the patients' data in a standardized format. This in fact creates lots of complications for them, such as opening different programs at the same time, inserting patient's clinical data in different programs twice, etc.
Since the Covid-19 pandemic, the need of having a standardized format of health data became more important because all the clinicians were in an emergency, and time for them was so important and valuable. Therefore, he decides to suggest his manager to convince the Directions of the hospital to participate in a European collaborative research project regarding Data Standardization. This is one of the highest priority topics because it is a diffused problem for all Healthcare communities. Meanwhile, he searches about already existing research possibilities and also new ones about this topic. Once, during a meeting, he becomes aware of the PiPPi Community of Practice Platform from a colleague who is directly involved in the discussions of EUHA. Through the link that he gets, he accesses the landing page of PiPPi Platform and collects all the initial information about the PiPPi CoP, how they can register (as a private or organization), what is the description of CoP and its process inside of PiPPi platform and so on.</td></tr>
</table>

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Meanwhile, Steven's boss gets confirmation from the direction of the hospital to start a new project around the suggested topic as soon as possible. Therefore, he registers his organization in the PiPPi platform (see UC-1), sets up to receive all the notifications (see UC-16), and starts to learn about the functionalities of the platform. He decides to add the problem of his organization as an Unmet Need, when he posts Unmet Need using the template (see UC-8), the system shows him an already existing similar Unmet Need, so he likes it (see UC-2) and left a comment to the owner of the Unmet Need (see UC-7). Steven decides to have a look also to the idea page to find specific studies of a research organization in which he can join and start a collaboration. He enters the idea page and enters specific keywords. He filters the results according to his Unmet Need (see UC-10); the system shows two matching ideas in which one fits the best. He likes the matched idea (see UC-12) and comments (see UC-11) to the owner of the idea to start a discussion with him. After a short time, he receives the comment from Adriana Andreotti from Research and Innovation Community. They fix a call to discuss the topic and eventually do some brainstorming. They held some meetings and both organizations show their interest regarding a possible collaboration but also, they agree on the need to involve in their discussions also a representative from Policy Makers, to get point of view of Lawmakers and one from Payers for financial support. Adriana previously noticed that she had comments on the posted idea from both Policy Makers and Payers. Therefore, she answers back to them (see UC-11) asking for their support. After receiving a confirmation, she creates a private forum to start their collaboration on the interested topic. .

Table 1 - Scenario 1

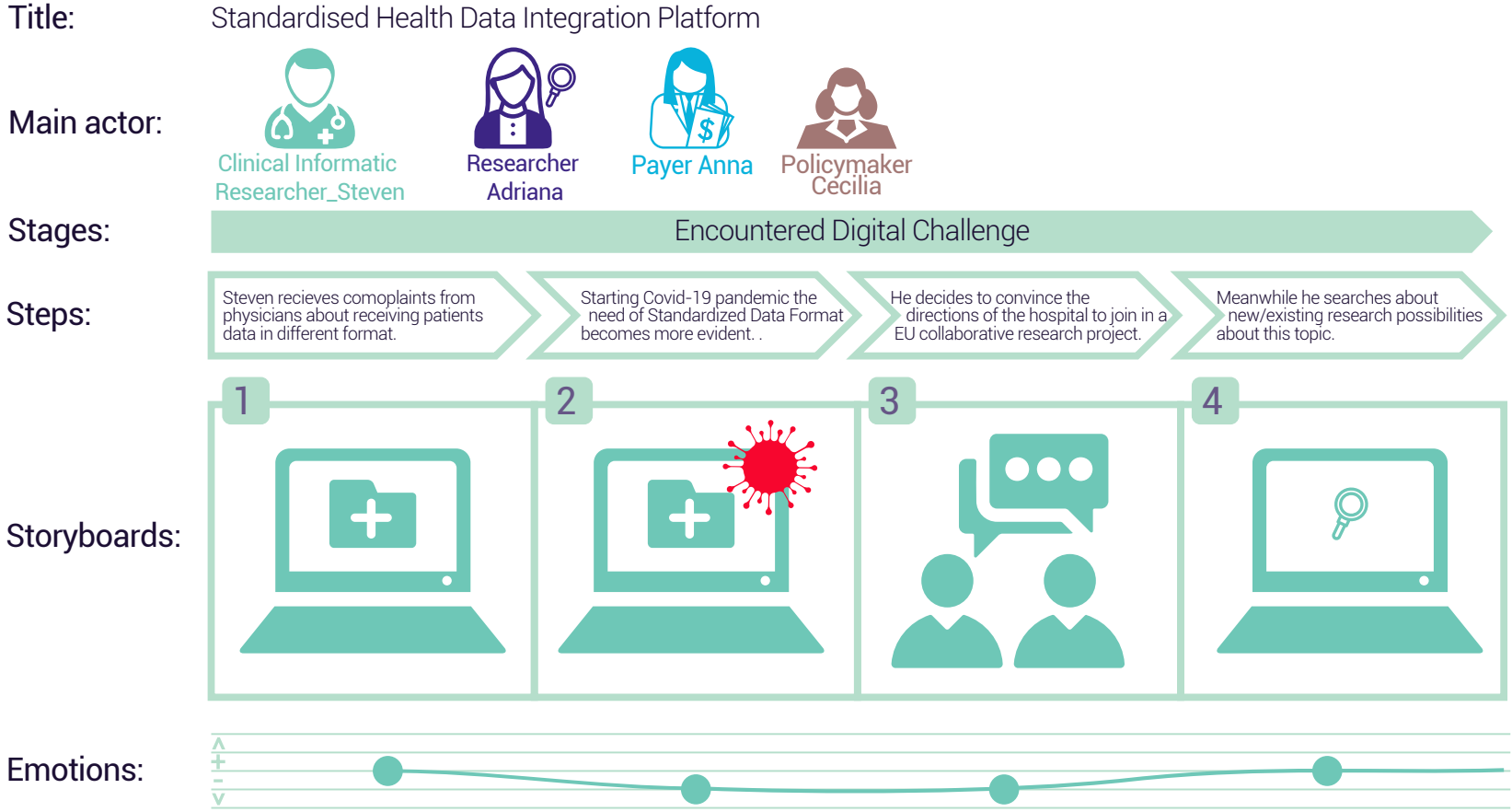

Figure 8 - User Journey Map 1a

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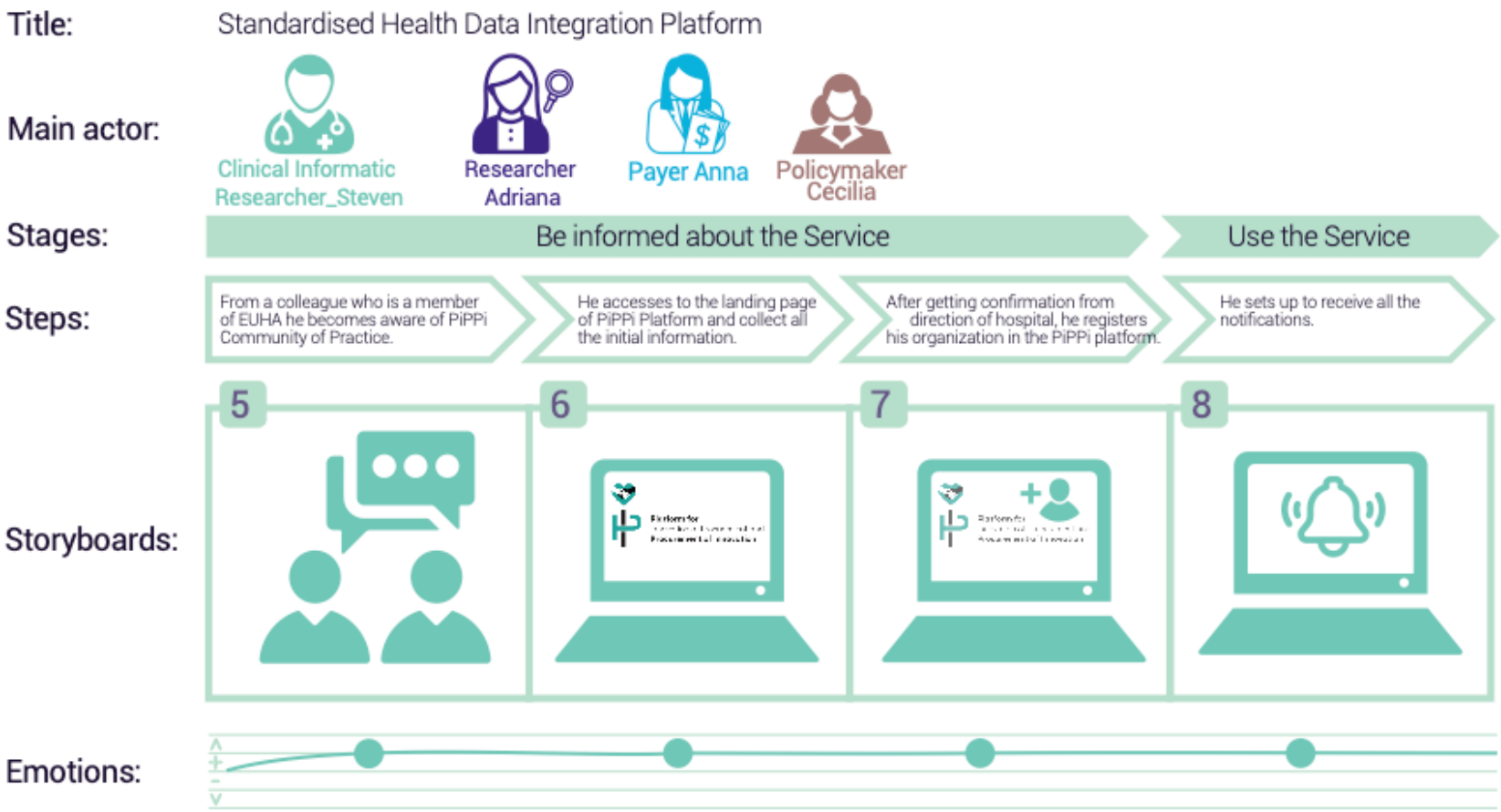

Figure 9 - User Journey Map 1b

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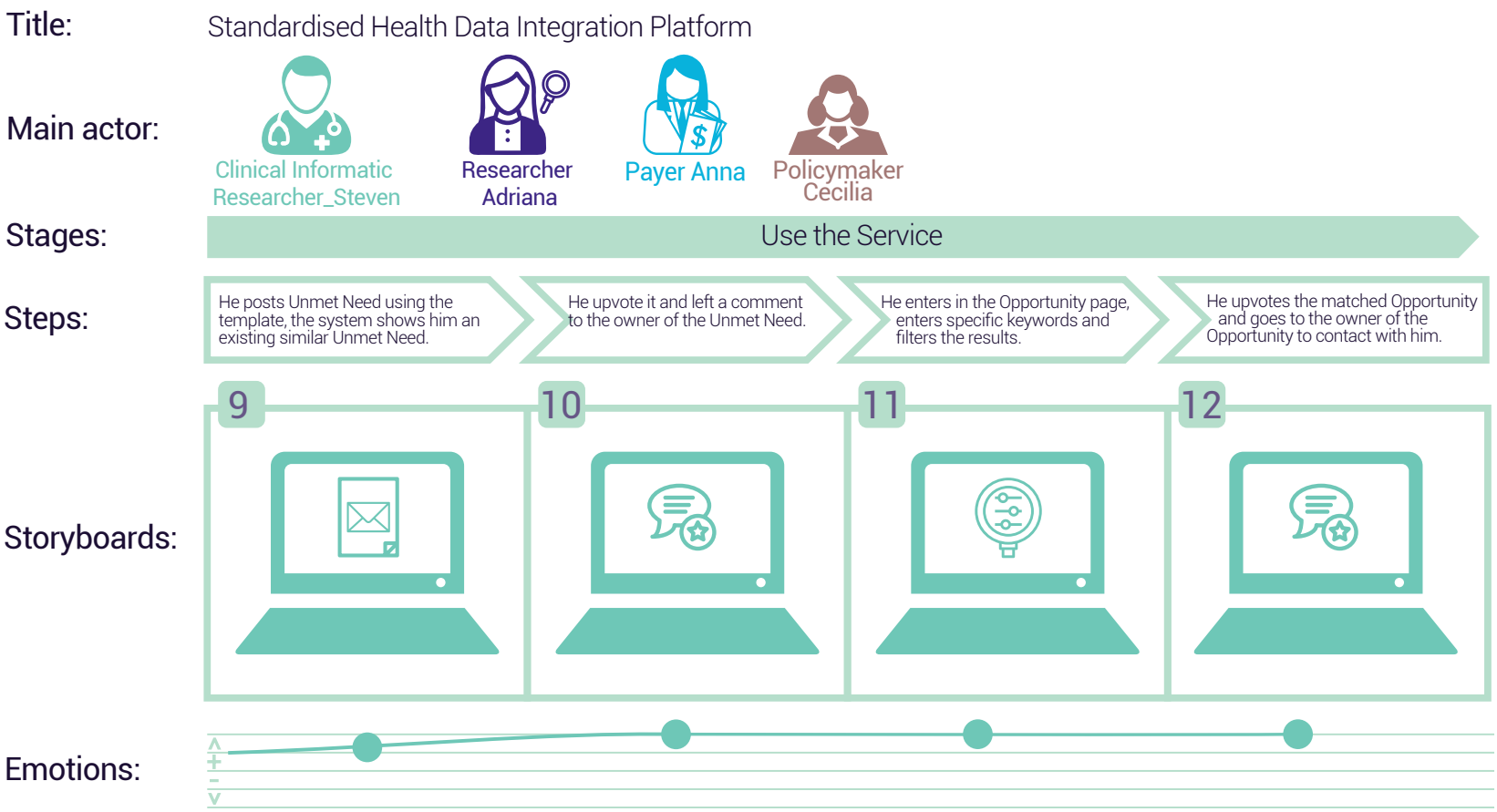

Figure 10 - User Journey Map 1c

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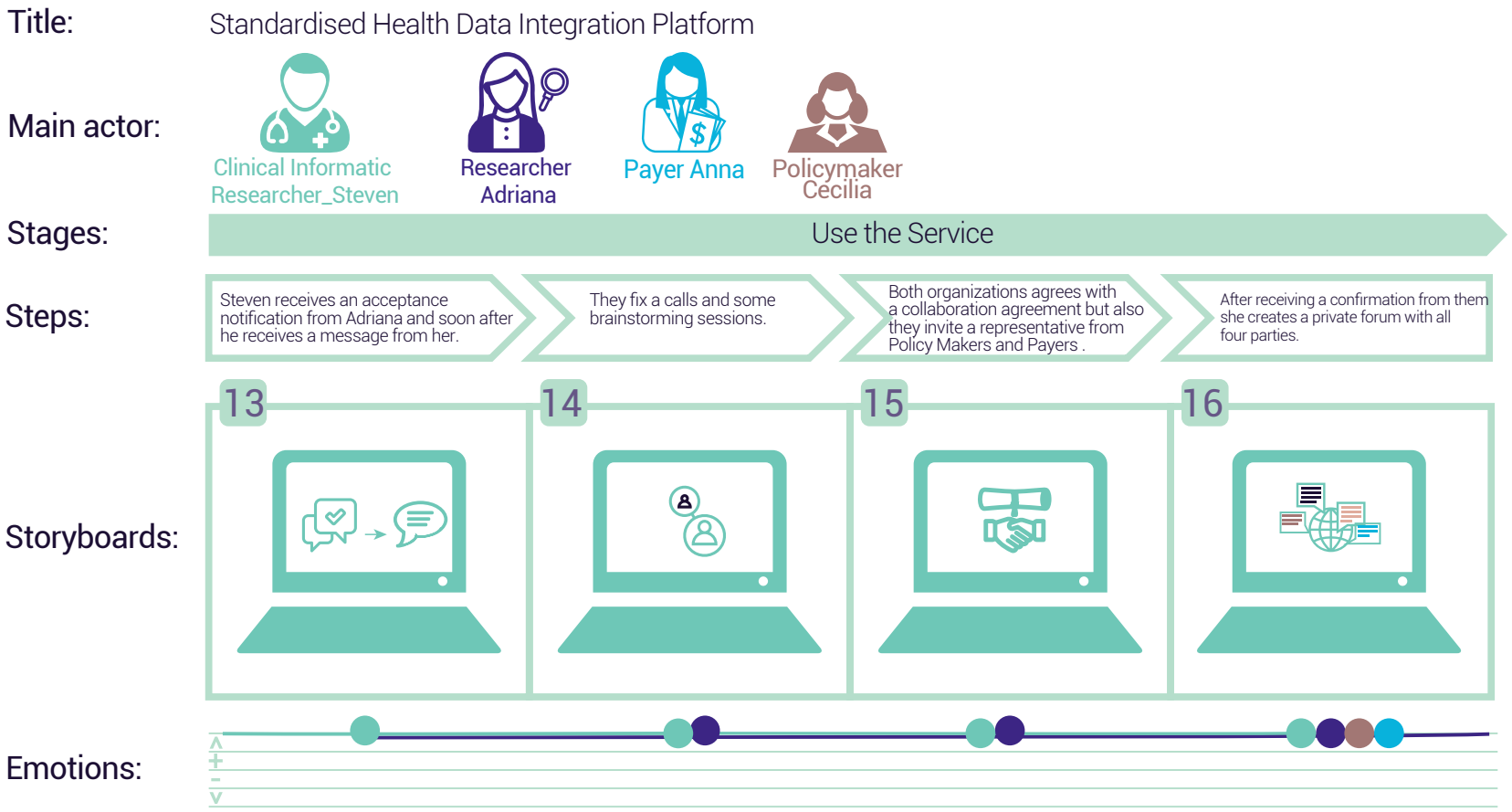

Figure 11 - User Journey Map 1d

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<table>
<tr><td colspan="2">Challenge 2: Visualization of aggregated diagnostic patient data</td></tr>
<tr><td rowspan="4">Included Personas</td><td>Healthcare Provider</td></tr>
<tr><td>Patient</td></tr>
<tr><td>Colleagues (Other HCP’s)</td></tr>
<tr><td>PiPPi Platform Users who have the shared Unmet Need</td></tr>
<tr><td colspan="2">Scenario:</td></tr>
<tr><td colspan="2">A 55-year-old Dutch patient, Luuk, moves to Italy for his job. With this new change, Luuk can't pay much attention to his diet, wellness routine, and doctor's checks. Lately, he is having long-standing coughs that get worse. Consequently, he goes to the general practitioner at a hospital in Milan to understand the cause of the cough. The practitioner asks for a blood test, a chest X-ray and directs him to the Oncologist.
The X-ray image of his lungs reveals an abnormal nodule. Besides learning that Luuk has been a heavy smoker for 15 years and his father also died of lung cancer, the Oncologist Antonio Moratti decides to perform a biopsy. Nevertheless, before determining by which procedure to perform the biopsy, he lacks a full understanding of the patient’s overall health status, as there are risks of biopsy as well. This is because, diagnosis procedures and treatment can be difficult due to the comorbidities, such as Luuk's diabetes. He needs to carefully assess these comorbidities before any diagnostic or therapeutic decisions regarding a probable lung cancer. Doctor Antonio necessitates to monitor all of Luuk's health conditions quickly and effectively since it is an emergency state where he has to make a fast decision. However, Luuk has only very few unstructured electronic health records in the health data infrastructure.
Doctor Antonio feels overwhelmed by not being able to visualize the old records of Luuk in proper formats, considering not every test is appropriate for every patient. He faces difficulties when attempts to have a full understanding of Luuk’s overall health status including his medical history, laboratory values, and daily habits to make an effective clinical decision. Therefore, Doctor Antonio asks for many time-</td></tr>
</table>

consuming exams. As the exams take a long time, Luuk's cancer gets worse, and Doctor Antonio loses time to decide what treatment is most appropriate for Luuk.
He is tired of experiencing this problem over and over again with different patients. When he complains to his colleagues about this specific problem, his colleagues mention a Webinar announcement on this subject in the news section of the hospital's website and attached on the hospital's notice board. He goes to the hospital's website and reads the content of this webinar as various Stakeholder's exchange experience and knowledge to detail the Digital Challenge of "Visualization of aggregated diagnostic patient data". He finds out that this Webinar is organized by a Community of Practice called PiPPi.
When he claims to see the webinar details, he is directed to the landing page of PiPPi Platform. He reads that the PiPPi Community is an ecosystem in which stakeholders can share their unmet needs, experiences, develop and discuss areas of opportunities. He decides to become a member to work on his current unmet need and feel part of the PiPPi CoP. He goes to "Register" through the tabs of the page. After registration (see UC-1), he enrolls himself for the webinar as well (see UC-17). To participate actively in interactions around this unmet need and to find other Stakeholders in the Healthcare sector with shared unmet needs, he shares his Unmet Need in the system as "A computer-based solution for Flexible visualization of collected diagnostic patient data" (see UC-2). As soon as he shares his unmet need, he is notified by the relevant unmet needs published earlier by other Stakeholders on the PiPPi Platform. He recognizes that his unmet need has been discussed by other professionals from other countries for months.
After reviewing the Stakeholders' profile details and working areas, he interacts with the relevant ones (see UC-7) with the same cross-border unmet needs and joins a linked forum. He realizes that his unmet need is a part of a cross-border digital challenge chosen by a multi-disciplinary and multi-cultural group. To develop the definition of this problem and to be part of the future innovations, together with other experts, they decide holding a workshop series to describe and further detail the unmet need. As the team details the unmet need, he edits his published Unmet need (see UC-6) modifying its visibility, title, description, keywords, uploaded files, topic,

as well as changes the status of it (see UC-4). Furthermore, through the webinar, they discuss the point of views of diverse Stakeholders like clinicians, patients, IT, service designers as well as potential approaches and ideas to visualize information extracted from clinical documents (see UC-9). Meanwhile, he discovers the Training Materials on the platform and decides to attend PCP / PPI classes (see UC-17). Thus, he can take part in a PCP/PPI related to the Digital challenges from now on.

Table 2 - Scenario 2

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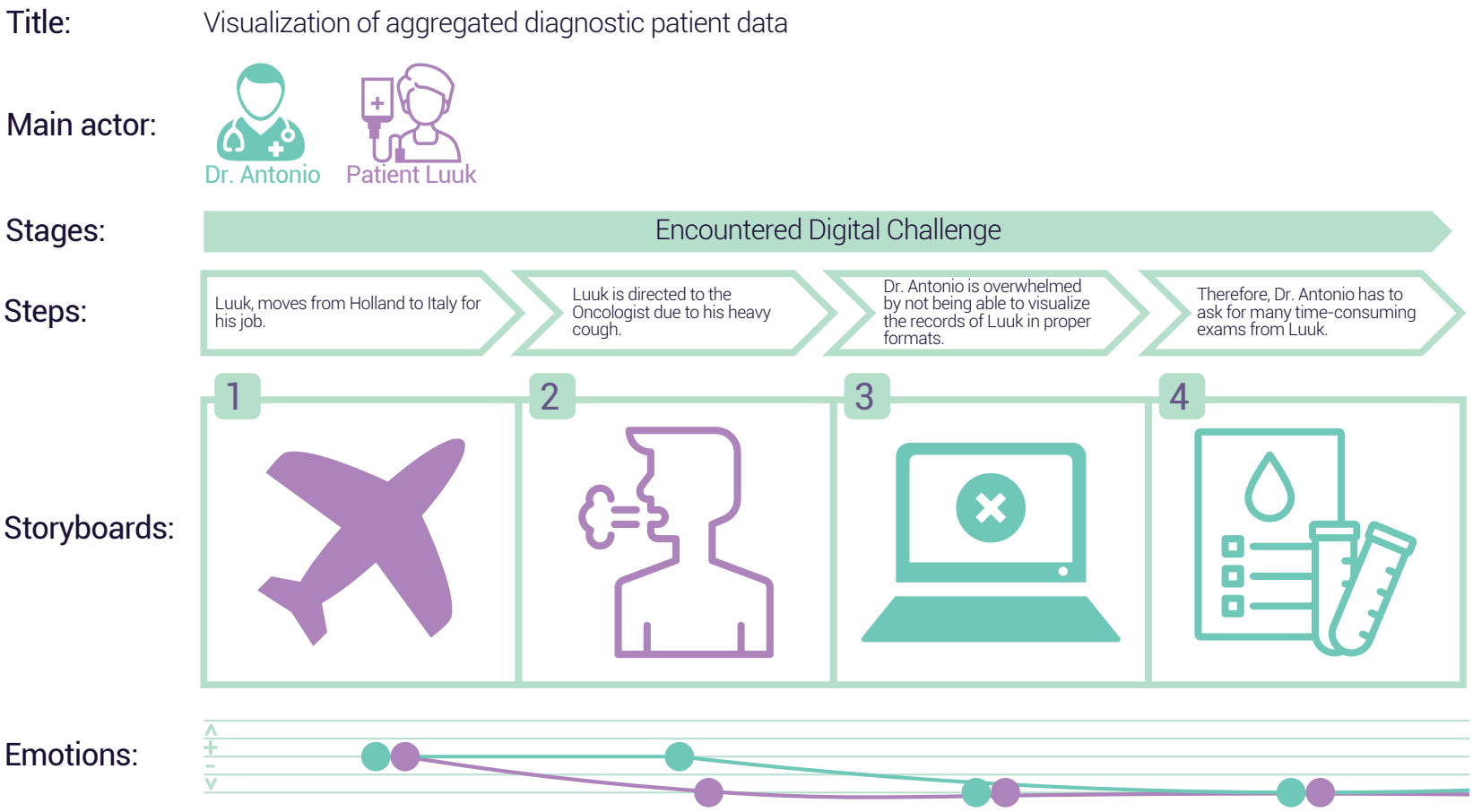

Figure 12 - User Journey Map 2a

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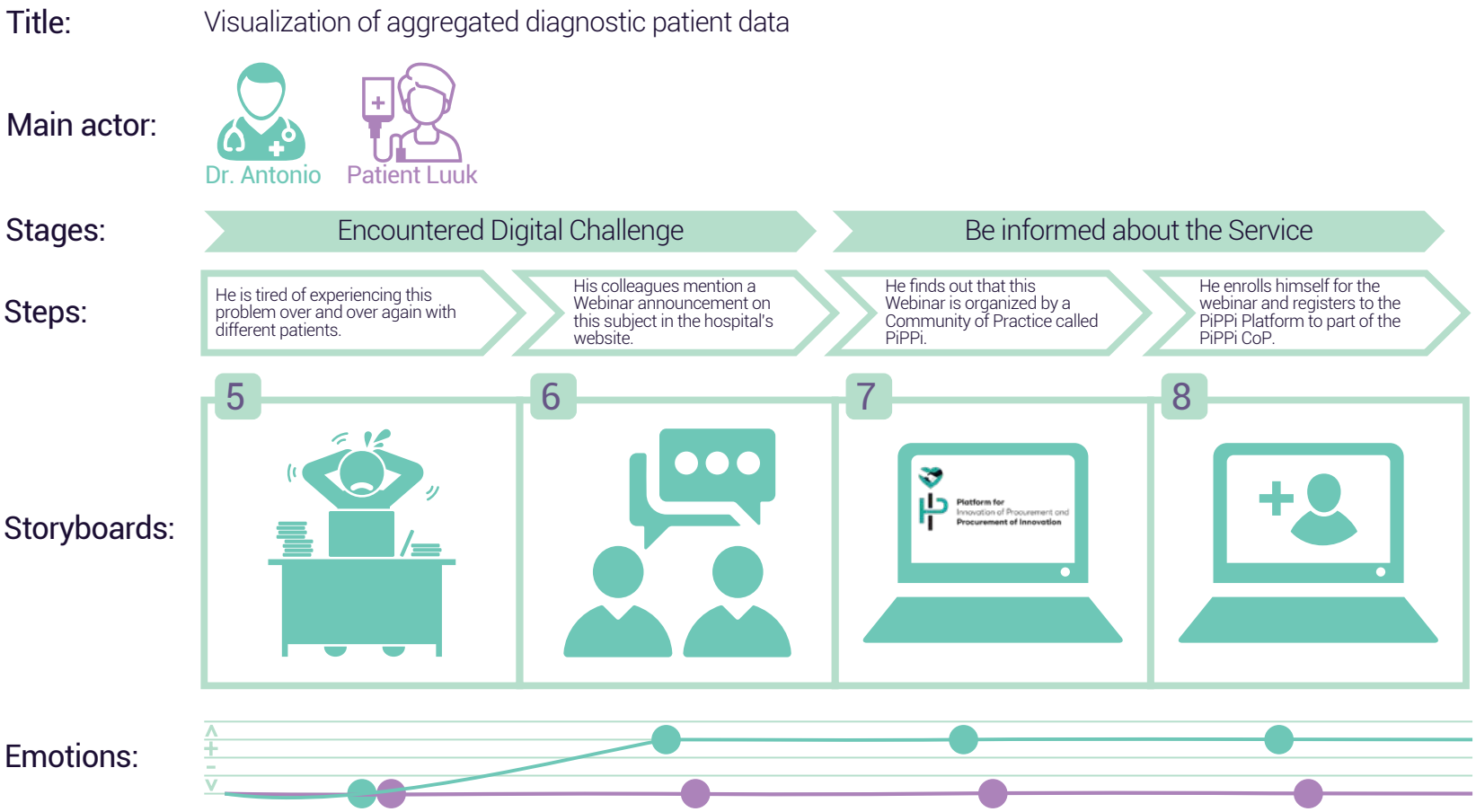

Figure 13 - User Journey Map 2b

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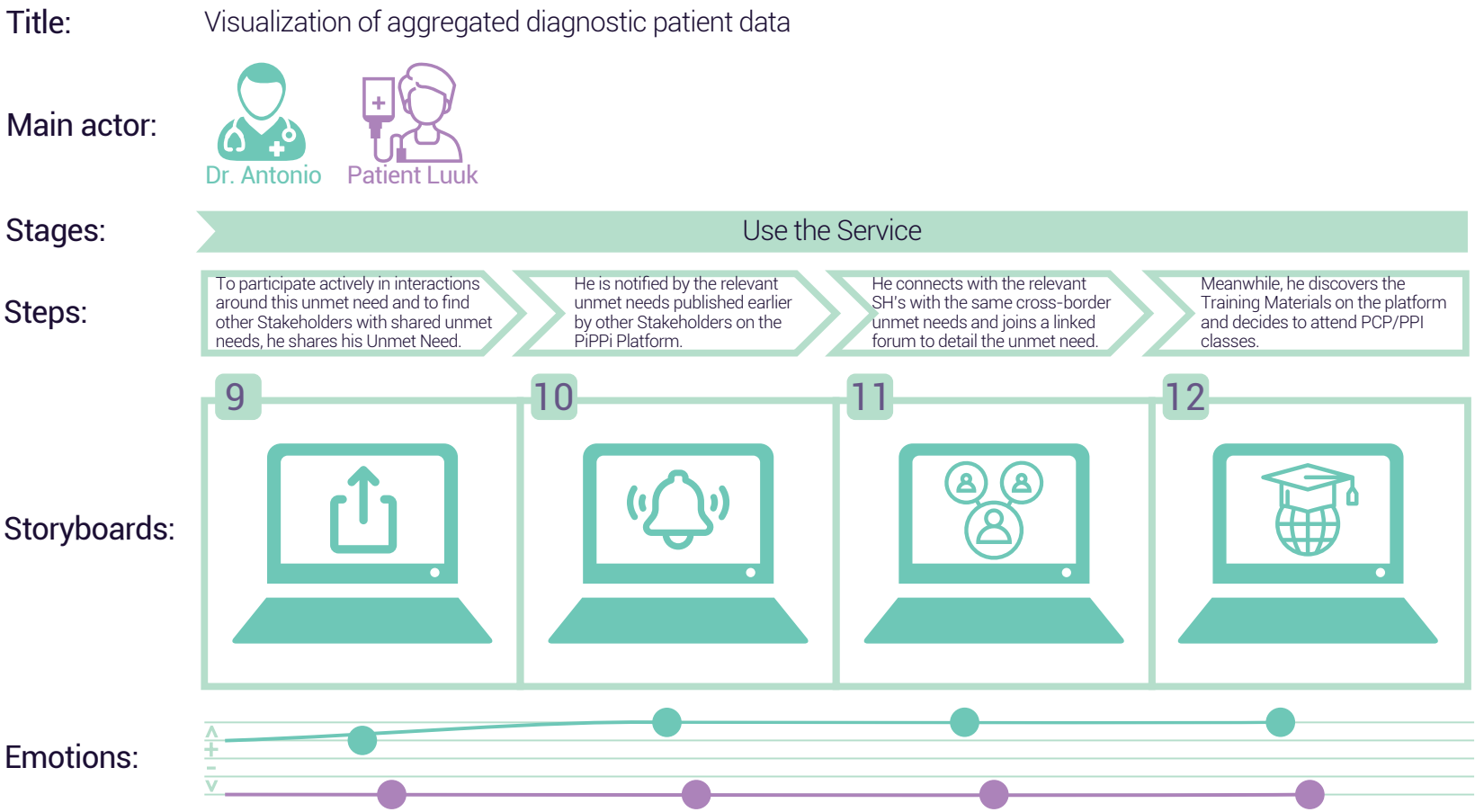

Figure 14 - User Journey Map 2c

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<table>
<tr><td colspan="2">Challenge 3: Continuous Monitoring and Engagement of Patients along the Specialized or Highly Specialized Care Path – within as well as Outside of the Hospital</td></tr>
<tr><td rowspan="7">Included Personas</td><td>Healthcare Provider</td></tr>
<tr><td>Researcher</td></tr>
<tr><td>Payer</td></tr>
<tr><td>Policymaker</td></tr>
<tr><td>Industry Provider</td></tr>
<tr><td>Enabler</td></tr>
<tr><td>Citizen and Patient Association Member</td></tr>
<tr><td colspan="2">Scenario:</td></tr>
<tr><td colspan="2">Antonio Moratti, Surgeon/Oncologist (HCP) works at a large university hospital in Milan and a private clinic. Specifically, he is specialized in immunotherapy treatments for lung cancer. He started to do more virtual consults with patients due to the Covid-19 pandemic. However, he needs to continuously monitor the qualitative and quantitative data of patients with severe chronic diseases inside and outside the hospital more effectively. Consequently, he feels the lack of advanced telemedicine software with AI-decision support.
Therefore, he wants to discover the existing solutions used for this Digital Challenge in other hospitals as best practices (PCP/PPI). He would like to figure out what do patients feel about this challenge. Finally, although he is short of time, he wants to give idea to the industry in a practical way and see products/services in development in this regard.
While doing research, Antonio discovers the PiPPi Platform, which serves the Community of Practice to share and get best practices, unmet needs, and opportunities in the healthcare environment. He registers on the PiPPi Platform (see UC-1). First, he searches for the prominent topics in the system (see UC-13) and realizes that the topic Monitoring that encompasses his UMN is very active. He reports the unmet need for "Continuous monitoring and engagement of patients along with the specialized or highly specialized care path – within as well as outside of the hospital" on the platform by using the provided template (see UC-2). Through</td></tr>
</table>

the template, Antonio specifies several aspects of the unmet need, such as keywords and a description, which offer an overview of the need; the scope, which he sets to ‘public’, in order to attract the interest of other stakeholders; the status, which he sets to ‘in search of ideas', in order to urge other stakeholders to take action to provide idea on the unmet need and further collaborate to detail it.

The posted unmet need becomes available on the list of unmet needs on the platform, and it is viewed by other users. He also edits his own profile and adds that he is now investigating this subject (see UC-14). Meanwhile, his Unmet Need matches a Researcher's Unmet need and Industry Provider’s opportunity. Hence, he realizes that his reported unmet need is shared among several other Stakeholders; Cristina, Lung Cancer Researcher, who would like to translate her research into clinical practice; and Raquel, Industry Provider, who would like to develop the lacking technology/products suitable for unmet needs in the Covid-19 Pandemic. He reaches them by pinging them through comments under their unmet needs (see UC-7) to further detail the need and to share insights that can help find opportunity areas for it.

They agree to create an external private forum with the scope of exchanging knowledge on this specific topic and understanding the different points of view around the challenge. As there are no solutions on the market addressing this challenge and there is an interest to stimulate the development and testing of new solutions (PCP). They start discussing the opportunity to develop technologic products with sensors and services to ease the Patient-Health Care Provider engagement and continuous monitoring of the patient.

Stakeholders working on this issue also search in the Platform to find relevant UMN’s (see UC-3), and they become aware of this unmet need and the corresponding public forum, while navigating on the PiPPi Platform. Anna is one of them, who is a representative of a healthcare paying entity in Stockholm. She joins the conversation (see UC-5). She obtains information to make strategic decisions regarding healthcare service and innovation tied to the Healthcare service specifications and related budgets. She understands what is happening in the Healthcare environment, which are different Stakeholders tight to it and what might

be an innovation. She realizes that in the recent years there has been increased demand for an innovation to monitor patients with chronic illnesses. She invites a user from the Policymakers, as strengthening the design of health care financing can guarantee health system sustainability. Cecilia, an employee in the Ministry of Health, participates in the conversation and she detects the unmet needs of different SH categories in society through their posted descriptions. She discusses the common constraints of stakeholders surrounding the unmet needs and the implications at the system level. She takes action to improve the outcome and satisfaction by adapting Healthcare Policies to the unmet needs of the different Stakeholders. The discussion group members search the PiPPi Platform to find an Enabler (see UC-15). They find the Enabler, Michael, who is an Employee from a consulting agency. Also, Michael joins the forum to comprehend the opportunities from HC and Industry, to be able to invest. He offers his expertise on cost-effectiveness to Healthcare Providers. Finally, an expert patient, Antonia, who is part of a patient association with chronic disease joins to give ideas from her point of view. She states her need for a better understanding of her disease, continuous supervision by her doctor as she's going through difficult experiences. The results of this collaboration are mutual knowledge exchange, promote innovative digital opportunities for monitoring and predicting different kinds of deteriorations through the use of advanced technical telemedicine solutions.

Table 3 - Scenario 3

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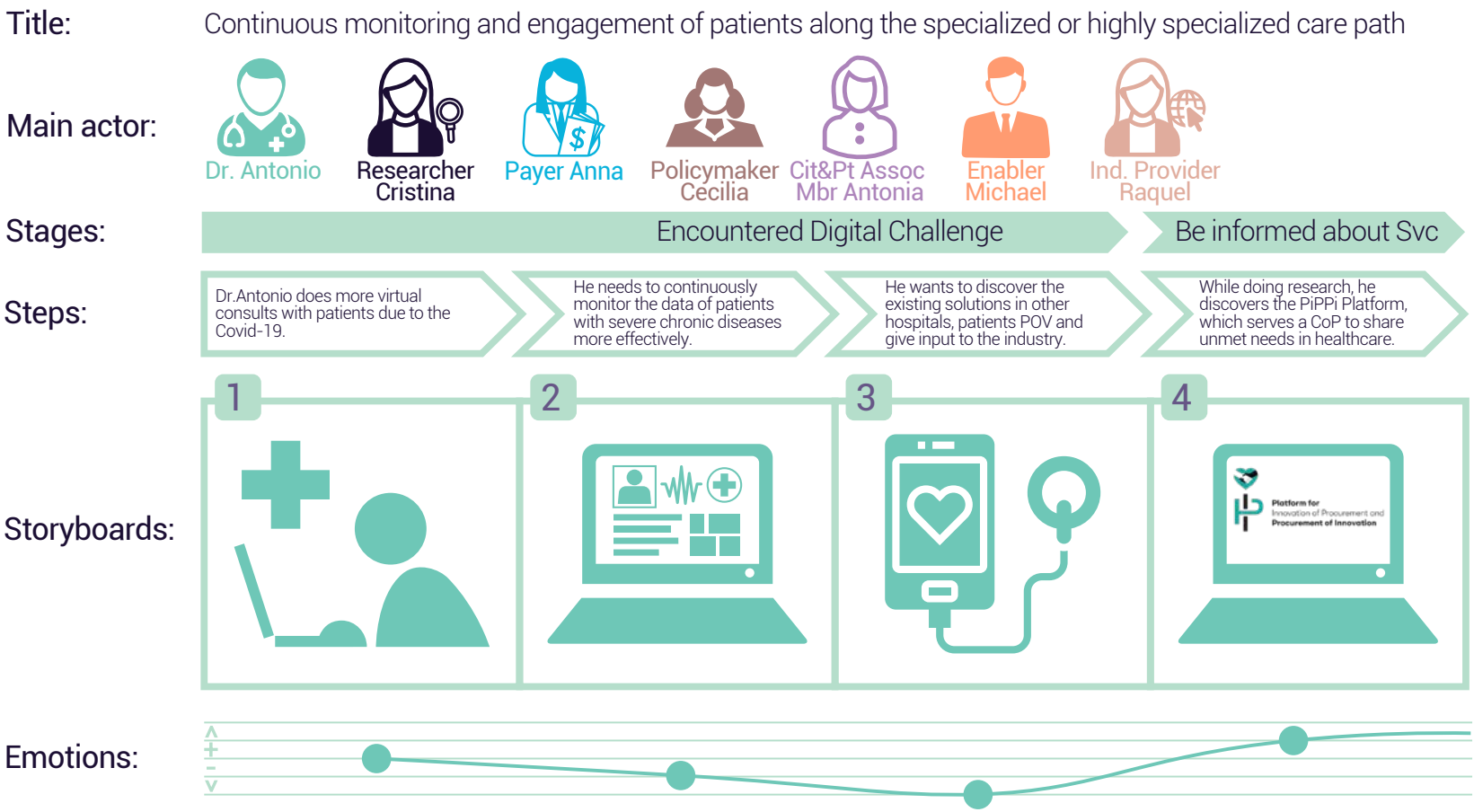

Figure 15 - User Journey Map 3a

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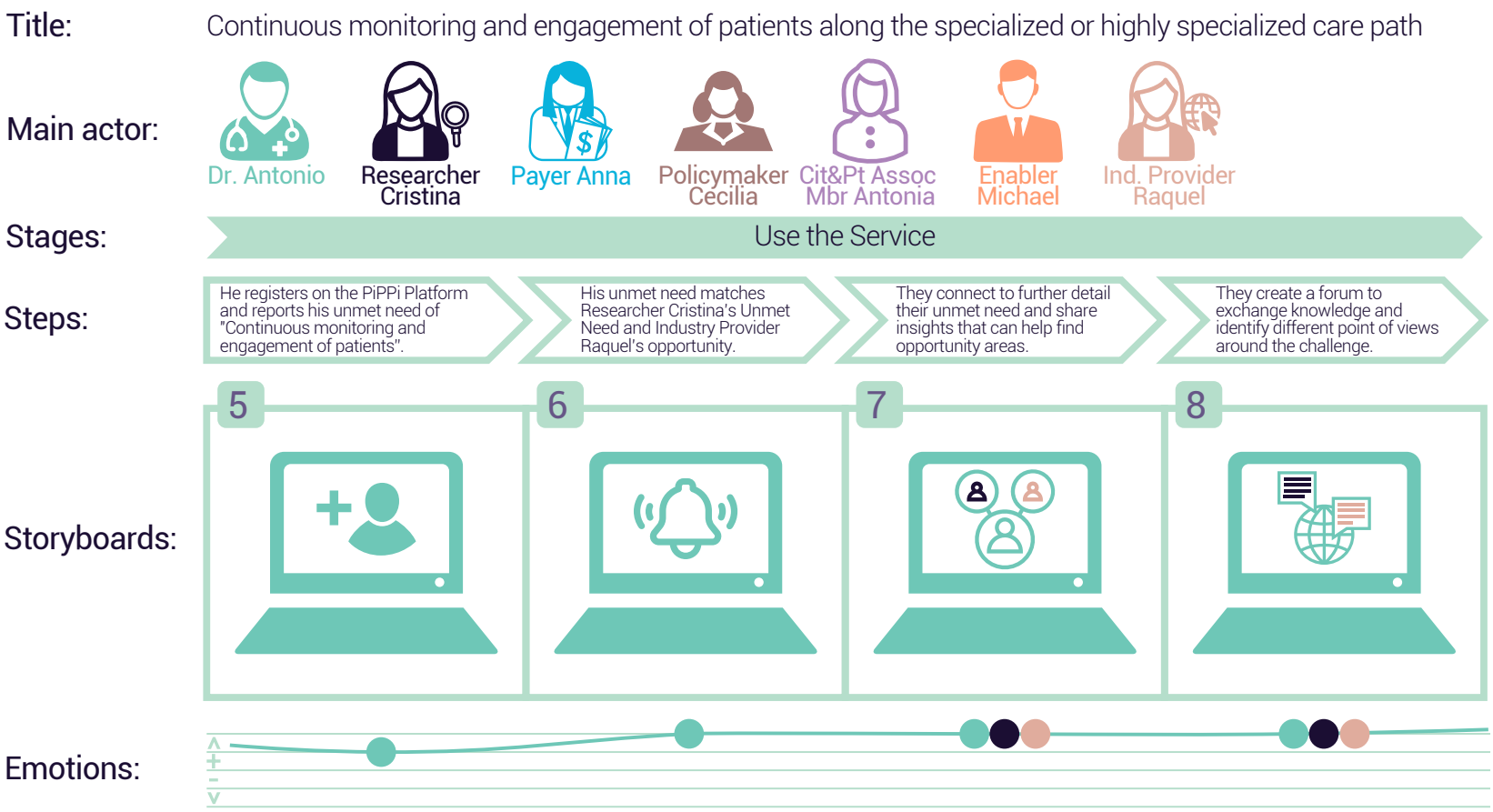

Figure 16 - User Journey Map 3b

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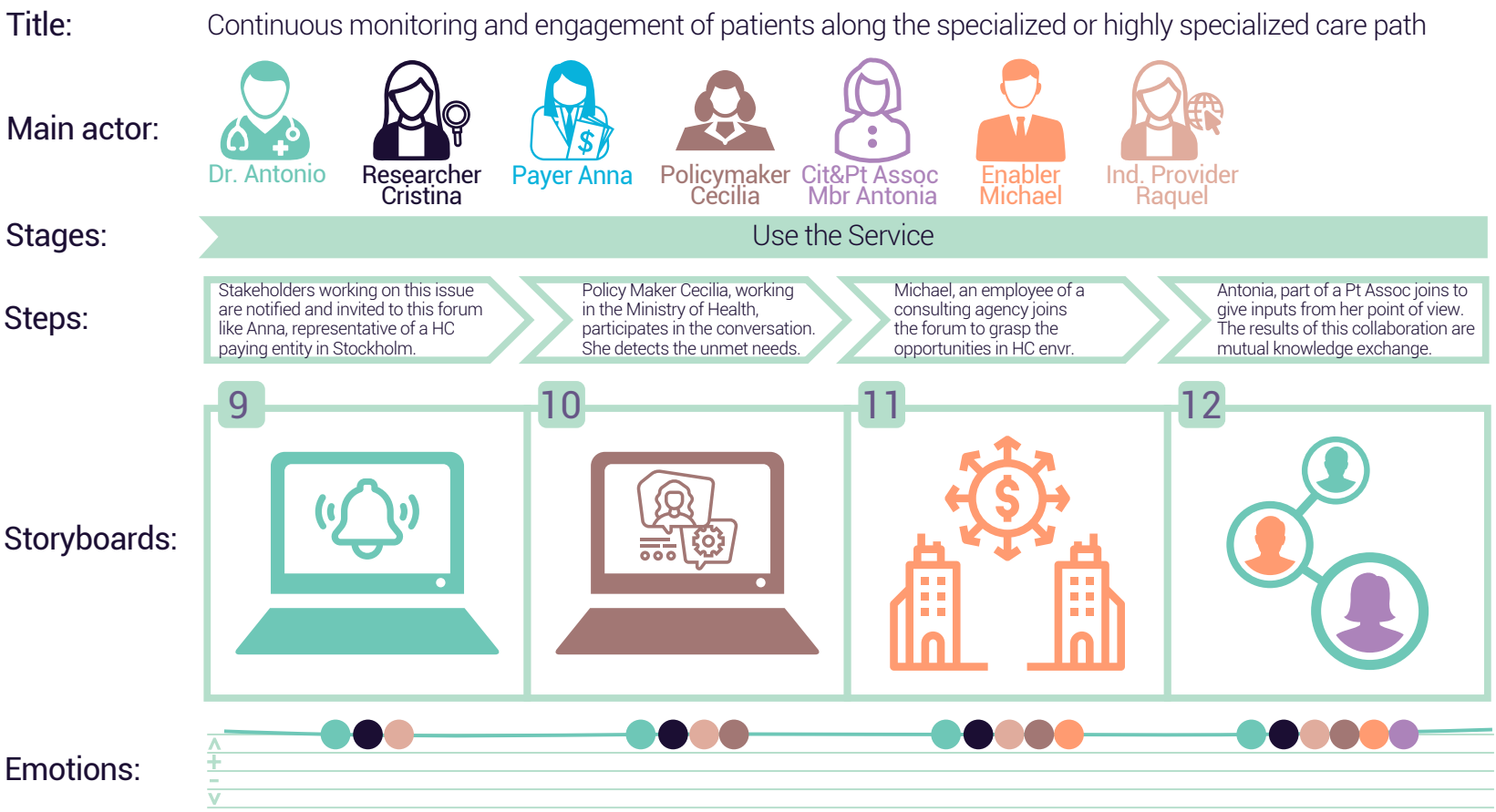

Figure 17 - User Journey Map 3c

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2. Implementation-Specific Preparations

Purpose

In April and May 2021 Implementation-Specific Preparations were performed to create a common language between the PiPPi WP4 team and the Developer. As the designed PiPPi Platform is intangible and complex, it was crucial to make sure that the development team was on the same page about the solution. Another objective to hold for these preparations was to prevent modification demands to functionalities of the platform during the implementation phase.

Methods and Materials

To take the next step after the Requirements Elicitation and lay the basis for the upcoming realization of the PiPPi Platform, WP4 team (representing the PiPPi Consortium), and the chosen Developer, Ideas2Innovation Sweden AB, held weekly meetings. During these alignment meetings, the participants discussed: (i) what should be implemented to fulfill user needs, (ii) how the requirements should be prioritized, and (iii) the timings of the implementation (e.g., implementation release dates).

Initially, WP4 team presented the Functionalities they have been working on and iterating according to the requests of WP2/3/6 partners. On this basis, for the next meetings, the Developer created Flow Charts of the PiPPi Platform, showing the Functionalities and their relationship with each other and the corresponding interaction possibilities with the future users. WP4 team and the development team discussed the feasibility of each functionality thoroughly. After each meeting the WP4 team iterated the functionalities, maintaining a prioritized functionalities list as well as a discussion points list.

Meanwhile, WP4 decided to invite selected Consortium Members to create a special small group, from now on it will be called as the Core Working Team (CWG). The participants were characterized having proper skills in order to assist WP4 team in the strategic decision-making related to the Implementation of the PiPPi Platform.

The modifications to the Functionalities, their iterations and the developers' questions were, on a weekly basis, discussed also with the CWG Team. While the functionalities were being iterated and re-prioritized, the Business Requirements of the PiPPi Project were always kept at the forefront. Finally, the WP4 team and the Developer decided the release implementation timings according to (i) required implementation periods, (ii) the deadlines of the PiPPi Project, and (iii) the timings of External SH Engagements.

Results

As a result, (i) uncertainties regarding the functionalities of the platform were resolved, (ii) functionalities were re-iterated and re-prioritized and (iii) the deadlines of the releases were defined (i.e., at the end of September, the 1st release will be completed, after the release of each feature, the PiPPi team will test the features with the Acceptance Criteria, the 2nd release will be made at the end of November, meanwhile, the bugs detected will be fixed until May 2022).

3. PiPPi Platform System Requirements Described through the Use Cases

Purpose

WP4 team created Use Cases to deepen the value of the idealized PiPPi platform and express how it should contribute to users. In other words, the PiPPi Platform User Requirements are presented through the detailed Use Cases. As stated in the book Requirements Development by Karl Wiegers, a use case is a sequence of actions between an actor (i.e., a user) and the system to achieve an outcome of value to the user (Wiegers & Beatty, 2013).

Methods and Material

In the first place, all the significant Use Cases were extracted from the three initial scenarios, narrating the use of PiPPi Platform.

Subsequently, based on (Wiegers & Beatty, 2013), a comprehensive template was utilized to detail the use cases, illustrated in Table 4. The first element of the template is a unique *ID* and *Name*, containing a verb and indicating the user goal. Then, the Actors are stated among the stakeholder categories (e.g., Healthcare provider) of PIPPI. An *Actor* is a person (or sometimes another product/system) that interacts with the system. Other elements of the use case template are: (i) a textual *Description* of the use case; (ii) a *Trigger*, that is an event that initiates the execution of the use case; (iii) *Preconditions* of the system, which are conditions that enable the execution of use case; (iv) *Postconditions*, which are the new conditions of the system after the execution of the use case (as observable by the user, and/or physical outcomes, and/or system changes); (v) the *Flow of actions* of the use case, in other words, an ordered sequence of interactions between the actor and the system. The flow can be made up of: (a) A Normal Flow, which is the default flow of actions; (b) an Alternative Flow, that represents fewer common variations; and (c) an Exceptional Flow, which consists of the actions that can take place if an expected event occurs.

ID and Name:	The name and the identifier of this Use Case
Primary Actor:	The Stakeholder who initiates this Use Case.
Secondary Actor:	The Stakeholder who interacts with the Primary Actor (optional).
Description:	A description of this Use Case.
Trigger:	The event that triggers the execution of this Use Case.

Preconditions:	The conditions that must be met before this Use Case can be executed.
Post conditions:	The conditions that must be met after this Use Case has been executed.
Normal Flow:	The ordered list of steps that must take place in order to achieve the goal of the Use Case.
Alternative Flow:	Other paths that may be followed by the Stakeholder in order to achieve the goal of the Use Case.
Exceptional Flow:	The ordered list of steps that may take place in the event of an exception.

Table 4 - Use Case specification template

Time after time, the use cases were presented to PiPPi partners through the Feedbacking Workshops with Consortium Members, some external and internal SH's via a survey (please see D4.5 for more detailed information). According to their feedback, Use-Cases have been continuously improved.

Later, the Features that make up the Use-Cases were written, and described through the User Stories in cooperation with the PiPPi Platform's Developer. A User Story is a brief and simple description of a feature told from the perspective of the product-service system (Cohn, 2004). User stories were written according to the following template: As a <type of user>, I want <some goal> so that <some reason>. These features were shared with other WP's via e-mail and during the team meetings. According to the feedback received, the features were iterated until the approval of other WP's was obtained. Being the complete Features list part of the technical Annexes to the Service Agreement signed with the Developer, this constitutes a confidential documentation and cannot be disclosed in the current public report. The appointed EC reviewers and PO however can receive it by requesting via email.

While writing the Use Cases, Roles and Permissions of the Stakeholder Categories on the PiPPi Platform were determined. Every user of the Platform, which belongs to a specific Stakeholder (SH) category, is appointed a specific Role, which rules the actions that (s)he can perform within the Platform itself. This work has been undertaken in collaboration with WP2, who set out the SH categories (i.e., Patient & Citizen, Payer, Industry Provider, Policy Maker, Healthcare Provider, Researcher), WP3, WP6 and the Developer, in order to be aligned with the CoP processes and Business Model previsions. Five Roles where then identified: Viewer, Contributor, Expert, Decision Maker, Admin. In addition, which additional actions these SH categories can perform, only on condition that it is authorized by the Admin, were determined. The current version of the Roles and Permissions Matrix is presented in the next paragraph.
Finally, the Technical Specification of the Platform are reported, to present the aimed Software performance in a precise manner (Indeed Editorial Team, 2021), please see the corresponding Section.

Results

Final Version of Use Cases

In total, 17 Use Cases were extracted and detailed. Below is an example of a use case (see Table 5), the entire use cases list can be found in the Appendix (see Appendix

Use Cases).

UC-2 Publish an Unmet Need

ID and Name:	**UC-2 Publish an Unmet Need**
Primary Actor:	User
Description:	User publishes his/her Unmet Need on the platform.
Trigger:	User indicates that (s)he wants to publish an Unmet Need.

Preconditions:	PRE-1. User is logged into PiPPi Platform. PRE-2. At least one of the Features of Publish Unmet Need through a Simplified Template or Publish Unmet Need is enabled by the Admin for users with the Viewer role.
Postconditions:	POST-1. Unmet Need is stored in the system. POST-2. A notification is e-mailed to whoever has enabled notifications regarding the unmet needs and/or the relevant topic.
Normal Flow:	**2.0 Publish an Unmet Need** 1. User asks to publish an Unmet Need. 2. System provides the Publish Unmet Need Form. 3. User fills the form including title, keywords, description, area, files, images, co-creators, visibility for SH's, existence of an associated private forum. 4. User selects either to Publish or Save Draft (see 2.1) 5. User asks to Publish Unmet Need (see …) 6. System confirms to Publish Unmet Need request (see …) 7. The user may download, fill and upload the blank template on the specific Unmet Need's page [optional].
Alternative Flow:	**2.1 Save Draft** 1. User asks to save the Unmet Need as draft **2.** System confirms to save the Unmet Need
Exceptional Flow:	**2.0.E1 Existing Unmet Need** 1. System displays to the user the existing other similar unmet needs 2. User can ask to view details of these specific unmet needs 3. If the user still wants to publish his/her Unmet Need to the system, then return to step 4 of normal flow.

Table 5 - Example Use Case - Publish an Unmet Need

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Roles and Permissions

Which SH Categories can perform which functionalities is presented through the Roles and Permissions Matrix (please see Table 6). Once SH Categories are selected in the Sign-up process, users are given a role that SH and Subcategory can have (please see the current version at Table 7). User Groups unite users from different SH categories, and they have distinctive authorizations. Only Administrators will have permission to create user groups. Please note that the correspondence between Roles and Stakeholders categories presented in Table 8 could be subject to change, following both the evolution of the definition of the CoP processes and the validation activities with the Stakeholders themselves.

In Table 6, the "X" in a cell means that the role named in the column has permission to perform the Feature shown in the row. The "(X)" in a cell shows that these features can be turned on and off by the admin when necessary.

For example, the "Publish Unmet Needs through a Simplified Template" functionality was decided not to be given as Default to Industry Provider SH Category to prevent them from advertising for their own benefit. Whereas Publish Unmet Need functionality was given as Default to a Healthcare Provider.

Feature	ROLE	ROLE	ROLE	ROLE	ROLE
	Viewer	Contributor	Expert	Decision Maker	Admin
Read information	X	X	X	X	X
Interact (comment/like)	X	X	X	X	X
Publish unmet need		X	X	X	X
Publish ideas to an unmet need		X	X	X	X
Publish unmet need / change status		X	X	X	X
Review ideas			X	(X)	(X)
Make decision for ideas				X	(X)
Manage users / Permission					X
Manage groups					X
Manage process					X

Table 6 - Roles and Permissions Matrix

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European Commission
Horizon 2020 European Union funding for Research & Innovation

Clusters		Subcluster I		Subcluster II	
Healthcare providers (procurers)	Contributor	Hospitals	Contributor	Procurers	Contributor
		Primary care	Contributor	Administration and Innovation professionals	Contributor
		Hospitals Socio-sanitary center	Contributor	Healthcare professionals	Contributor
		Others	Contributor		
Citizens & Patient Organitzation	Contributor	Citizens	Contributor	PCAG members	Contributor
		Patient Organizations	Contributor		
Payers	Viewer	Public	Viewer	Regional	Viewer
		Private	Viewer	National	Viewer
Policy-makers	Viewer / Contributor	Local/Regional	Viewer	Procurers	Contributor
		National	Viewer		
		Transnational	Viewer		
Industry	Viewer	SME / Start-up	Viewer	Pharma	Viewer
		Large companies	Viewer	Medtech	Viewer
Research and Innovation Community	Viewer / Contributor	Technological centers & Technological Universities	Viewer	-	
		Biomedical Research centers & Universities	Contributor	-	
		Procurement experts	Viewer	-	
Enablers	Viewer / Contributor	Governmental agencies	Contributor	Regional	Viewer
				National	Viewer
		Non-governmental agencies	Viewer	European	Viewer
				Procurer	Contributor

		Consulting firms	Viewer	-	
		Investors	Viewer	-	
		Others	Viewer	-	

Table 7 - Roles that Stakeholder and Subcategories can have

Technical Specification of the PiPPi Platform

As described in Deliverable 4.5, the PiPPi Platform implementation results to be a mix of customised development integrated with features delivered by the Developer through an already existing Software as a Service (i.e., *Wide Ideas*) with ad hoc modifications.

The PiPPi technical Platform will consist of two different parts, interconnected between each other, please see Figure 18 – PiPPi Platform framweork.

1. The PiPPi Web
2. Share & Innovate

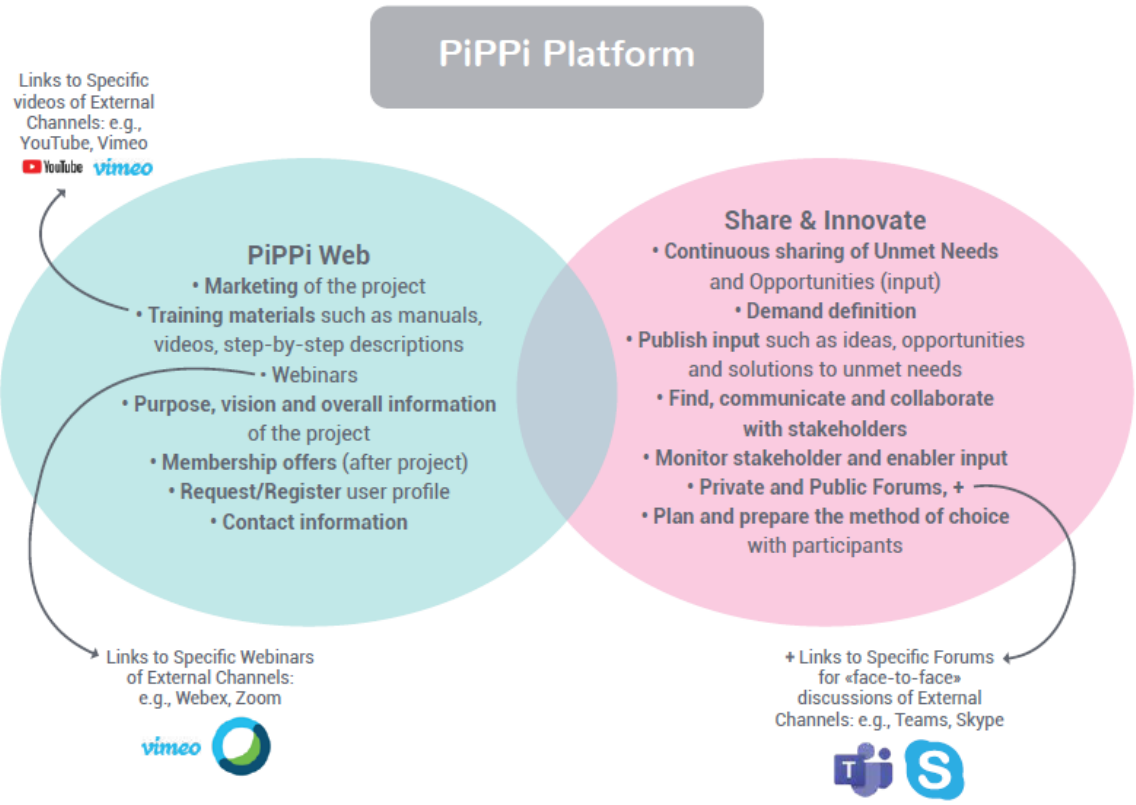

Figure 18 – PiPPi Platform framweork

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

The *PiPPi Web* is a website, built with the open-source platform WordPress, where all the needed information regarding the PiPPi project and its CoP, as well as the related activities, will be described. It will contain the Training part, the Marketing section the Contacts, as well as will manage the user registration and creation of profiles. Third-party services are used for webinars and storage of videos but will be embedded or linked from PiPPi Web to provide a seamless user experience.

The *Share and Innovate* part of the Platform allows users to share and describe unmet needs, co-create around them through private and public forums of users and match them with related ideas, opportunities, and best practices. This part is delivered by the Developer through the Software-as-a-service Wide Ideas[1]. Then, the PiPPi Platform is built by integrating "high-level" software components into a customized solution. They are all going to be delivered as a service and thus constantly improved by e.g. features, performance, and security.

In the following are reported the technical specification of the resulting PiPPi Platform:

1. Availability

Definition: availability is defined as the probability that the Platform is operating properly when it is needed, i.e., that it is not failed or undergoing maintenance (Spacey, 2021).

Specifications: the PiPPi Platform will be up and running 24/7. Moreover, the Platform is a cloud-based service that is delivered over an internet connection, which means that the reliability is measured in terms of network uptime. *Wide Ideas* have an SLA with minimum availability of 99,9%.

2. Throughput

Definition: throughput measures the MAXIMUM (not avg.) number of concurrent users that the Platform can handle (Spacey, 2021).

Specifications: Owing to its cloud-based nature, the Platform offers a high level of scalability (practically limitless). This is currently not a requirement, but it may turn out to be useful, should the userbase of the Platform grow in the future.

[1] https://getwideideas.com/

3. Authentication & Authorization

Definition: a system must abide by certain authentication and authorization policies. Authentication refers to assessing data as valid and Authorization provides clearance for users to access it.

Specifications: Authentication is done through Azure AD or Azure AD B2C using the OAuth 2.0/OpenID Connect and SAML 2.0 mechanisms

4. Interoperability

Definition: the software must offer comprehensive compatibility. This means that it needs to work on all the major operating systems, web browsers, and technical devices. These requirements may function based on the technology needs of customers.

Specifications: the Platform operates with Microsoft Edge, Google Chrome, Apple Safari and Mozilla Firefox.

5. Privacy

Definition: it refers to protecting a customer's sensitive data from internal data professionals and employees. For example, a privacy technical requirement may not allow employees to view a customer's social security number stored within a customer database.

Specification: Wide Ideas stores personal information and is therefore subject to GDPR. Wide Ideas is compliant with all requirements following that storage. The development team shares responsibility for customer support. To make the customer support flow efficient, selected members in the support team will have access to customer data. All access to customer data is done with authorization- and access controls in place. Access for a team member can be withdrawn at any time.

Customer data is never stored on employee computers. For instance, all developers use dummy data during development instead of customer data. All employees are given a walkthrough of PiPPi's security policy upon employment and are required to follow the procedures outlined there strictly. Wide Ideas does not have a separate security organization. Instead, all employees are part of always keeping our

customers' data safe. All customer data is stored in data centers within the EU. All access to the datacenters is strictly made through encrypted connections.

6. Data reliability

Definition: Data reliability means that data is complete and accurate

Specifications: automated backups of all data are taken at regular intervals 8every 24 hours). The automated backups are taken without affecting the performance or availability of the database operations. All the backups are stored separately in a storage service, and those backups are globally replicated for resiliency against regional disasters

7. Data and Information security

Definition: it refers to the encryption and security of user credentials, personal private information and user generated data. This level of security would also involve a requirement for encrypting highly classified information as well.

Specification: *Wide* Ideas is responsible for protecting PiPPi users' data from unauthorized access. Every time data is transferred it is protected by secure and encrypted protocols. In the cases where Wide Ideas exposes some part of the information on the internet, we use TLS to encrypt data during transfer. Automated tools are used to verify that encryption adheres to industry standards. Private keys for our certificates are stored with an extra layer of encryption. Any private keys that are suspected of being tampered with are immediately discarded and new keys are generated. Threshold for the security of user credentials and personal private information: *Wide Ideas* are B2C using the OAuth 2.0/OpenID Connect and SAML 2.0 mechanisms.

Validation of Requirements' Plan

The elicited User Requirements need to be then validated, and this process consists of two different passages (Wiegers & Beatty, 2013).

- To make sure that the steps of the documented Use Cases are written clearly and correctly through informal peer-reviews by the WP4 team, which provided a quality examination before baselining the features,
- To test whether the Platform correctly adheres to the Use Cases via Acceptance Criteria.

This chapter describes the plan of PiPPi Platform's requirements validation.

Purpose

Validation activities are carried out to uncover defects in the written requirements and, eventually therefore, in the future implemented PiPPi Platform. Therefore, the broader purpose of the Validation activities is to produce higher-quality requirements and develop the PiPPi Platform quicker and more economical.

Methods and Materials

Reviewing Requirements

After writing the Use Cases, the WP4 team held a few hours of Informal Peer Review meetings in a small group of 2 or 3 people composed by the WP4 team in July 2021. In these gatherings, one of the researchers read all the Use-Cases one-by-one, and the team detected all the glaring errors, ambiguities, and missing steps. In the meanwhile, another participant took note of these deficiencies. After the session, they corrected all the found issues and obtained higher-quality Use Cases. In this way, the team reviewed the acceptability of the Use Cases before starting the formal Acceptance Criteria Processes.

Based on the proposed checklist to validate Software Requirements in the book "Use and Profit from Peer Reviews on Business Requirements Documents" by Hoffman and Burgess, the WP4 team did the ultimate check, by simplifying the checklist suggested in the book (Wiegers & Beatty, 2013).

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

In detail, the WP4 team made sure of the success of the use cases according to the following parameters.

- Correctness: The WP4 team checked if the document covers all the requirements that are expected from the system.
- Completeness: The WP4 team checked if all the to-be-determined features are resolved as much as possible. They also made sure that all the necessary features were included.
- Consistency: The WP4 team ensured that the requirements do not involve conflicts among them. They also checked that each use case was written in the same format, numbered according to the same rules, and the chosen terminology.

Acceptance Criteria

OSR Researchers started looking for the answer to the question "How would we assess whether the solution meets the requirements?". In short, Acceptance Criteria (AC) are the circumstances with a clear pass/fail result that the software must satisfy.

User Stories to Evaluate the SW

As the first step, user stories are utilized following the recommendation of Wiegers and Beatty, Agile projects can prepare Acceptance Criteria by writing user stories (Wiegers & Beatty, 2013). To start, an Excel table containing the ID, Names and Descriptions of the Features and the Assessment criteria was prepared. First, an Excel table containing the ID, Names, and Descriptions of the Features and the Assessment criteria was prepared. These mentioned criteria are (i) the ID and (ii) the name of the feature, (iii) associated use case, (iv) user story, (v) acceptance test result among fail, pass, half-pass, (vi) the date, and (vii) comment. If needed, the tests could be repeated and new scores with new test dates could be entered. Below is the table prepared for a feature (Please see Table 8).

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

Features of the Platform				First Assessment		
ID	**Name / Short description**	**Associated Use Case**	**User Story**	**Acceptance Test fail (0), pass (1), half-pass (1/2)**	**Date**	**Comment**
Share & Innovate						
X	E.g., Add a Comment to an Unmet Need		E.g., As a user I want to have the possibility to add comments to Unmet Needs of my interest			

Table 8 - Acceptance Criteria via User Stories

WP4 Research team evaluated in an Agile way the implemented features in the Table, to see if they function as they supposed to be. This process was performed for Release 1 that was made in August - September 2021 and will be repeated for Release 2 in November 2021, following the PiPPi Project implementation roadmap. Scores were given according to the test results, the dates were written, as well as comments, if any. Open issues were coded as TBD in the comments section.

Acceptance Tests to Evaluate the SW

To test the Platform releases it was decided to also create Acceptance Tests. The purpose to use Acceptance Tests is to evaluate whether the developed PiPPi Platform satisfies its written requirements, to filter out defects in the requirements, and, ultimately, in the implemented software. This method is a more detailed evaluation than testing with User Stories.

The acceptance tests were written by the WP4 team for each use case covering its: (i) normal flow, (ii) alternative flow, and (iii) exceptional flow, to measure the level of success of implementation. Nevertheless, considering priorities, the higher importance was given to normal flows, and less to alternative and exceptional flows. The acceptance tests were written in the form of scenarios using a template called the Given-When-Then template (Kamil Nicieja, 2018). In brief, the Writing Given-When-Then scenarios; *Given's* are the prerequisites that enable the scenario to happen,

When's convey the main action of the scenario, whereas the *Then's* report the consequences (Kamil Nicieja, 2018).

To illustrate, the acceptance test for the use case “Publish an Unmet Need”, in which the user posts an Unmet Need to the system, is presented in the example below.

Scenario The user publishes a new Unmet Need

Given No other Unmet Need with the same name and keywords exists in the system

When User attempts to report his/her Unmet Need

Then Users Unmet Need should be posted in the list of Unmet Needs

After each new feature is developed in an agile way by the developers and then tested through the user stories by the WP4, the OSR team plans to carry out the acceptance tests for the features together with the suitable WP's (WP2,3,6), and with the stakeholders in their hospitals. External stakeholders’ involvement is also projected for the validation activities to be able to validate both the requirements and the success of solution itself. During the Acceptance Tests, the testers will use the written scripts to examine the software following the test-to-break approach, where the testers put the system to extremes until it breaks to uncover all the possible bugs. Finally, the results of a test showing the success level of the implementation will be coded as fail (0), pass (1) or half-pass (1/2).

To guarantee a coherent and easy to read narrative, all the results of the testing activities will be collected in the final Deliverable 4.4 “Reports on validation by use-cases”.

Discussion and Conclusions

In this section, a summary of the outcomes reached from the concluding activities of requirements elicitation, implementation-specific discussions with developers, use case approach, and the validation is presented.

As the use of design thinking helps to solve the challenges of elicitation of software requirements, the OSR team applied DT methods in collaboration with PiPPi Consortium partners to iterate PiPPi Platform Requirements. Personas, Scenarios, and UJM's obtained as a result of these activities are presented in Section 1. Thanks to the requirements elicitation methods, the OSR team identified 18 use cases describing the requirements of the PiPPi Platform (please see the Appendix

Use Cases) to be pursued in the implementation of the platform (Task 4.3). Then, implementation-specific discussions were carried out with the Developer and core-working team with agile culture to align on the requirements, priorities, feasibilities of the functionalities, and the timeline of the Software releases. Following the requirements elicitation, the WP4 team reviewed the use cases diligently to increase their quality and understandability. During the agile implementation period of the Platform, WP4 team will carry out the formal Acceptance Criteria Methods, also involving Consortium partners and external Stakeholders, to test whether the PiPPi Platform is implemented in order to fulfil the User Requirements. Thanks to this process, all the defects and weak points were detected and conveyed to the developers for improvement.

When the implementation phase will be completed by the Developers' team, the platform testing and validation through a cross-border PCP will be carried out (Task 4.4).

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Appendix

Use Cases

PiPPi Platform: The web application that makes the functionalities of PIPPI accessible to the PIPPI user-base through a web browser.
System: The layer of software and hardware that is necessary to run the platform and that lies beneath it.

Registration

UC-1 Register to the PiPPi Platform

ID and Name:	**UC-1 Register to the PiPPi Platform**
Primary Actor:	User
Description:	User registers to the PiPPi platform.
Trigger:	User indicates that (s)he wants to register on the platform.
Postconditions:	POST-1. The system stores the registration. POST-2. The system communicates to the User that the registration was successful.
Normal Flow:	**UC-1.0 Register to the PiPPi Platform** 1. User asks to Register Profile 2. System asks if the user wants to create a Personal Account or an Organizational Account (see 1.3). 3. User asks to create a Personal Account 4. System asks if the User belongs to one of the SH Categories of A, B, C (see 1.1) or E, D, F (see 1.2) 5. User enters requested information (see 1.0.E1). 6. The system sends the user an email to complete the registration. 7. User asks to go to the Registration continuation page from the link in the user's email, 8. User enters requested information (e.g., phone number, workplace, etc.) and (s)he asks to complete the registration.

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	9. System sends Verification Code to user by email. 10. User completes registration to PiPPi Platform by entering the code into the system (see 1.0.E2). 11. System confirms to user that the registration is completed. 12. The system stores the registration.
Alternative Flows:	**1.1 Create a Personal Account (A-B-C SH Categories)** 1. User claims to belong to one of A-B-C Categories. 2. The system prompts the user to enter the following information: Name, E-mail Address. 3. Return to step 5 of normal flow. **1.2 Create a Personal Account (D-E-F SH Categories)** 1. User claims to belong to one of D-E-F Categories. 2. The system prompts the user to enter some information (e.g., name, e-mail address, etc.). 3. User enters requested information (see 1.0.E1). 4. The system sends the Registration Request to the Admin by e-mail. 5. Admin of PiPPi Platform accepts the Registration Request. 6. Return to step 11 of normal flow. **1.3 Create an Organizational Account** 1. User asks to create an Organizational Account. 2. The system prompts the user to enter some information (e.g., name of organization, location, etc.). 3. User enters requested information (see 1.0.E1). 4. The system sends the Registration Request to the Admin by e-mail. 5. Admin of PiPPi Platform accepts the Registration Request (see 1.2.E3). 6. Return to step 11 of normal flow.
Exceptions:	**1.0.E1 Existing Identifier** 1. System communicates that there already exists a user with the same identifier (e.g., the same email address).

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

	2. If user enters a different identifier, then continue with normal flow. **1.0.E2 Invalid Confirmation Code** 1. System communicates that the provided confirmation code is not valid. 2. If user re-enters the confirmation code correctly, then continue with normal flow. **1.2.E3 Disapproval** 1. System Rejects to Register the account.

Unmet Needs

UC-2 Publish an Unmet need

ID and Name:	**UC-2 Publish an Unmet Need**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor publishes his/her Unmet need on the platform.
Trigger:	Contributor indicates that (s)he wants to publish an Unmet need.
Preconditions:	PRE-1. Contributor is registered and logged into PiPPi Platform. PRE-2. At least one of the Features of Publish Unmet need through a Simplified Template or Publish Unmet need is enabled by the Admin for users with the Viewer role (Table 7 - Roles that Stakeholder and Subcategories can have).
Postconditions:	POST-1. Unmet need is stored in the system. POST-2. A notification is sent to whoever has enabled notifications regarding the unmet needs and/or the relevant topic.

Normal Flow:	**2.0 Publish an Unmet Need** 1. Contributor asks to publish an unmet need. 2. System provides the Publish unmet need Form. 3. User fills the form (e.g. title, keywords, description area, etc.) 4. Contributor selects either to Publish or Save Draft (see 2.1). 5. Contributor asks to Publish Unmet need (see 2.0.E1). 6. System confirms the Publish Unmet need request (see 2.2). 7. Contributor may download, fill, and upload the blank template on the specific unmet need page [optional].
Alternative Flow:	**2.1 Save the UMN as Draft** 1. Contributor asks to save the Unmet need as draft 2. System confirms to save the Unmet need
Alternative Flow:	**2.2 Continue Editing the Draft UMN** 1. User asks to open draft unmet need of own or the one (s)he is co-creator of. 2. The System displays the selected draft unmet need. 3. User edits the elements as desired. 4. User asks to save new edits (including option to publish) 5. System confirms to save (and/or publish) the updated unmet need.
Exceptional Flow:	**2.0.E1 Existing Unmet Need** 1. System displays to the Contributor the existing other similar unmet needs. 2. Contributor can ask to view details of these specific unmet needs. 3. If the Contributor still wants to publish his/her Unmet need to the system, (s)he changes the identifier of the unmet need, then return to step 4 of normal flow.

UC-3 Search for Unmet needs

ID and Name:	**UC-3 Search for Unmet needs**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer searches for Unmet needs using different filter from the Unmet needs repository.
Trigger:	Viewer indicates that (s)he wants to filter among the Unmet needs.
Preconditions:	PRE-1. Viewer is registered and logged into PiPPi Platform.
Postconditions:	POST-1. System displays the search results among the Unmet needs according to the selected filters.
Normal Flow:	**3.0. Search for Unmet needs** 1. Viewer asks to open the Unmet needs Page 2. System opens the Unmet needs Page 3. Viewer applies desired filters (e.g., keyword(s), free text search, etc.) 4. Viewer asks to carry out the Search (See 3.0.E1). 5. The system displays the Unmet needs resulting from the applied filters.
Exceptions:	**3.0.E1 No Unmet Need Found** 1. System could not find any result from the search with the selected filters. 2. System notifies the viewer that the search was unsuccessful. 3. If the viewer requests to repeat the search using other filters, then system restarts Use case.

UC-4 Change the Status of an Unmet need

ID and Name:	**UC-4 *Change the status of Unmet need***
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.

Description:	Contributor changes the status of his/her published Unmet need.
Trigger:	Contributor indicates that (s)he wants to change the status of his/her published Unmet need.
Preconditions:	PRE-1. Contributor is registered and logged into PiPPi Platform. PRE-2. Contributor is owner or the co-creator of the Published Unmet need.
Postconditions:	POST-1. System changes status of the Unmet need. POST-2. A notification is emailed to co-creators (if any) and users who set their notification preferences to be notified on this matter.
Normal Flow:	**4.0. Change the Status of Unmet need** 1. Contributor asks to open his/her Published Unmet need. 2. System displays the selected Unmet need. 3. Contributor asks to change the status of the selected Unmet need among one of status options (e.g, immature, etc.). 4. System confirms the request of changing status of Unmet need. 5. System stores the changed status of the Unmet need. 6. System emails to co-creators (if any) and users who set their notification preferences to be notified on this matter.

UC-5 Ask to join an external private forum

ID and Name:	**UC-5 Ask to join an external private forum**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.

Description:	Contributor asks to join an external private forum on a specific UMN.
Trigger:	Contributor indicates that (s)he wants to join the private forum of a specific UMN.
Preconditions:	PRE-1. Contributor is registered and logged-in to the platform. PRE-2. Contributor has permission to view at least one Unmet need (a public one or a private one and got permission to interact).
Postconditions:	POST-1. The Request to join the forum is emailed to the UMN owner.
Normal Flow:	**5.0 Ask to join an external private forum** 1. Contributor asks to visualize a specific Unmet need. 2. System displays the specific Unmet need. 3. Contributor requests to join the external private forum relating to the UMN. 4. System displays a form to be filled in order to understand the reasons for the request. 5. The contributor fills the form and asks for it to be sent for confirmation (See 5.0.E1). 6. System sends an email to the owner and possible co-creators of the Unmet need with a request to add Contributor as a member of the private forum.
Exceptions:	**5.0.E1 Insufficient information is entered** 1. System informs Contributor of the required questions to be answered. 2. If Contributor fills out the necessary questions, then return to step 6 of normal flow.

UC-6 Edit Unmet need

ID and Name:	UC-6 Edit Unmet need
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor edits his/her published Unmet need (e.g., title, description, etc.).
Trigger:	Contributor indicates that (s)he wants to edit his/her published Unmet need (e.g., title, description etc.).
Preconditions:	PRE-1. Contributor is registered and logged into PiPPi Platform. PRE-2. Contributor is owner or the co-creator of the Published Unmet need.
Postconditions:	POST-1. System modifies the Unmet need as requested. POST-2. A notification is emailed to co-creators (if any) and users who set their notification preferences to be notified on this matter.
Normal Flow:	**UC-6.0 Edit Unmet need** 1. Contributor asks to open his/her published Unmet need. 2. System displays the selected Unmet need. 3. Contributor modifies the factors of the Unmet need (e.g., title, description, keywords, etc.). 4. Contributor asks to save the modifications he has made. 5. System confirms the request of changing status of Unmet need. 6. System stores the modified factors of the Unmet need. 7. System emails to co-creators (if any) and users who set their notification preferences to be notified on this matter.

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

UC-7 Post comment on an Unmet need

ID and Name:	**UC-7 Post comment on an Unmet Need**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor adds comment to a specific Unmet need.
Trigger:	Contributor indicates that (s)he wants to add comment to a specific Unmet need.
Preconditions:	PRE-1. Contributor is registered and logged in. PRE-2. If the Contributor posts comment to a Private Unmet need, the Contributor must be allowed to interact with that UMN. Or he has to be a creator/co-creator.
Postconditions:	POST-1. System stores the new comment to the UMN. POST-2. System notifies the Owners of this specific UMN and users who have set their notifications to be notified, about new comments. POST-3. If the Ping feature is used, the system sends an e-mail notification to the Pinged user(s).
Normal Flow:	**7.0 Post comment on an Unmet Need** 1. Contributor asks to open selected UMN. 2. The system opens the selected UMN page. 3. Contributor writes the message (s)he wants to post (See 7.1). 4. Contributor asks to post the comment. 5. System confirms the request of posting the comment. 6. System stores the new comment to the UMN in the system. 7. System notifies UMN Owners and users who have set their notifications to be aware of new comments.
Alternative Flow:	**7.1 Post comment by Pinging Users** 1. Contributor writes the message (s)he wants to post by pinging user(s), namely by typing @name. 2. Contributor asks to post the comment.

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

	3. System confirms the request of posting the comment. 4. System stores the new comment to the UMN in the system. 5. System notifies UMN Owners, users who have set their notifications to be aware of new comments, and the pinged user(s) about this new comment.

UC-8 Like an Unmet need

ID and Name:	**UC-8 Like an Unmet need**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor likes a specific unmet need.
Trigger:	Contributor indicates that (s)he wants to like a specific unmet need.
Preconditions:	PRE-1. Contributor is registered and logged in. PRE-2. If the Contributor likes a Private Unmet need, the Contributor must be allowed to interact with that UMN. Or he has to be a creator/co-creator.
Postconditions:	POST-1. System stores the new like to the UMN. POST-2. System notifies the Owners of this specific UMN and users who have set their notifications to be notified, about new likes.
Normal Flow:	**8.0 Post comment on an Unmet Need** 1. Contributor asks to open selected UMN. 2. The system opens the selected UMN page. 3. Contributor asks to like the UMN. 4. System confirms the request to put a like. 5. System stores the new like to the UMN in the system. 6. System notifies UMN Owners and users who have set their notifications to be aware of new like.

Ideas

UC-9 Add idea to an Unmet need

ID and Name:	**UC-9 Add idea to an Unmet need**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor adds idea to a specific Unmet need.
Trigger:	Contributor indicates that (s)he wants to add an idea to a specific Unmet need.
Preconditions:	PRE-1. Contributor is registered and logged in. PRE-2. If the Contributor adds idea to a Private Unmet need, the Contributor must be allowed to interact with that UMN. Or it has to be a creator/co-creator.
Postconditions:	POST-1. System stores the new idea to the UMN. POST-2. System notifies the Owners of this specific UMN and users who have set their notifications to be notified, about this new idea. POST-3. Newly added idea becomes available to UMN owners' evaluation.
Normal Flow:	**9.0 Add idea to an Unmet need** 1. Contributor asks to access selected UMN page. 2. The system opens the selected UMN page. 3. Contributor asks to add idea. 4. The system opens the corresponding form to add idea. 5. Contributor fills out the form (e.g, title, description, keywords, etc.). 6. Contributor asks either to add the idea or save it as draft (see 9.1) (see 9.0.E1) 7. System confirms the request of adding the idea. 8. System stores the new Idea to the UMN in the system.

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

	9. System notifies this new idea to UMN Owners and users who have set their notifications to be aware of it. 10. Newly added idea becomes available to UMN owners' evaluation.
Alternative Flow:	**9.1 Save the idea as Draft** 1. Contributor asks to save the idea as draft. 2. System confirms to save the idea.
Alternative Flow:	**9.2 Continue Editing the Draft Idea** 1. User asks to open draft idea of own or the one (s)he is co-creator of. 2. The system displays the selected draft idea. 3. User edits the elements as desired. 4. User asks to save new edits (including option to publish). 5. System confirms to save (and/or publish) the updated idea.
Exceptions:	**9.0.E1 Incomplete information is entered** 1. System notifies the Contributor that missing information has been entered. 2. If the Contributor wishes, (s)he completes the missing parts of the form and continues from the step 4 of the normal flow.

UC-10 Search for Ideas

ID and Name:	**UC-10 Search for Ideas**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor searches for idea among the idea repository using different filters. From ideas one can visualize only the ideas to public UMN's as well as the ideas written for the UMN's for which (s)he is authorized to visualize.

Trigger:	Contributor indicates that (s)he wants to filter among the Unmet needs.
Preconditions:	PRE-1. Contributor is registered and logged into PiPPi Platform.
Postconditions:	POST-1. System displays the search results among the Unmet needs according to the selected filters.
Normal Flow:	**10.0. Search for Ideas** 1. Contributor asks to open the Ideas page. 2. System opens the Ideas page. 3. Contributor applies desired filters (e.g., free text search, topic, etc.). 4. Contributor activates desired sorting factors (e.g., last published, the last update, etc.) 5. Viewer asks to carry out the Search (See 10.0.E1). 6. System displays the ideas resulting from the applied filters and sorting filters.
Exceptions:	**10.0.E1 No Idea Found** 1. System could not find any idea resulting from the search with the selected filters. 2. System notifies the user that the search was unsuccessful. 3. If the Contributor requests to repeat the search using other filters, then system restarts use case.

UC-11 Post comment on an Idea

ID and Name:	**UC-11 Post comment on an Idea**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor posts comment to a specific idea.

Trigger:	Contributor indicates that (s)he wants to post comment to a specific idea.
Preconditions:	PRE-1. Contributor is registered and logged in. PRE-2. If the Contributor posts comment to a Private idea, the Contributor must be allowed to interact with the UMN associated with the specific idea. Or he has to be a creator/co-creator.
Postconditions:	POST-1. System stores the new comment to the idea. POST-2. System notifies the idea owners and users who have set their notifications to be notified about new comments. POST-3. If the Ping feature is used, the system sends an e-mail notification to the Pinged user(s).
Normal Flow:	**11.0 Post comment on an Unmet need** 1. Contributor asks to open selected idea. 2. The system opens the selected idea (see 11.1). 3. Contributor writes the message (s)he wants to post. 4. Contributor asks to post the comment. 5. System confirms the request of posting the comment. 6. System stores the new comment to the idea in the system. 7. System notifies idea owners and users who have set their notifications to be aware of new comments.
Alternative Flow:	**11.1 Post comment by Pinging Users** 1. Contributor writes the message (s)he wants to post by pinging user(s), namely by typing @name. 2. Contributor asks to post the comment. 3. System confirms the request of posting the comment. 4. System stores the new comment to the idea in the system. 5. System notifies idea owners, who have set their notifications to be aware of new comments, and the pinged user(s) about this new comment.

UC-12 Like an Idea

ID and Name:	**UC-12 Like an Idea**
Primary Actor:	Contributor See the Roles and Permissions table to discover other SH's with different roles who are allowed to use this Feature.
Description:	Contributor likes a specific idea.
Trigger:	Contributor indicates that (s)he wants to like a specific idea.
Preconditions:	PRE-1. Contributor is registered and logged in. PRE-2. If the Contributor likes a Private idea, the Contributor must be allowed to interact with the UMN associated with the specific idea. Or he has to be a creator/co-creator.
Postconditions:	POST-1. System stores the new like to the idea. POST-2. System notifies the idea owners and users who have set their notifications to be notified about new likes.
Normal Flow:	**12.0 Like an Idea** 1. Contributor asks to open selected idea. 2. The system opens the selected idea. 3. Contributor asks to like the idea. 4. System confirms the request to put a like. 5. System stores the new like to the idea in the system. 6. System notifies idea owners and users who have set their notifications to be aware of new comments.

Topics

UC-13 Search for Topics

ID and Name:	**UC-13 Search for Topics**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer searches for a specific Topic among the repositories.

Trigger:	Viewer indicates that (s)he wants to filter among the Topics.
Preconditions:	PRE-1. Viewer is registered and logged into PiPPi Platform.
Postconditions:	POST-1. System displays the search results among the Topics according to the selected filters.
Normal Flow:	**UC-13.0 Search for Topics** 1 Viewer asks to access topic page. 2 System displays the topic page. 3 Viewer searches through topics using filters (e.g., free text search, status, etc.) (see 13.0.E1). 4 System displays the topics found as a result of the selected filters.
Exceptions:	**13.0.E1 No Topic Found** 1. The system could not find any topic as a result of the selected filters. 2. The system notifies the viewer that the search was unsuccessful. If the Viewer wishes to renew the search using other filters, then system restarts use case.

Users / Organizations

UC-14 Edit Profile

ID and Name:	**UC-14 Edit Profile**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer modifies components in his/her profile.
Trigger:	Viewer indicates that (s)he wants to components items in his/her profile.
Preconditions:	PRE-1. Viewer is registered and logged into PiPPi Platform.
Postconditions:	POST-1. System modifies the personal profile as requested.

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European Commission | Horizon 2020 European Union funding for Research & Innovation

Normal Flow:	**14.0 Edit Profile** 1. Viewer asks to open his/her profile page. 2. System displays the profile page. 3. Viewer modifies the factors of the profile (e.g., name, profession, etc.). 4. Viewer asks to save the modifications he/she has made (see 14.0.E1). 5. System confirms the request of saving the modifications to the profile. 6. System stores the modified Profile.
Alternative Flow:	**14.1 Edit Profile of an Organization** 1. Viewer asks to open profile of a specific organization. 2. System displays the profile page. 3. Viewer modifies the factors of the profile (e.g., Name of Organisation, Location, etc.). 4. Viewer asks to save the modifications he/she has made (see 14.0.E1). 5. System sends a confirmation request to the admin via e-mail (see 14.0.E2). 6. Admin accepts request. 7. System confirms the request of saving the modifications to the profile. 8. System stores the modified Profile.
Exceptions:	**14.0.E1 Existing Identifier** 1. System communicates that there already exists a user with the same identifier (e.g., the same email address). 2. If user enters a different identifier, then continue with step 5 of normal flow. **14.0.E2 Failed Organizational Profile Modification** 1. Admin does not accept the request. 2. The system rejects the request of saving the modifications to the profile.

UC-15 Search for Users

ID and Name:	**UC-15 Search for Users / Organizations**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer searches for specific users / organizations among the repositories.
Trigger:	Viewer indicates that (s)he wants to filter among the users / organizations.
Preconditions:	PRE-1. Viewer is registered and logged into PiPPi Platform.
Postconditions:	POST-1. System displays the search results among the users/organizations according to the selected filters.
Normal Flow:	**15.0 Search for Users** 1. Viewer asks to access CoP Members page. 2. System displays the CoP Members page (see 15.1). 3. Viewer searches users by filters (e.g., free-text search, alphabetical order, etc.) (see 15.0.E1). 4. System displays the users found as a result of the selected filters.
Alternative Flow:	**15.1 Search for Organizations** 1. Viewer searches for the organizations using filters (e.g., free-text search, alphabetical order, etc.) (see 15.0.E1). 2. System displays the organizations found as a result of the selected filters.
Exceptions:	**15.0.E1 No User Found** 1. The system could not find any user / organization as a result of the selected filters. 2. The system notifies the viewer that the search was unsuccessful. If the viewer wishes to renew the search using other filters, then system restarts use case.

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European Commission | Horizon 2020 European Union funding for Research & Innovation

UC-16 Set Notification Preferences

ID and Name:	**UC-16 Set Notification Preferences**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer sets his/her preferences on the notifications s/he wants to receive.
Trigger:	Viewer indicates that (s)he wants to set the notifications preferences.
Preconditions:	PRE-1. Viewer is registered and logged-in to the platform.
Postconditions:	POST-1. Notification preferences are recorded in the system.
Normal Flow:	**16.0 Set Notification Preferences** 1. Viewer opens the notification preferences (see 16.1). 2. System displays the kinds of possible notifications to be received (e.g., Subscribe / Unsubscribe Topics, Subscribe / Unsubscribe keywords for unmet need, etc.) 3. Viewer selects the kinds of notifications to be informed about. 4. Viewer asks to complete setting-up notification preferences. 5. System saves notification preferences modification.
Alternative Flow:	**16.1 Set Notification Preferences for an Organizational Account** 1. System displays the kinds of possible notifications to be received (e.g., Subscribe / Unsubscribe Topics, etc.). 2. Return to step 3 of normal flow.

Training material

UC-17 View Training Materials

ID and Name:	**UC-17 View Training Materials**
Primary Actor:	Viewer (and all other SH's with different roles)
Description:	Viewer visualizes the training materials (i.e., videos, webinars, relevant documents) regarding the guidelines and regulations of PCP, PPI, PiPPi CoP, etc.
Trigger:	Viewer indicates that (s)he wants to visualize the training materials.
Preconditions:	PRE-1. Viewer is registered and logged into the PiPPi platform.
Postconditions:	POST-1. Viewer directed to selected video or webinar platforms or viewed the preferred documents.
Normal Flow:	**17.0 View Training Materials** 1. Viewer accesses the page of Training Services. 2. Viewer asks to visualize a selected training material among videos, webinars and relevant documents (see 17.1). 3. System displays the selected training material.
Alternative Flow:	**17.1 View Training Materials by Being Transferred to External Platforms** 1. Viewer is being directed to the external site that hosts the training material (e.g., webinars, videos, online courses, PPI portals) of interest.

Acceptance Tests

Feature: Register to the PIPPI platform

Scenario: The user requests to create a Personal account in the A-B-C category

When Antonio requests to register a Personal account of category 'A'

Then The system should send Antonio a link via email to complete the registration

Scenario: The user provides the information to create a Personal account in the A-B-C category

Given Antonio received a link via email to the Registration continuation page

And Antonio accessed the Registration continuation page

And Antonio provided all the requested information

When Antonio requests to finalize the registration of the account

Then The system should send a verification code to Antonio via email

Scenario: The user provides a valid verification code

Given Antonio received a verification code from PIPPI

And The verification code is valid

When Antonio provides the verification code

Then The system should store the registration

And The system should notify Antonio of the successful registration

Scenario: The user provides an invalid verification code

When Antonio provides an invalid verification code

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

Then The system warns Antonio that the verification code is invalid

Scenario: The user requests to create a Personal account in the D-E-F category

Given Anna provided all the information to create a Personal account of category 'D'

And Roberto is an admin

When Anna requests to register the account

Then The system should send a registration request to Roberto via email

Scenario: The user requests to create an Organizational account

Given Antonio provided all the information to create an Organizational account

And Roberto is an admin

When Antonio requests to register the account

Then The system should send a registration request to Roberto via email

Scenario: The admin accepts a registration request

Given Roberto is an admin

And Roberto received a registration request for Antonio's account

When Roberto accepts the registration request

Then The system should store the registration

And The system should notify Antonio of the successful registration

Scenario: The admin rejects a registration request

Given Roberto is an admin

And Roberto received a registration request for Antonio's account

When Roberto rejects the registration request

Then The system should notify Antonio of the unsuccessful registration

Scenario: Identifier is already taken

Given Antonio is registered on the PiPPi platform

And Antonio's identifier is 'healthy82@gmail.com'

When Raquel attempts to register with 'healthy82@gmail.com' as an identifier

Then The system should reject Raquel's request to register

Feature: Publish an Unmet Need

Scenario: The user publishes an Unmet Need with a unique title

Given There exists no other Unmet Need that is titled 'LF-vaccine'

And Antonio is registered and logged in

And Antonio is enabled to publish Unmet Needs

When Antonio requests to publish an Unmet Need titled 'LF-vaccine'

Then The system should store the 'LF-vaccine' Unmet Need

Scenario: The user attempts to publish an Unmet Need with a non-unique title

Given There exists an Unmet Need that is titled 'LF-vaccine'

When Antonio requests to publish an Unmet Need titled 'LF-vaccine'

Then The system should reject the request

And The system should request a new title that is unique

Scenario: The user attempts to publish an Unmet Need similar to other existing Unmet Needs

Given There exist several Unmet Needs whose keyword is 'Covid-19'

When Antonio requests to publish an Unmet Need with the 'Covid-19' keyword

Then The system should provide the list of Unmet Needs whose keyword is 'Covid-19' to Antonio

Scenario: The user publishes a public Unmet Need

Given Antonio is registered and logged in

And Antonio is enabled to publish Unmet Needs

When Antonio requests to publish a public Unmet Need titled 'LF-vaccine'

Then The 'LF-vaccine' Unmet Need should become visible to everyone

Scenario: The user publishes a private Unmet Need

Given Antonio is registered and logged in

And Antonio is enabled to publish Unmet Needs

When Antonio requests to publish a private Unmet Need titled 'LF-vaccine' with Anna as a co-creator

Then The 'LF-vaccine' Unmet Need should become visible only to Antonio and Anna

Scenario: The system notifies the relevant users when a new Unmet Need is published

Given Antonio is registered and logged in

And Raquel set his preferences to receive notifications about the 'Covid-19' Topic

When Antonio requests to publish a public Unmet Need titled 'LF-vaccine' with the 'Covid-19' keyword

Then The system should notify Raquel that the 'LF-vaccine' Unmet Need was published

Scenario: The user saves a draft of an Unmet Need

Given Antonio is registered and logged in

And Antonio is enabled to publish Unmet Needs

When Antonio requests to save a draft of an Unmet Need

Then The system should store the draft

And The draft should only be visible to Antonio

Feature: Search for Unmet Needs

Scenario Outline: The user searches for an Unmet Need by keyword

Given The following Unmet Needs have been published

Title	Keywords	Status
Covid-19 vaccine	[coronavirus, vaccination]	immature
Covid-19 tracking app	[coronavirus, contact-tracing]	in-search-of-solution

And Antonio is registered and logged in

When Antonio searches for Unmet Needs by providing this combination of filters: <free_text>, <keywords> and <status>

Then Antonio should view the resulting list of <matching_Unmet_Needs>

Examples:

free_text	keywords	status	matching_Unmet_Needs
-	[robotics]	-	[ ]
brain	-	-	[ ]

vaccine	-	in-search-of-solution	[ ]
Covid-19	[contact-tracing]	immature	[ ]
Covid-19	[contact-tracing]	in-search-of-solution	[Covid-19 tracking app]
vaccine	-	-	[Covid-19 vaccine]
-	-	in-search-of-solution	[Covid-19 tracking app]
-	[coronavirus]	-	[Covid-19 vaccine, Covid-19 tracking app]
Covid-19	-	-	[Covid-19 vaccine, Covid-19 tracking app]
Covid-19	[vaccination]	-	[Covid-19 vaccine]
Covid-19	[contact-tracing]	-	[Covid-19 tracking app]
-	[vaccination]	immature	[Covid-19 vaccine]
-	[contact-tracing]	-	[Covid-19 tracking app]
-	[vaccination, contact-tracing]	-	[Covid-19 vaccine, Covid-19 tracking app]

Scenario: The user is neither the owner nor the co-creator of a private Unmet Need

Given The 'Covid-19 vaccine' Unmet Need has been published

And The 'Covid-19 vaccine' Unmet Need is private

And The 'Covid-19 vaccine' Unmet Need has the 'coronavirus' keyword

And Antonio is not the owner of the 'Covid-19 vaccine' Unmet Need

And Antonio is not the co-creator of the 'Covid-19 vaccine' Unmet Need

When Antonio searches for Unmet Needs by providing the 'coronavirus' keyword

Then The system should not display the 'Covid-19 vaccine' Unmet Need

Feature: Change status of Unmet Need

Scenario: The user changes the status of his/her Unmet Need

Given Antonio is registered and logged in

And Antonio is the owner or co-creator of the 'LF-vaccine' Unmet Need

And Raquel is the co-creator of the 'LF-vaccine' Unmet Need

And Michael enabled notifications for the 'LF-vaccine' Unmet Need

When Antonio requests to change the status of the 'LF-vaccine' Unmet Need

Then The system should change the status of the 'LF-vaccine' Unmet Need

And The system should notify Raquel of the change

And The system should notify Michael of the change

Scenario: The user is neither the owner nor the co-creator of the Unmet Need

Given Antonio is not the owner of the 'LF-vaccine' Unmet Need

And Antonio is not the co-creator of the 'LF-vaccine' Unmet Need

When Antonio requests to change the status of the 'LF-vaccine' Unmet Need

Then The system should reject the request

Feature: Ask to join external private forum

Scenario: The user asks to join a forum

Given Antonio is the owner of the 'LF-vaccine' Unmet Need

And Christina is registered and logged in

And The 'LF-vaccine' Unmet Need has an external private forum

When Christina requests to join the forum of the 'LF-vaccine' Unmet Need

Then The system should send the request to Antonio

Feature: Edit Unmet Need

Scenario: The user changes the status of his/her Unmet Need

Given Antonio is registered and logged in

And Antonio is the owner or co-creator of the 'LF-vaccine' Unmet Need

And Christina is the co-creator of the 'LF-vaccine' Unmet Need

And Michael enabled notifications for the 'LF-vaccine' Unmet Need

When Antonio requests to edit the 'LF-vaccine' Unmet Need

Then The system should edit the 'LF-vaccine' Unmet Need

And The system should notify Christina of the change

And The system should notify Michael of the change

Scenario: The user is neither the owner nor the co-creator of the Unmet Need

Given Antonio is not the owner of the 'LF-vaccine' Unmet Need

And Antonio is not the co-creator of the 'LF-vaccine' Unmet Need

When Antonio requests to edit the 'LF-vaccine' Unmet Need

Then The system should reject the request

Feature: Post comment on an Unmet Need

Scenario: The user posts a comment on a public Unmet Need

Given The 'LF-vaccine' Unmet Need is public

And Antonio is registered and logged in

When Antonio posts a comment on the 'LF-vaccine' Unmet Need

Then The system should store the comment

Scenario: The owner of a private Unmet Need posts a comment on it

Given The 'LF-vaccine' Unmet Need is private

And Antonio is the owner of the 'LF-vaccine' Unmet Need

And Antonio is logged in

When Antonio posts a comment on the 'LF-vaccine' Unmet Need

Then The system should store the comment

Scenario: The co-creator of a private Unmet Need posts a comment on it

Given The 'LF-vaccine' Unmet Need is private

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio is logged in

When Antonio posts a comment on the 'LF-vaccine' Unmet Need

Then The system should store the comment

Scenario: The user posts a comment on an Unmet Need that is visible to only one stakeholder category

Given The 'LF-vaccine' Unmet Need is visible only to the 'Healthcare Provider' category

And Antonio is a 'Healthcare Provider'

And Antonio is logged in

When Antonio posts a comment on the 'LF-vaccine' Unmet Need

Then The system should store the comment

Scenario: The user pings another user

Given Antonio is registered and logged in

And Raquel is registered

When Antonio pings Raquel in a comment on an Unmet Need

Then The system should notify Raquel

Scenario: The system notifies users of the new comment on an Unmet Need

Given Antonio is the owner of the 'LF-vaccine' Unmet Need

And Michael enabled notifications for the 'LF-vaccine' Unmet Need

And Raquel is registered and logged in

When Raquel posts a comment on the 'LF-vaccine' Unmet Need

Then The system should notify Antonio

Then The system should notify Michael

Feature: Like an Unmet Need

Scenario: The user likes a public Unmet Need

Given The 'LF-vaccine' Unmet Need is public

And Antonio is registered and logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Scenario: The user likes an Unmet Need that is visible to only one stakeholder category

And The 'LF-vaccine' Unmet Need is visible only to the 'Healthcare Provider' category

And Antonio is a 'Healthcare Provider'

And Antonio is registered and logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Scenario: The user likes a private Unmet Need

Given The 'LF-vaccine' Unmet Need is private

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Scenario: The user likes an Unmet Need, and the system notifies the owner and anyone who enabled notifications for it

Given Antonio published an Unmet Need titled 'LF-vaccine'

And Raquel enabled notifications for the 'LF-vaccine' Unmet Need

And Michael is registered and logged in

When Michael likes the 'LF-vaccine' Unmet Need

Then The system should notify Antonio that Michael liked the 'LF-vaccine' Unmet Need

And The system should notify Raquel that Michael liked the 'LF-vaccine' Unmet Need

Feature: Like an Unmet Need

Scenario: The user likes a public Unmet Need

Given The 'LF-vaccine' Unmet Need is public

And Antonio is registered and logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Scenario: The user likes an Unmet Need that is visible to only one stakeholder category

And The 'LF-vaccine' Unmet Need is visible only to the 'Healthcare Provider' category

And Antonio is a 'Healthcare Provider'

And Antonio is registered and logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Scenario: The user likes a private Unmet Need

Given The 'LF-vaccine' Unmet Need is private

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio logged in

When Antonio likes the 'LF-vaccine' Unmet Need

Then The system should store the like

Platform for Innovation of Procurement and Procurement of Innovation
European Commission
Horizon 2020 European Union funding for Research & Innovation

Scenario: The user likes an Unmet Need, and the system notifies the owner and anyone who enabled notifications for it

Given Antonio published an Unmet Need titled 'LF-vaccine'

And Raquel enabled notifications for the 'LF-vaccine' Unmet Need

And Michael is registered and logged in

When Michael likes the 'LF-vaccine' Unmet Need

Then The system should notify Antonio that Michael liked the 'LF-vaccine' Unmet Need

And The system should notify Raquel that Michael liked the 'LF-vaccine' Unmet Need

Feature: Add Idea to an Unmet Need

Scenario: The user adds an Idea to a public Unmet Need

Given The 'LF-vaccine' Unmet Need is public

And Antonio is registered and logged in

When Antonio adds an Idea titled 'mRNA-vax' to the 'LF-vaccine' Unmet Need

Then The system should store the 'mRNA-vax' Idea

Scenario: The user adds an Idea to an Unmet Need that is visible to only one stakeholder category

Given The 'LF-vaccine' Unmet Need is visible only to the 'Healthcare Provider' category

And Antonio is a 'Healthcare Provider'

And Antonio is registered and logged in

When Antonio adds an Idea titled 'mRNA-vax' to the 'LF-vaccine' Unmet Need

Then The system should store the 'mRNA-vax' Idea

Scenario: The owner adds an Idea to a private Unmet Need

Given The 'LF-vaccine' Unmet Need is private

And Antonio is the owner of the 'LF-vaccine' Unmet Need

And Antonio logged in

When Antonio adds an Idea titled 'mRNA-vax' to the 'LF-vaccine' Unmet Need

Then The system should store the 'mRNA-vax' Idea

Scenario: A co-creator adds an Idea to a private Unmet Need

Given The 'LF-vaccine' Unmet Need is private

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio logged in

When Antonio adds an Idea titled 'mRNA-vax' to the 'LF-vaccine' Unmet Need

Then The system should store the 'mRNA-vax' Idea

Scenario: The system notifies the owner and anyone who enabled notifications for an Unmnet Need, when it receives a new Idea

Given Antonio published an Unmet Need titled 'LF-vaccine'

And Michael enabled notifications for the 'LF-vaccine' Unmet Need

And Raquel is registered and logged in

When Raquel adds an Idea titled 'mRNA-vax' to the 'LF-vaccine' Unmet Need

Then The system should notify Antonio that Raquel added the 'mRNA-vax' Idea

And The system should notify Michael that Raquel added the 'mRNA-vax' Idea

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Scenario: The user saves a draft of an Idea

Given Antonio is registered and logged in

When Antonio requests to save a draft of an Idea

Then The system should store the draft

And The draft should only be visible to Antonio

Feature: Search for Ideas

Scenario Outline: The user searches for an Idea by using free text

Given The following Unmet Needs (along with their Ideas) have been published

Unmet Need	Idea	Date	Phase
Covid-19 vaccine	mRNA-vax	2020-11-24	in-development
Covid-19 vaccine	viral-vector	2020-12-05	completed
Covid-19 tracking app	Immuni	2020-05-14	completed
Covid-19 tracking app	COVIDSafe	2020-06-07	completed

And Antonio is registered and logged in

When Antonio searches for Ideas by providing this combination of filters: <free_text>, <phase>, and <date>

Then Antonio should view the resulting list of <matching_Ideas>

Examples:

free_text	phase	date	matching_Ideas
-	completed	-	[viral-vector, Immuni, COVIDSafe]
virus	-	-	[ ]
viral	in-development	-	[ ]
viral	completed	-	[viral-vector]
viral	completed	2020	[viral-vector]

| vaccine | - | 2020-11 | [mRNA-vax,] |

| vaccine | - | - | [mRNA-vax, viral-vector] |

| Covid-19 | - | - | [mRNA-vax, viral-vector, Immuni, COVIDSafe] |

Scenario: The system does not display Ideas that were added to Unmet Needs that the user has no access to

Given The 'Covid-19 vaccine' Unmet Need is private

And The 'mRNA-vax' Idea was added to the 'Covid-19 vaccine' Unmet Need

And Antonio is not the owner of the 'Covid-19 vaccine' Unmet Need

And Antonio is not the co-creator of the 'Covid-19 vaccine' Unmet Need

When Antonio searches for Ideas by providing the 'vaccine' text

Then The system should not display the 'Covid-19 vaccine' Unmet Need

Feature: Post comment on an Idea

Scenario: The user posts a comment on a public Idea

Given The 'LF-vaccine' Unmet Need is public

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is registered and logged in

When Antonio posts a comment on the 'mRNA-vax' Idea

Then The system should store the comment

Scenario: The owner of a private Unmet Need posts a comment on an Idea

Given The 'LF-vaccine' Unmet Need is private

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is the owner of the 'LF-vaccine' Unmet Need

And Antonio is logged in

When Antonio posts a comment on the 'mRNA-vax' Idea

Then The system should store the comment

Scenario: The co-creator of a private Unmet Need posts a comment on an Idea

Given The 'LF-vaccine' Unmet Need is private

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio is logged in

When Antonio posts a comment on the 'mRNA-vax' Idea

Then The system should store the comment

Scenario: The user posts a comment on an Idea that was added to an Unmet Need that is visible to only one stakeholder category

Given The 'LF-vaccine' Unmet Need is visible only to the 'Healthcare Provider' category

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is a 'Healthcare Provider'

And Antonio is logged in

When Antonio posts a comment on the 'mRNA-vax' Idea

Then The system should store the comment

Scenario: The user pings another user

Given Antonio is registered and logged in

And Michael is registered

When Antonio pings Michael in a comment on an Idea

Then The system should notify Michael

Scenario: The system notifies users of the new comment on an Idea

Given Antonio is the owner of the 'mRNA-vax' Idea

And Michael enabled notifications for the 'mRNA-vax' Idea

And Raquel is registered and logged in

When Raquel posts a comment on the 'mRNA-vax' Idea

Then The system should notify Antonio

Then The system should notify Michael

Feature: Like an Idea

Scenario: The user likes an Idea that was added to a public Unmet Need

Given The 'LF-vaccine' Unmet Need is public

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is registered and logged in

When Antonio likes the 'mRNA-vax' Idea

Then The system should store the like

Scenario: The user likes an Idea that was added to a private Unmet Need of which he/she is the owner

Given The 'LF-vaccine' Unmet Need is private

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is the owner of the 'LF-vaccine' Unmet Need

And Antonio is registered and logged in

When Antonio likes the 'mRNA-vax' Idea

Then The system should store the like

Scenario: The user likes an Idea that was added to a private Unmet Need of which he/she is the co-creator

Given The 'LF-vaccine' Unmet Need is private

And The 'mRNA-vax' Idea was added to the 'LF-vaccine' Unmet Need

And Antonio is a co-creator of the 'LF-vaccine' Unmet Need

And Antonio is registered and logged in

When Antonio likes the 'mRNA-vax' Idea

Then The system should store the like

Scenario: A user likes an Idea, and the system notifies the owner of the Idea and anyone who has enabled notifications for that Unmet Need

Given Raquel added the 'mRNA-vax' Idea to the 'LF-vaccine' Unmet Need

And Christina has enabled notifications for the 'LF-vaccine' Unmet Need

And Michael is registered and logged in

When Michael likes the 'mRNA-vax' Idea

Then The system should notify Raquel that Michael liked the 'mRNA-vax' Idea

And The system should notify Christina that Michael liked the 'mRNA-vax' Idea

Feature: Search for Topics

Scenario Outline: The user searches for a Topic

Given The following Topics are present on the platform

Topic	Status	Created_by
Rehabilitation	Active	Antonio
Covid-19 vaccines	Completed	Raquel
Covid-19 treatment	Completed	Michael
Post-treatment care	Active	Antonio

And Antonio is registered and logged in

When Antonio searches for a Topic by providing this combination of filters: <free_text>, <status>, <created_by>

Then Antonio should view the following list of <results>

Examples:

free_text	status	created_by	results
coronavirus	-	Antonio	[ ]
rehabilitation	Active	Raquel	[ ]
rehabilitation	Active	-	[Rehabilitation]
rehabilitation	Completed	-	[ ]
Covid-19	-	-	[Covid-19 vaccines, Covid-19 treatment]
Covid-19	-	Michael	[Covid-19 treatment]
-	-	Antonio	[Rehabilitation, Post-treatment care]

Feature: Edit profile

Scenario: The user edits a Personal profile

Given Antonio is registered and logged in

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When Antonio requests to edit her Personal profile

Then The system should store the new changes

Scenario: The user provides a non-unique identifier

Given Antonio is registered

And Antonio's identifier is 'healthy82@gmail.com'

When Raquel requests to edit his Personal profile by changing his identifier to 'healthy82@gmail.com'

Then The system should reject Raquel's request

Scenario: The user edits an Organizational profile

Given Antonio is registered and logged in

When Antonio requests to edit the Organizational profile of 'Ospedale San Raffaele'

Then The system should send a confirmation request to the admin via email

Scenario: The admin accepts the confirmation request

Given Roberto is an admin

And Roberto received a confirmation request to edit the Organizational profile of 'Ospedale San Raffaele'

When Roberto accepts the confirmation request

Then The system should store the new changes

Scenario: The admin rejects the confirmation request

Given Roberto is an admin

And Roberto received a confirmation request to edit the Organizational profile of 'Ospedale San Raffaele'

When Roberto rejects the confirmation request

Then The system should not store the new changes

Feature: Search for Users/Organizations

Scenario Outline: The user searches for another User

Given The following Users are registered

Forename	Surname	Category	
Antonio	Moratti	Healthcare Provider	
Michael	Freeze	Enabler	
Michael	Moratti	Payer	
Cecilia	Nieminen	Healthcare Provider	

And Anna is registered and logged in

When Anna searches for Users by providing this combination of filters: <free_text> and <category>

Then Anna should view the resulting list of <matching_Users>

Examples:

free_text	category	matching_Users	
Richard	Policy maker	[ ]	
Nieminen	Healthcare Provider	[Cecilia Nieminen]	
Michael	Payer	[Michael Moratti]	
Michael	-	[Michael Moratti, Michael Freeze]	
Moratti	Healthcare Provider	[Antonio Moratti]	
Moratti	-	[Antonio Moratti, Michael Moratti]	

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| - | Healthcare Provider | [Antonio Moratti, Cecilia Nieminen] |

Scenario Outline: The user searches for an Organization

Given The following Organizations are registered

Name	Location
Vall d'Hebron	Spain
Policlinico Gemelli	Italy
Karolinska Institutet	Sweden
Ospedale San Raffaele	Italy

And Antonio is registered and logged in

When Antonio searches for Organizations by providing this combination of filters: <free_text> and <location>

Then Antonio should view the resulting list of <matching_Organizations>

Examples:

free_text	location	matching_Organizations
Medizinische	-	[ ]
-	Finland	[ ]
Hebron	Spain	[Vall d'Hebron]
-	Sweden	[Karolinska Institutet]
Karolinska	-	[Karolinska Institutet]
Raffaele	-	[Ospedale San Raffaele]
Raffaele	Italy	[Ospedale San Raffaele]
-	Italy	[Policlinico Gemelli, Ospedale San Raffaele]

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Feature: Set notification preferences

Scenario: The user asks to set notification preferences for his/her personal account

Given Anna is registered and logged in her personal account

When Anna requests to change the preferences by subscribing to the 'coronavirus' Topic

Then The system should store the new preferences

Scenario: The user asks to set notification preferences for an organizational account

Given Anna is registered and logged in the organizational account of 'Ospedale San Raffaele'

When Anna requests to change the preferences by subscribing to the 'coronavirus' Topic

Then The system should store the new preferences

Feature: View training materials

Scenario: The user views training materials

Given Antonio is registered and logged in

When Antonio asks to view a video regarding the regulations of PCP/PPI

Then The system should display the requested video