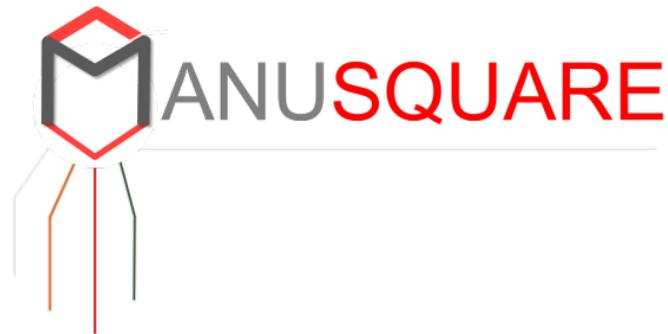


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MANUfacturing eco**S**ystem of **QUA**lified **R**esources **E**xchange

D5.1

Services Design and Characterization

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LIST OF ABBREVIATIONS

Acronym	Description
AGV	Automated Guided Vehicle
BPMN	Business Process Modelling Notation
DoA	Description of Action
MANU-SQUARE	MANUfacturing ecoSystem of QUAlified Resource Exchange
MG	MANU-SQUARE Goal
NDA	Non-Disclosure Agreement
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Quotation
SME	Small and Medium Enterprise
WP	Work Package

1 EXECUTIVE SUMMARY

The main goal of the Deliverable D5.1 is to describe the activities carried out in Task 5.1 of the project proposal. The deliverable introduces the method used to design and characterize the services that will be utilized on the platform adopting the perspective of both the customer (i.e. the entity requesting a resource) and the supplier (i.e. the entity that is suited in provisioning the requested resource). In effect, the overall goal is to understand how customers and suppliers will use the MANU-SQUARE platform and delve into the processes and requirements that characterize each service.

This task follows those performed as part of WP1 and provides additional depth into the exact sequence of activities that best fits potential users' needs as well as in capturing the informational requirements and design aspects that are paramount. To validate the services designed in WP1, task 5.1 builds on a series of workshops conducted with partners of the project and future users of the MANU-SQUARE platform functionalities, as described in the methodology section, section 3. The purpose of these workshops is to develop a consolidated view of the requirements of the services and provide input for their design. This information is presented in sections 4 and 5 of the present deliverable, along with the resource and sharing service and the innovation management correspondingly.

In addition, the workshops included a focus on the value that the services provide to the companies and how they should be optimally utilized. The input received from the participants is detailed in section 6, where the perceived value related to each sub-service and a description of the organizational resources that need to be put in place in order to actualize the use of the platform and services are described. The objective of this activity is to better understand the pains and gains of potential users, how the platform can contribute to alleviate pains during these processes and to identify the optimal strategies for marketing, promoting, and pricing of the platform. In section 7 we conclude the deliverable with overall remarks and key information that was extracted during these activities and should be utilized in the following tasks of the WP5.

2 INTRODUCTION

This document, which sums up the activities performed in Task 5.1 and includes the outputs of the work performed as part of these, aims to define and characterize the services that will be supported by the MANU-SQUARE platform. The workshops carried out in this task as well as the other activities that were part of Task 5.1 aim to develop a consolidated view of the sequence of activities that describe each service and define the functional specifications that are necessary to make the platform fully functional and operational – that is to say – information exchange, document support, and design. The overall objective of this task is to develop a deeper understanding of how the platform services should function in order to serve the needs of its users, either from a customer side or from a supplier one. Moreover, this task aims at the understanding of the needs that the services fulfil for companies as well as the specific values that are created through their use. We explore this issue by evaluating the intended service alignment with business processes, the specific indicators of value that they impact, and further implementation practices that will be developed to support their use. In sum, the objectives of Task 5.1 and subsequently the activities described in deliverable 5.1 focus on:

1. Characterising and delineating the services by consolidating the processes, informational requirements and design aspects.
2. Understanding the business value of service use through the MANU-SQUARE platform for stakeholders and their approaches to integrate them into operations.

2.1 Aims and scope of the task

The aim of Task 5.1 is to understand the service characteristics and details based on the input of several industrial partners, and to specify these requirements to be developed as services on the MANU-SQUARE platform. The approach followed in this task was targeted in validating the described services and identifying information and design aspects that are important in the development of the actual platform. The rationale in performing the task has been based on two primary reasons

- To consolidate services with industrial partners and to increase the fit of the developed solutions to their business needs;
- To understand their usage patterns, motivations for adopting the MANU-SQUARE platform, and requirements that are covered by the described services.

To realize these goals, Task 5.1 has set the following objectives and activities:

- To align business processes as developed in tasks 1.2 and 1.3 according the needs of industrial business partners;
- To explore the information exchange requirements and the communication patterns that are typical between suppliers and customers as part of the different services;
- To understand the design characteristics that facilitate optimal use of the platform from the perspective of the users and to validate key touchpoints¹ of interaction.
- To identify the value that the platform produces for customers and suppliers separately for each sub-service, to strengthen the selling point of the platform, and to develop the pricing scheme.

¹ A touchpoint is any interaction (including encounters where there is no physical interaction) that might alter the way that your customer feels about your product, brand, business or service.”

- To outline the key resources and the deployment strategies that industry partners are planning to undertake when assimilating the services and MANU-SQUARE platform in their operations.

2.2 Relationships with other tasks

Task 5.1 designs and characterizes the MANU-SQUARE platform services in details. Receiving outputs of the T1.2 and T1.3 as input, the outcome of this task will be aligned with other tasks in WP5, and further impact WP6 and WP7. The relationships of Task 5.1 are depicted in Figure 1 and explained below.

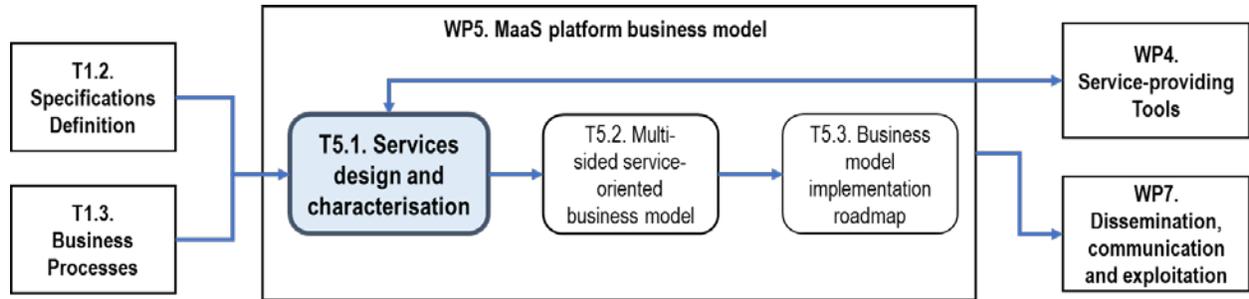


Figure 1: The relationships of T5.1

The interdependencies within WP5:

- Task 5.2: the purpose of this task to develop a multi-sided service-oriented business model for the MANUSQUARE platform. The business model will be based on the value proposition model outlined in Task 5.1, and will focus on the analysis of expected revenue streams and cost elements for each involved actor and customer type.

The interdependencies with other WPs:

- WP4: this WP aims at developing the tools that provide the added-value services needed by the ecosystem members to implement the new business models. The results of this WP will be deployed and validated by the end users in WP6. Task 5.1 builds up the service BPMN aligned with the business processes of the end users, as such adding to the link between WP4 and WP6, that was initially developed by T1.3.
- WP7: this WP aims at providing a detailed plan for exploitation of research and technologies developed by MANU-SQUARE by industrial and academic partners, in view of the commercial exploitation of the produced results. This WP will utilize the business model developed in WP5, and will define an operative action plan for bringing the prototype to market, looking beyond the end of the project.

2.3 Outline

The report consists of the following chapters:

- § 2 introduces Task 5.1 of the MANU-SQUARE project, and the relations of this task with other tasks in the project;
- § 3 describes the methodology for characterising the services and eliciting the business value;
- § 4 describes the resource sharing and finding services
- § 5 describes the open innovation support services;

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- § 6 discusses the value of the platform as perceived by industrial partners and highlights some key findings that will be used in subsequent tasks
- § 7 concludes the deliverable with some overall key points and a short discussion about how the outputs of the task can be leveraged

3 METHODOLOGY

The most important aspect of the MANU-SQUARE platform is that it provides a number of services that are valuable to fulfill the requirements of industrial partners. This guarantees that the platform will be used by the expected entities and that apart from initial adoption usage will continue. Our approach furthermore aimed at understanding the processes that underpin the different services provided by the platform in detail in order to understand the full set of requirements so that all activities are performed within the MANU-SQUARE platform without the need to switch to other means of communication. To ensure that all requirements were consolidated and consolidated, we followed an approach that built on individual interviews with key industry-respondents and focus groups, coordinated by several members of the MANU-SQUARE consortium. The research methodology mapped well onto the requirements of Task 5.1, since it enabled us to capture a broad depth of information on several different services.

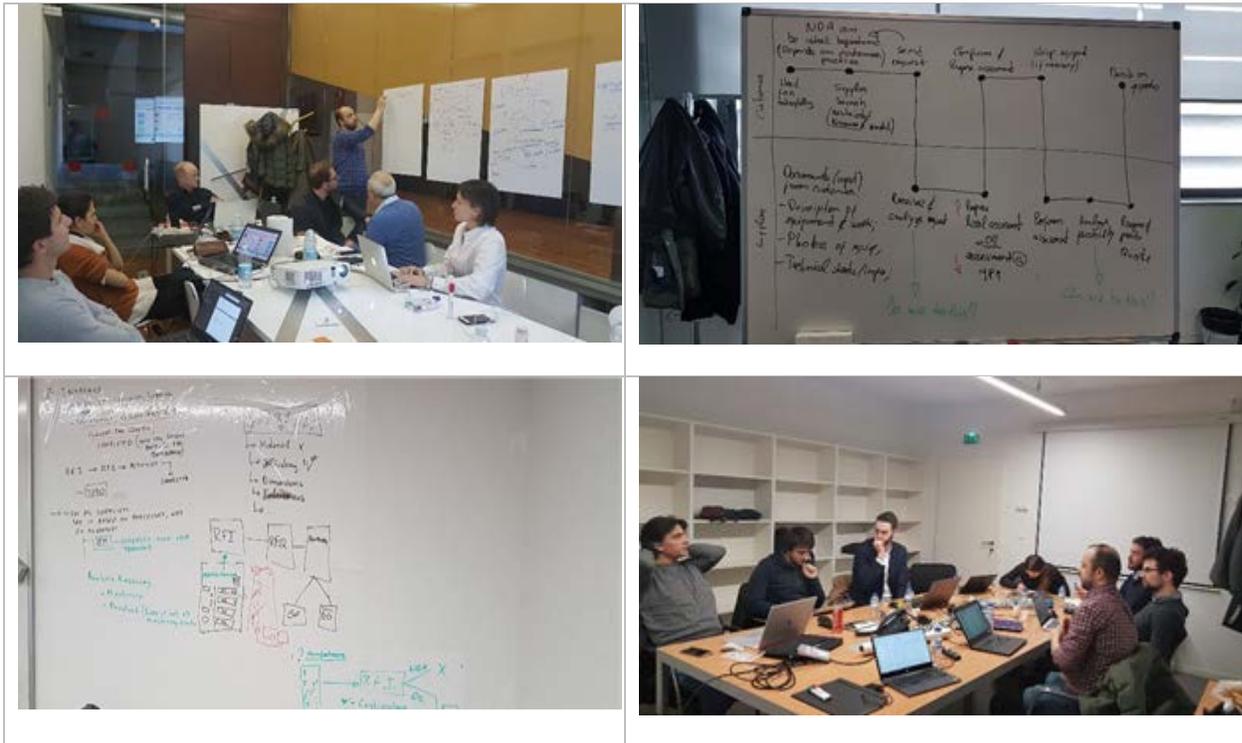


Figure 2: Pictures taken during workshops held in Porto and Milan

The workshops carried out in this task was to detail the services provided by the MANU-SQUARE platform starting from the initial overview provided in D1.2 and D1.3. More in detail, the discussions with use case companies took place:

- to update and refine the Business Process Modelling Notation (BPMN) of the types of services, mainly resource finding and sharing, and innovation management;
- to define the main interaction points between the business processes and the platform services;
- to have initial ideas on the design details as an input for the following tasks.

Research and industrial partners discussed these objectives in two workshops organized as described in Table 1 and Table 2.

Table 1: Service design workshop with the manufacturing technologies use case

Workshop 1	
Location:	JPM, Porto
Date	4-5 February 2019
Aim:	To work on the resource finding and sharing service
Industrial partners	JPM (2 people)
Research partners	SINTEF (3 people); INESC (3 people)
Main activities	<p>Session 1: general introduction of the MANU-SQUARE service/s from the different users' perspective</p> <p>Session 2: analysis and validation of the service BPMN, different touch points of the service, and identification of the relevant parameters that characterize them (all from the <u>customer's</u> perspective)</p> <p>Session 3: analysis and validation of the service BPMN, different touch points of the service, and identification of the relevant parameters that characterize them (all from the <u>supplier's</u> perspective)</p>

Table 2 Service design workshop with the textile use case

Workshop 2	
Location:	INNOHUB, Milan
Date	6 th February 2019
Aim:	To work on the innovation management service
Industrial partners	INNOVHUB (2 people); CSEM (1 person); TRUDEL (1 person)
Research partners	SUPSI (2 people); SINTEF (2 people)
Main activities	<p>Session 1: general introduction of the MANU-SQUARE service/s from the different users' perspective</p> <p>Session 2: analysis of the different touch points of the service and identification of the relevant parameters that characterize them</p> <p>Session 3: identification of the value drivers of the platform and the delivery strategy (how the service will be delivered to the customer), the different revenue flows (pay per use, fixed fee...), and the average expected prices users are willing to pay to get the MANU-SQUARE services</p>

4 RESOURCES FINDING AND SHARING SERVICE

One of the core services to be provided by the MANU-SQUARE platform is to facilitate the resource finding and sharing between manufacturing companies, enriched by the cross-sectorial nature of the platform. These services are seen as central to the platform, since one of the main motivations to adopt the platform is the function that discovers partners acquiring or providing resources and share services. The resource finding and sharing service will encompass the following aspects:

- *Supply and demand of manufacturing capacity:* The service of supply and demand of manufacturing capacity is built around the requirements that many firms have to purchase additional capacity or to make their production capacity that remains unused available. The types of resources that fall under this category include machines and/or skilled operators. The principal idea guiding this service is that production capacity can be bought and sold as a commodity, just like any other resource. This requirement is driven by the need for many companies to make the most value out of the expensive investments in machinery and manufacturing capacity, which can be sold when unused. On the other hand, some companies can access to additional and temporary capacity needed to fulfil specific requests.
- *Supply and demand of knowledge:* The service of supply and demand of knowledge is built around the complementary requirement for firms to obtain knowledge that can help drive innovation. While knowledge is obtained internally through R&D processes within firms, it is often the case that this generated knowledge can be sold to third parties. Therefore, the service of supply and demand of knowledge is grounded on the request and provision of technical competence, know-how, and skill-sharing that all together have the potential to drive innovation. The added value lies in the expanded boundaries that firms can create when searching for specific know-how that is not internally available, and – from a supply side – on creating more value for knowledge accumulated through experience that can be leveraged.
- *Supply and demand of by-products:* The service of supply and demand of by-products is grounded on current lack of visibility regarding the type and amount of wasted resources. This move towards by-product utilization and resource re-use is one of the core pillars of the transition from a linear to circular economy. Since many manufacturers and industry companies produce by-products which are of value for other firms, the creation of a service where such by-products can be found and acquired by interested buyers generates a new way of value creation. The presence of different stakeholders on the MANU-SQUARE platform means that the undesirable outputs of one company can be used as valuable inputs for others.

The cases involved to study the design and characteristics of resource finding and sharing are presented in Table 3 below.

Table 3 Use case for resource finding and sharing

Service	Case	Description of need
Demand of manufacturing capacity and knowledge	JPM - New Product Development -	Most JPM projects are based on its customers' investment plans, which can bring some degree of variability to the company's activity during the business year. This means that, in some occasions, JPM might experience shortages in its capacity that can be located in the engineering area or in the manufacturing process.

Supply of manufacturing capacity knowledge	JPM - Retrofitting and refurbishing -	Having a specific installed capacity, JPM might experience a surplus of unused capacity in its engineering or manufacturing capabilities, which are of great interest to be fully utilized. Being a relatively capital-intensive company, this becomes of great importance. Furthermore, JPM has substantial knowledge and manufacturing capacity to undertake retrofitting projects, which it aims to exploit. The use of the provided services is built on the need to expand the visibility of available manufacturing capacity and knowledge.
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4.1 Definition of the Service

In order to characterize services, first their functionalities and purposes have been defined validating the description derived from previous work with the industrial users. For each of the previously mentioned services, the intention has been to adopt the perspective of both the supplier and the customer. In other words, we seek to understand how the service will be executed when seeking or requesting resources, whether they are in the form of manufacturing capacity, by-products or knowledge, and how the process of providing capacity and confirming execution of supply needs to be performed. All the three services that fall under the category of resource finding and sharing follow a similar series of steps with slight deviations. The service may differ and can be defined from customer and supplier perspectives, as follows.

4.1.1 Service from the customer perspective

Figure 3 outlines the service from the customer side highlighting the main interaction points between the customer and the platform. This representation is user-oriented meaning that it provides an overview of the customer experience and has been used as a reference point in order to ensure that workshop participants were in agreement with the basic outline of the services and the sequence of steps within them. After this point the specific steps and details of the business processes were introduced to participants, and the detailed activities and sequence of processes were discussed and refined.

The process from the customers’ side starts with the selection of the service and the creation of the RFQ to search for possible suppliers that can fulfil a certain demand in relation to resource finding. Several criteria are used, and a list of potential suppliers is provided by the platform. In sequence, the customer selects the relevant suppliers that can potentially fulfil the requirements. A request for quotation (RFQ²) is sent at this point, in which the customer asks the suppliers for details about the cost associated with the supply of manufacturing capacity. The customer selects the best quotation in accordance with its criteria, which is then optionally proceeded with a partial payment. The project, in other words the business between the customer and supplier, is managed by the platform. Once the project is completed, the full payment is completed.

² RFQ: a Request for Quote refers to a request addressed towards all potential partners/suppliers and service providers to participate in the bidding process for a specified product or service.

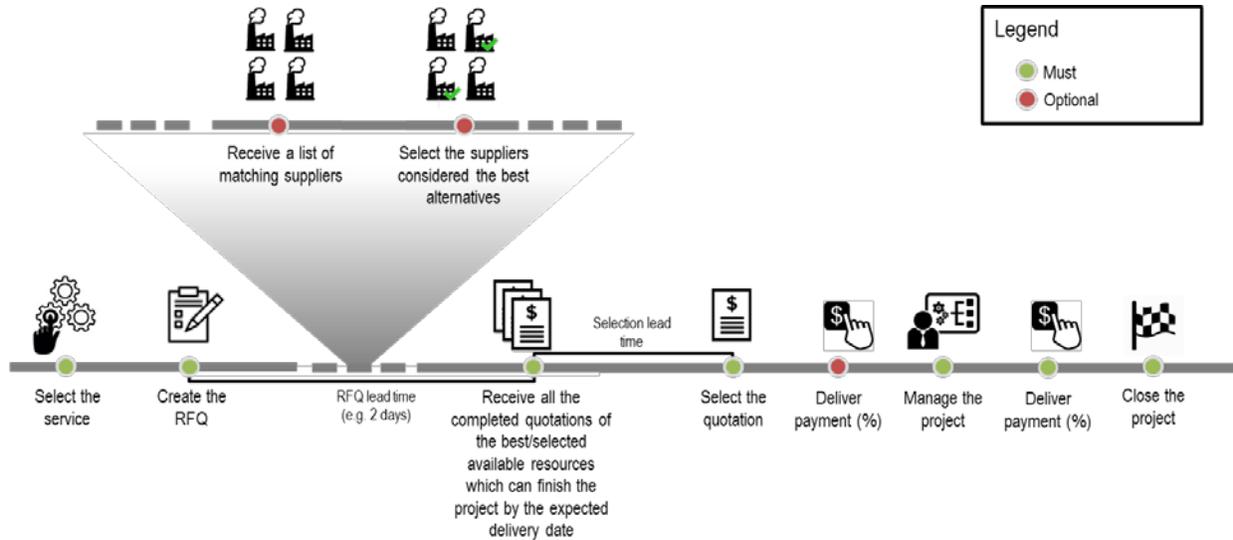


Figure 3 Resource sharing service: touch points with the platform from customer's perspective

This service consists of the following sub-services from the customer's perspective:

- Searching suppliers from extended supplier pool:* the procurement activities would benefit greatly with the possibility to use of a platform like MANU-SQUARE – that is to say – in the search for new potential suppliers and/or partners in an extended supplier pool across sectors and countries in Europe. The activity of finding new suppliers starts by including what type of resource one is looking for. The three sub-services serve as a first step in providing specific interfaces with relevant information. The process then continues, and for each sub-category, there are multiple criteria that are either relevant to the resource searched for, or to the type of supplier able to provide it. The match-making algorithm subsequently produces a list of potentially interesting suppliers in a prioritized manner, and customers can filter results dynamically based on several different filters.
- Matching qualified suppliers:* Companies collect information about suppliers in the market to identify and qualify them as a potential supplier for their business. The collected information might largely depend on the type of supply (e.g. engineering, product, equipment) and the type of supplier. The MANU-SQUARE platform will reduce the time spent for this process by automating many steps in the request for information and aggregating all information into a single platform. Furthermore, it will enable a tracking of communication history so that multiple employees from each participating company can have access and visibility to the communication during the process. This step provides – both customers and suppliers with a useful tool as the communication is aggregated in one medium, offering different functionalities so that they don't switch or use another means of information exchange.
- Request for Quotation (RFQ) process:* The RFQ process is conducted once the customer has selected a number of preferred suppliers. It can include several rounds of iteration, during which offers are sent out by the suppliers. These offers can be either declined, adapted, or accepted by the customer. During the RFQ process, the customer can set values for standardized parameter templates regarding the time and associated service level agreements. The specified constraints can be addressed to one or more suppliers. Once all quotes are returned, evaluated, and compared, the final selection of the supplier can be made. A feedback activity for those that were selected, and not selected ones concludes the RFQ process.
- Document sharing:* The document service support is a critical component for the customer. Several documents including product specifications, service or knowledge requirements, descriptions of service level agreements, and documentation for the RFQ process need to be exchanged between interested parties.

Providing this service is important so customers do not need the support of external services, but remain engaged in the MANU-SQUARE platform. Furthermore, the service should also provide a support for several versions of the same document as it may be updated and changed.

- *Tracing and tracking of the activities:* Transparency and visibility of activities and file exchange is one of the core aspects of the services of resource finding and sharing. From a customer's point of view, it is imperative that all information produced during search and acquiring of manufacturing and service capacity, by-products, and knowledge are recorded in the platform, and that they are visible only to authorized parties. This also entails that any changes made are logged and traced.

4.1.2 Service from the supplier's perspective

When adopting the perspective of the supplier, there is a complementary set of activities compared to the ones seen for the customers. Since suppliers are faced with the task of handling requests from many different customers, it is important that they have relevant information, which can be updated depending on new circumstances. They can keep track of requests and projects at different levels and can maintain a log of inquiries and communication history. Figure 4 illustrates the service process from the supplier's perspective.

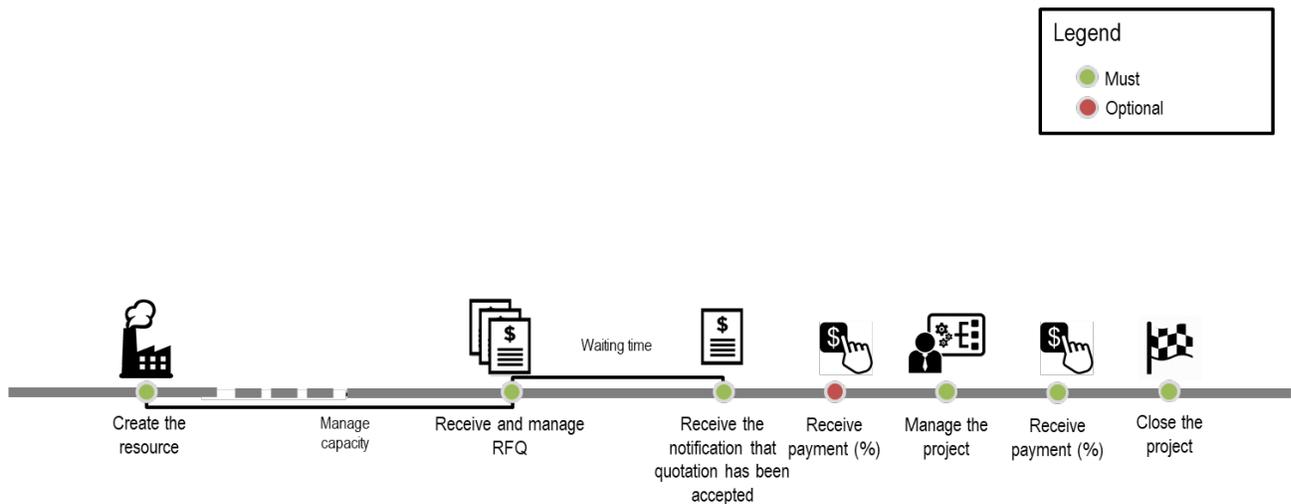


Figure 4 Resource sharing service: touch points with the platform from the supplier's perspective

This service offers the following sub-services from the supplier's perspective:

- *Profile and resources update:* From the supplier's side one of the most important tasks is being able to provide potential customers with an updated availability of resources, whether they are in terms of manufacturing capacity, by-products, and knowledge. For each of these resources, specific information needs to be included, with a level of details that, on the one hand, can enable the match-making tool to identify them and confirm their availability, and, on the other hand, to not reveal to competitors their level of performance and market activity. While some included information is rather static, such as details about the company itself, key individual contact points, and types of offered capacities, the resources and their availability can fluctuate depending on demand and require regular updating.
- *Assessment of the inquiries:* Due to the RFQ process, the supplier automatically receives inquiries in a standardized format and is supported in every step of the quotation preparation and potential communication with customers. This support is provided by standard templates to provide the required information by the

customer, as well as by communication means through the platform when dialogue needed between the customer and supplier in case of incomplete information.

- *Managing of projects:* Once suppliers have been qualified to be relevant to a project from a customer, there is a series of activities that need to be performed before being assigned a contract and during execution of such contract. From delivering quotes on requests from customers to adding information that is relevant to the project initiation or development, a number of communication and coordination activities need to be undertaken. The MANU-SQUARE platform needs to be built around adding the necessary functionality to encompass the activities related to the steps.
- *Document management:* As suppliers are required to deliver multiple documents over a given inquiry about resources or for a request for quote, the services that have been overviewed previously will include functionalities of uploading and sharing of documents. Typically, these include certifications about quality assurance and service level as well as templates and documents about responses to tenders and general inquiries.

4.2 Business Process Alignment

The envisioned MANU-SQUARE service for resource finding and sharing (defined in the previous section) has been discussed for revision and validation by JPM Industry that is the relevant use case company for this service. Relying on the use cases defined in D1.3, it has been possible to work on both the customer's perspective (the new product development use case) and the supplier's perspective (the retrofitting use case). The discussions with the company involved the following aspects:

- Validation of the overall BPMN and service execution steps for resource finding and sharing
- Identification and characterization of service touch points (service-user interactions)
- Identification of information sharing requirements

4.2.1 Open issues in the generic service description

The service process shown in Figure 3 has been elaborated and discussed in the use cases for business process alignment. There are some open issues in this process, that have to be further discussed and clarified, as summarized in Table 4.

Table 4 Touch points and open issues in resource sharing service

Touch point	Question marks and related answer
Create RFQ	<p>Q: Do customers ask for standard information from suppliers for qualification of the supplier?</p> <p>A: No. Part of the information is standard. But, depending on the type of the work requested or of the supplier type, the requested information may differ.</p> <p>Q: Do customers think that it is necessary to have an agreement (e.g. a non-disclosure agreement; NDA) at this stage?</p> <p>A: Yes, a NDA could be necessary if customer and supplier require exchanging information, depending on the type of the work to be done. Any work that may involve sensitive information would require a NDA.</p>

Manage payment	<p>Q: How do customers expect to manage payments? (e.g. within the platform, independently, etc...)</p> <p>A: Currently there is not a clear idea. The use case company, JPM, does not see benefits in performing the payment through the platform.</p>
Project management	<p>Q: Do the users expect the platform to manage the business activity?</p> <p>A: It depends on the scope of the management. For example, the document sharing and tracing and tracking of the activity could be useful to be managed by the platform.</p>

4.2.2 Detailed business process

The case company JPM will access the platform as a customer to find suppliers for the development and production of a new industrial Automated Guided Vehicle (AGV). This use case has been used to validate adequateness and completeness of the resource sharing BPMN shown in Figure 5. The same process can also be seen from the supplier's perspective. The case company JPM will use the platform also as a supplier to extend its market providing capacity to carry out retrofitting. The BPMN for the resource sharing service has also been validated from the supplier's perspective during the workshop considering the retrofitting and refurbishing case. In order to describe the BPMN clearer, it has been split into the following four parts, which are further elaborated in the subsections below. The process stops at the order confirmation, since the payment and project management has still some open issues as stated above.

- 1) Platform access and supplier search
- 2) Matchmaking
- 3) Supplier identification and RFQ
- 4) Supplier selection and notification

D5.1 – Services Design and Characterization

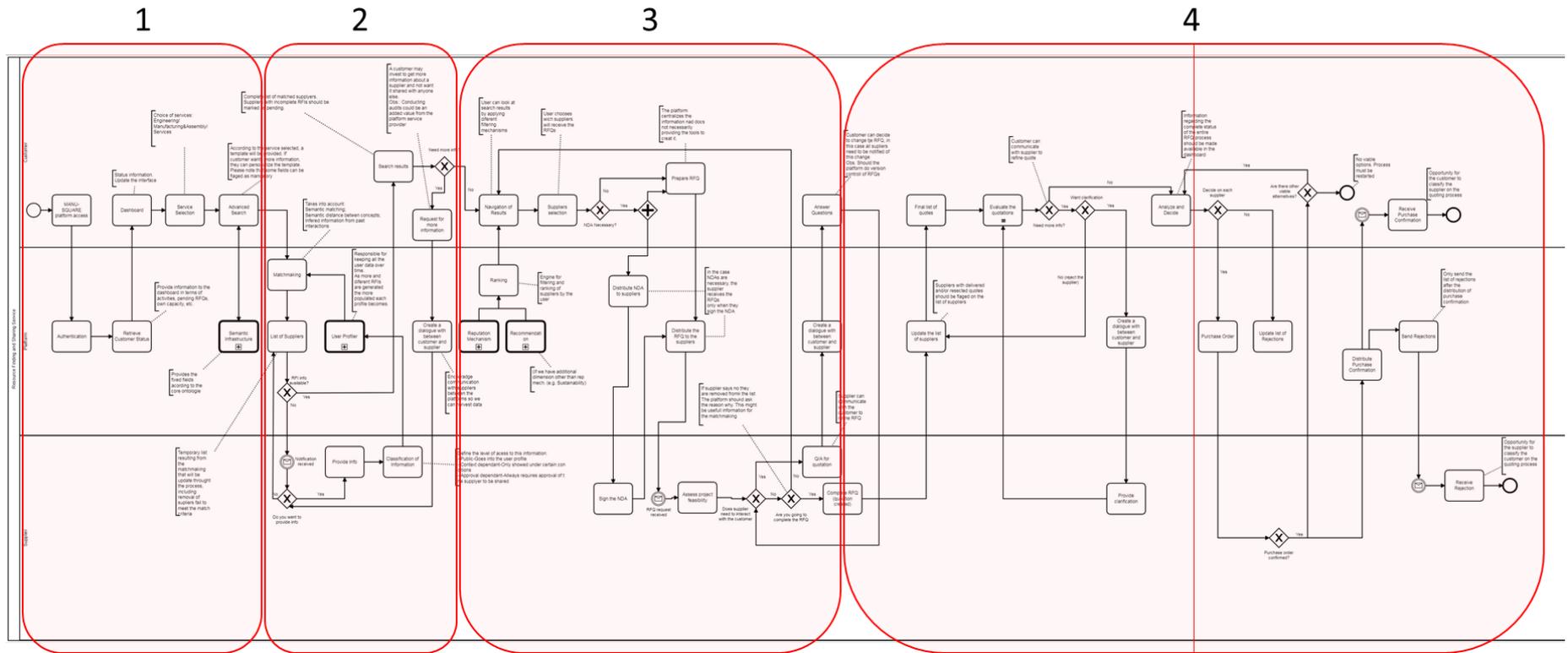


Figure 5 Resource sharing service BPMN (complete schema)

4.2.2.1 Platform access and supplier search

The process starts with the authorized customer accessing the MANU-SQUARE platform. A dashboard monitors and summarizes the on-going activities for that user and provides a set of choices for selection of the platform services. Once the resource sharing service is selected, a template is shown. The template has to be filled with the required information as an input for the advanced search functionality that will afterwards allow for the initial filtering and identification of the relevant suppliers. The advanced search function is supported by the semantic infrastructure of the platform. Thanks to the semantic, the matchmaking tool is able to indicate the relevant supplier information for each specific search.

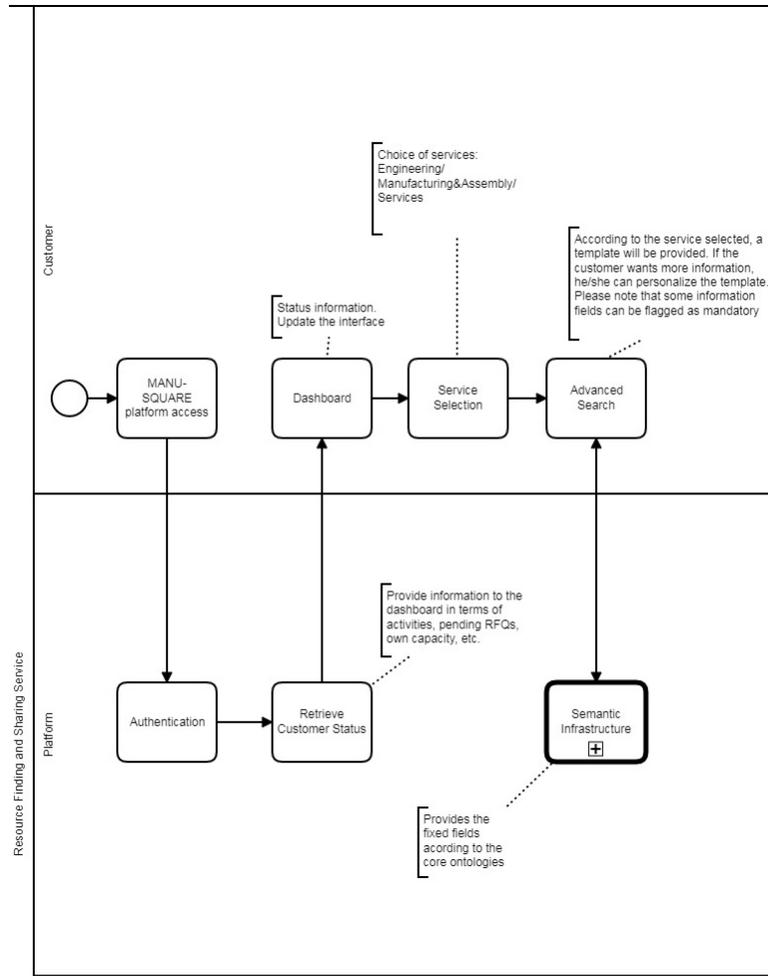


Figure 6 Resource sharing service BPMN: from the platform access to the supplier search

The following interfaces are needed at this stage:

- User dashboard summarizing the ongoing capacity sharing activities of the user and their status.
- Service selection enabling the selection of services by the user.
- Advance search providing the search parameters (e.g. process, material) for filtering out the relevant suppliers by the customer. This interface also enables the initial ranking of the suppliers based on a set of selected criteria (e.g. distance, price).

4.2.2.2 Match making

Once the relevant information for the project is registered by the customer, the platform activates the matchmaking process, which retrieves suppliers matching the search parameters based on the semantic algorithm. The supplier information is captured by the user profiler tool. If any information required by the customer is not available, the customer can initiate a request for information (RFI) dialogue with the supplier, where the information required to qualify the suppliers to be a supplier can be requested by customer. The supplier can choose to give that information to proceed or can reject and terminate the process. The RFI process is usually relevant in case the customer will work with the supplier for the first time.

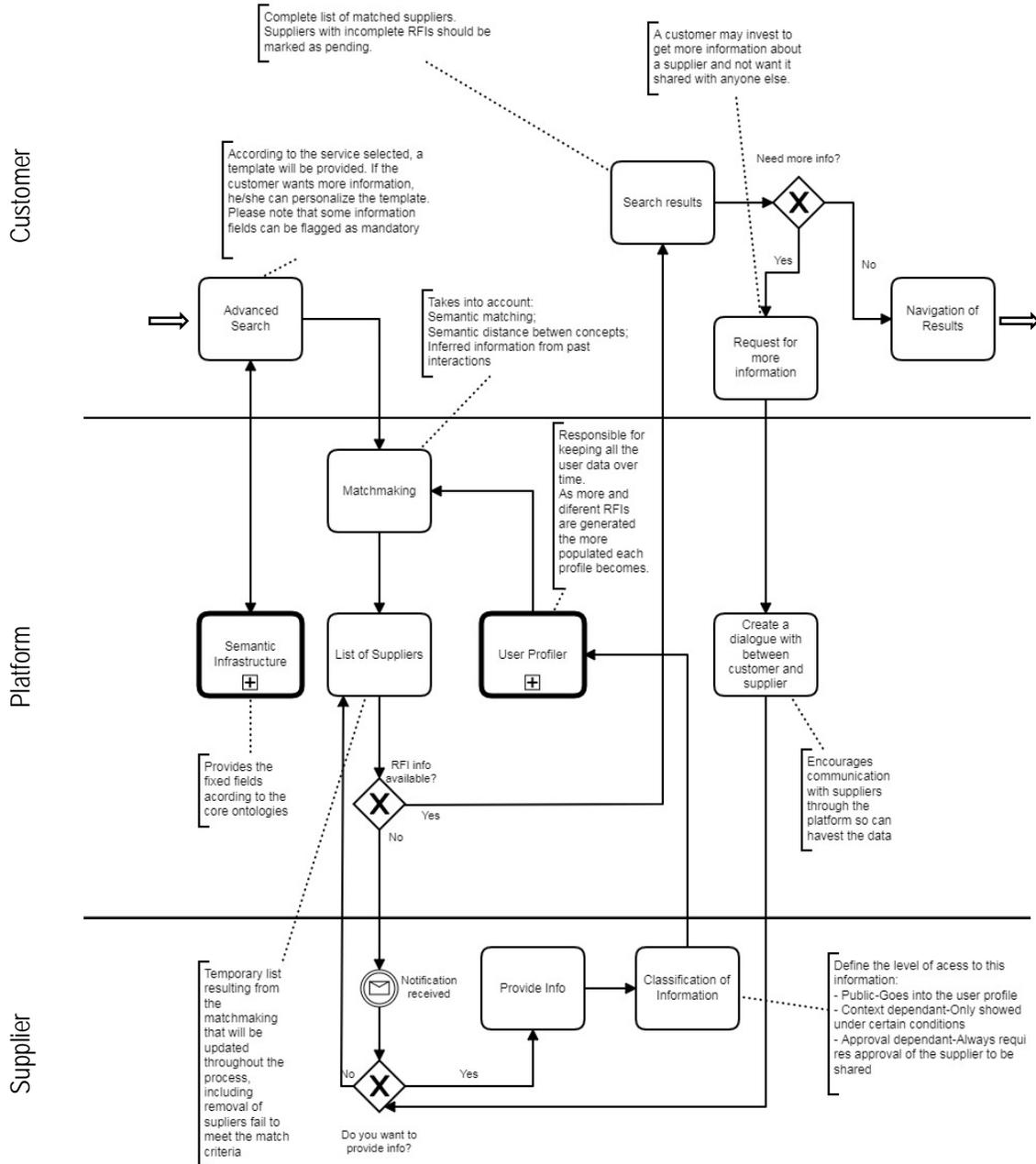


Figure 7 Resource sharing service BPMN: match making

The following interfaces are needed at this stage:

- RFQ template that will enable standardized preparation and communication of the RFQ.
- An interface that will enable the dialogue between the customer and the supplier.

4.2.2.3 Suppliers' identification and RFQ

Once the search results reveal the matching suppliers with required capacity and capabilities, the supplier selection and RFQ process starts. At this stage, first the necessity of signing a NDA is assessed depending on the type of supplier and/or on demand. The RFQ request is then distributed to the suppliers with a structured template. The suppliers evaluate the feasibility of the requested work and complete the RFQ. The feasibility assessment may also involve a visit to the customer's production site. If any information is needed to complete the RFQ from the supplier's side or if any additional information is needed by the customer after the RFQ is received, the platform enables a dialogue and information exchange between the customer and supplier to fulfil the missing information. The supplier then decides to proceed with the quote preparation or not. If the result of the analysis is positive, then it completes the quotation. Otherwise, it rejects the work, which then updates the list of suppliers.

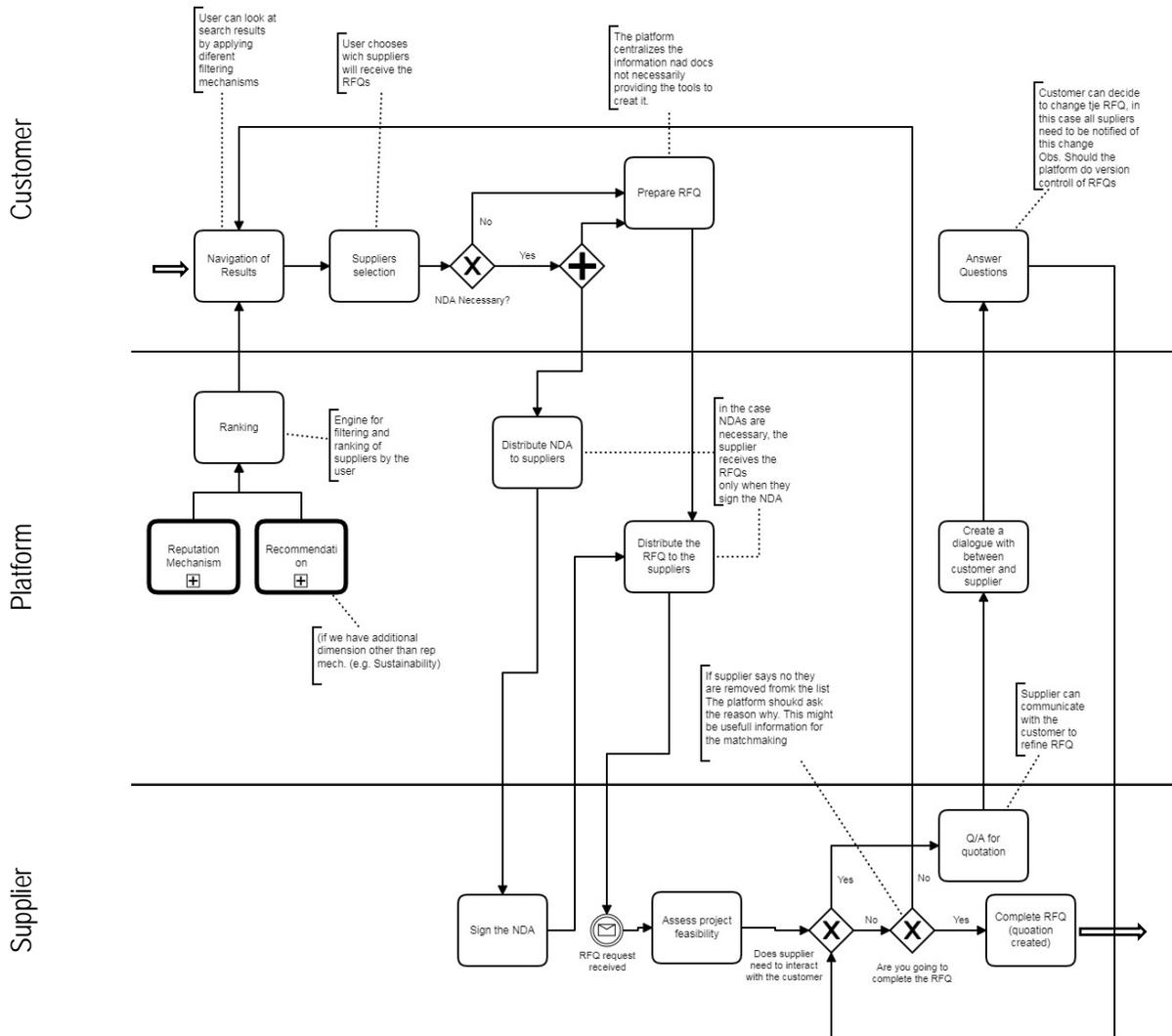


Figure 8 Resource sharing service BPMN: suppliers' identification and RFQ

The following interfaces are needed at this stage:

- RFQ template that will enable standardized preparation and communication of the RFQ.
- An interface that will enable the dialogue between the customer and the supplier.

4.2.2.4 Supplier selection and notification

Once the final list of complete RFQs are received from the suppliers, the customer evaluates the quotations. The customer may choose to accept or reject the quotation or may choose to ask for more clarification, if the RFQ is incomplete. The accepted quotation receives a purchase order sent by the platform, while the rejected quotations receive a notification.

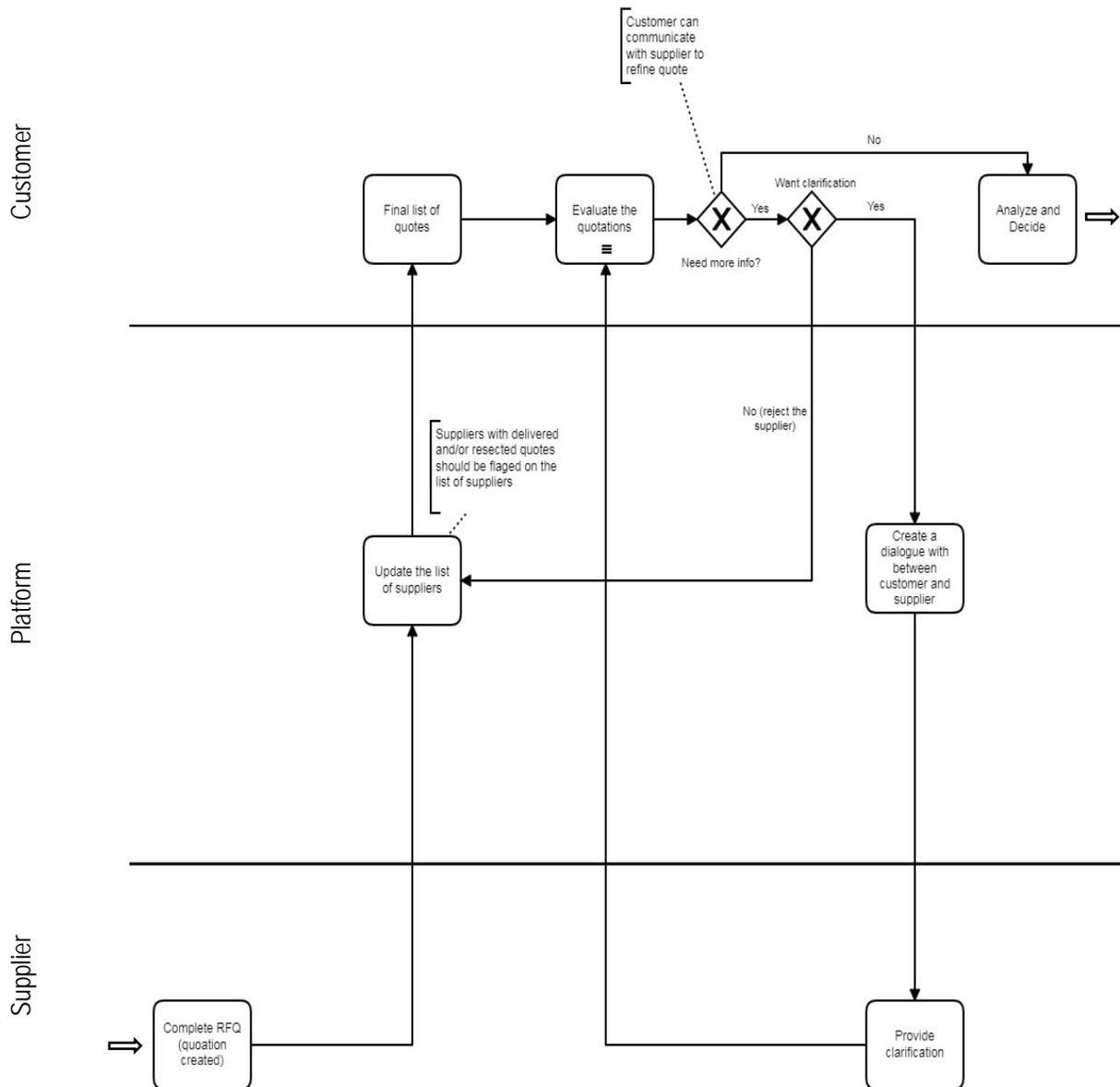


Figure 9 Resource sharing service BPMN: Supplier selection

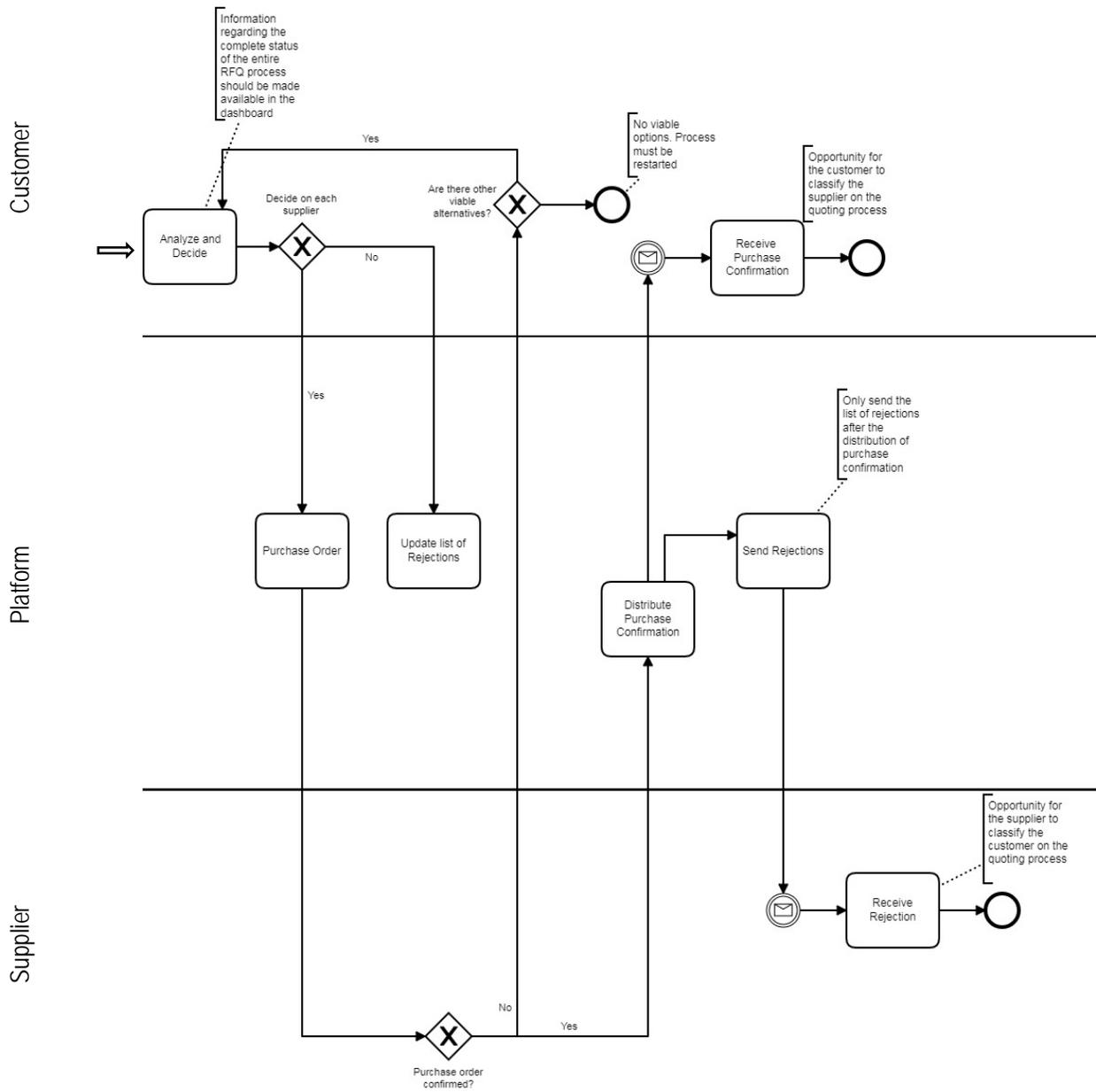


Figure 10 Resource sharing service BPMN: Supplier notification

4.3 Service Canvas (High Level Description)

Based on the descriptions above, service canvases in Figure 11 and Figure 12 have been drawn, from the customer's and the supplier's perspectives, respectively.

D5.1 – Services Design and Characterization

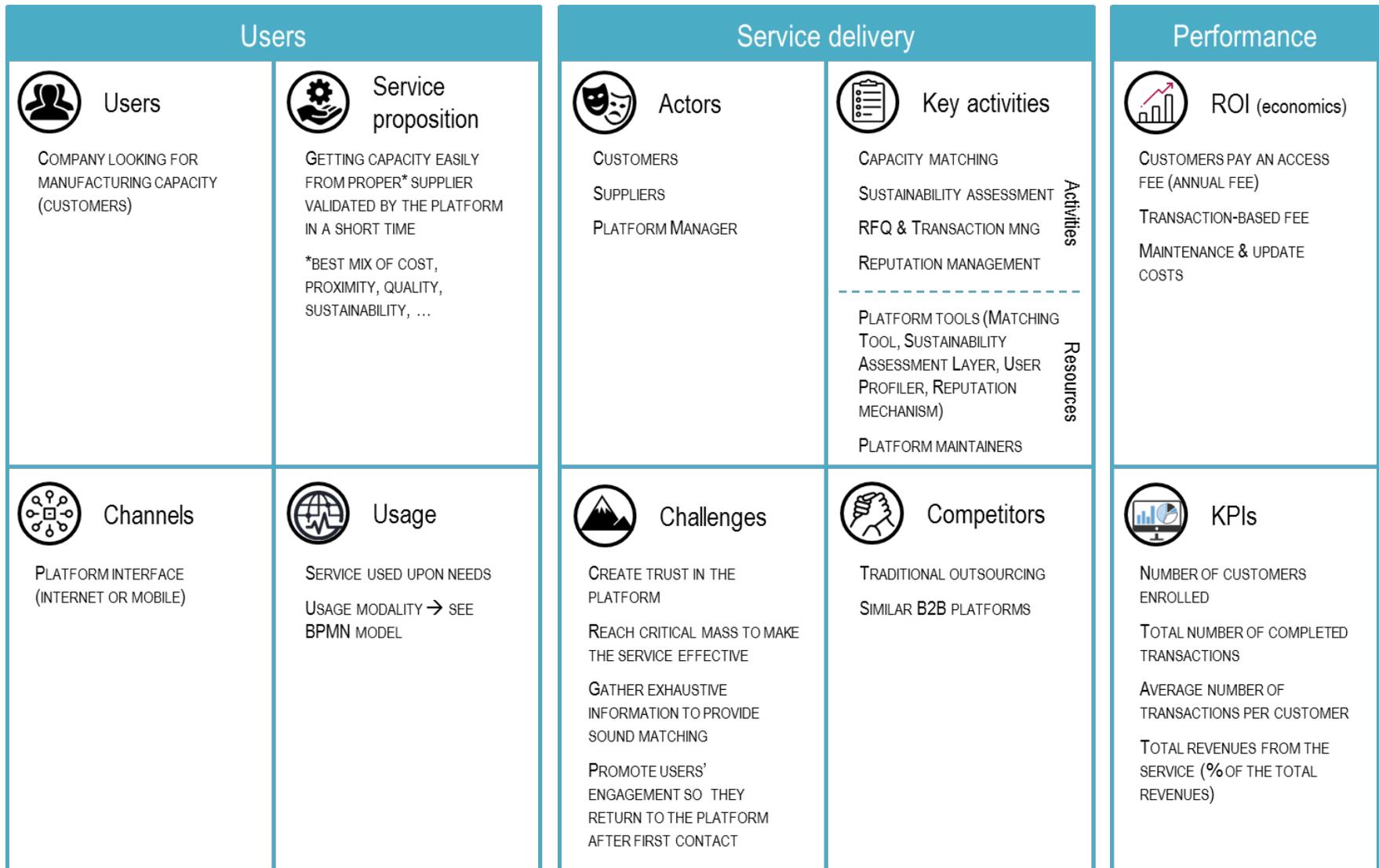


Figure 11 Resource finding and sharing service canvas – customer perspective

D5.1 – Services Design and Characterization

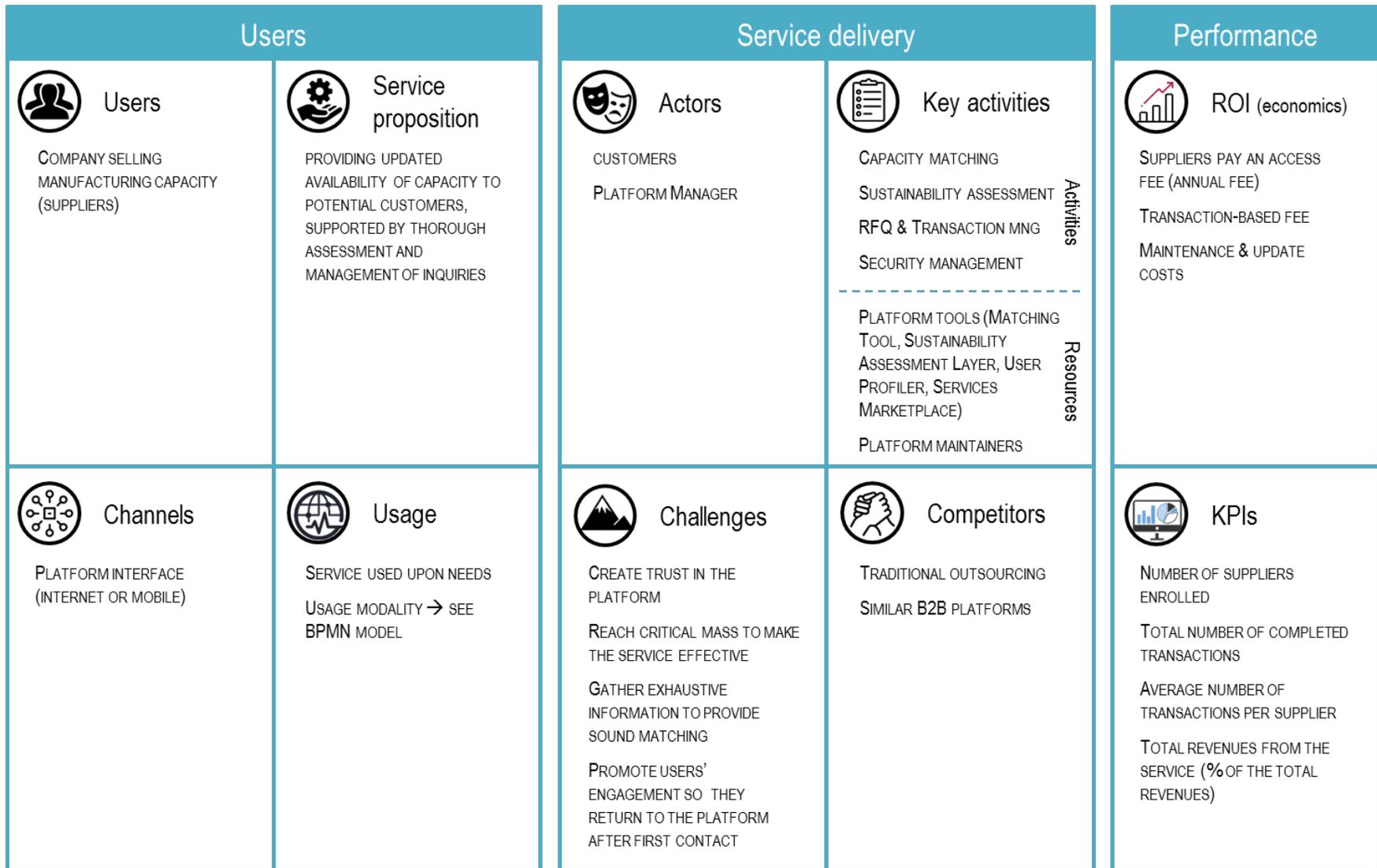


Figure 12 Resource finding and sharing service canvas – supplier perspective

5 INNOVATION MANAGEMENT

The aim of this chapter is to characterize the innovation management service starting from the initial service blueprint presented in D1.2 and extending it based on the information collected during the workshop held in Milan with the MANU-SQUARE partners involved in the demonstration scenario #3. First, a high level representation of the service is provided to highlight the sequence of interaction points between the users and the platform. Then a more detailed description of the service is provided based on the BPMN.

The role of the MANU-SQUARE platform is not limited to support resource sharing. It aims to act as a facilitator for unleashing the full innovation potential residing in any kind of companies, from large enterprises to SMEs, from traditional companies to start-ups. According to the outputs of D1.1, D1.2, and D1.3, these kinds of companies have different needs related to innovation as described in Table 5.

Table 5 Needs of different types of companies

Company type	Needs
Large enterprises	Protect valuable information Fertilize their usually close and structured environment with new ideas Access to external resources to develop non-core projects
SMEs	Access to not owned competences Expand their network Protect valuable information Access to external resources to develop non-core projects
Start-ups	Access to not owned competences Protect valuable information Expand their network

To address the needs reported in Table 5, MANU-SQUARE platform proposes the Innovation Management service. Participants of this service are:

- Customers: large companies, SMEs, and start-ups, who aim to receive support to manage and develop one or more of the innovation phases.
- Innovation Managers: researchers, experts, members of innovation/technology centres for coaching, consultants and innovation hub members belonging to the MANU-SQUARE ecosystem, who aim to find new customers through the platform and manage innovation projects “as a service”.

This service is implemented in the demonstration scenario #3, which involves the textile & cosmetics industry. The demonstrator aims to show how the MANU-SQUARE platform is able to support I-COTTON and TRUDEL in generating innovation ideas for new product development, configuring the corresponding value chain, and acquiring the required value chain actors. I-COTTON and TRUDEL play the role of customer, I-HUB can play the role of Innovation Manager. CSEM is involved in the design and the validation of the Innovation Management service, due to its high competence and experience in the field of innovation and related projects. Table 7 provides some more details about the role of single project partners in the demonstration scenario.

Table 6 Inputs from demonstration scenario

Partner	Description
I-COTTON	It aims to develop innovative products to satisfy market emerging needs. Initial investigations allowed to identify I-HUB as potential innovation manager, providing the knowledge for product and process re-design and a provider of an interesting bio-compatible and green material (sericin, coming from silk yarns processing) able to functionalize I-COTTON non-woven fabrics. Sericin is a by-product/waste of the production processes of TRUDEL.
TRUDEL	TRUDEL understands the value chain in silk from the mulberry tree through to the branded silk scarf. It can contribute with its know-how. Moreover, it is interested to benefit from a platform to be able to

	identify new suitable innovation partners. For TRUDEL it is critical to manage confidential business data.
I-HUB	I-HUB has deeper knowledge in textile sector. In particular, its main competences are related to silk products and processes. I-HUB's projects are related to develop, transfer, and exchange technologies between partners involved in the textile and cosmetics industry.
CSEM	CSEM is specialized in micro-technology, nanotechnology, microelectronics, systems engineering, and communications technologies. Thanks to its experience and competences, it is capable to support the development of technology platforms in micro-/nanotechnologies and Information and Communication Technology (ICT).

5.1 Definition of the service

In Innovation Management service, MANU-SQUARE plays the role of the facilitator, supporting the interaction between customers and Innovation Managers and guaranteeing efficiency and reliability. This service has been generally described in Deliverable D1.2, "Domain ontology authoring tool" §5.2.1. In the following, further investigations are presented, identifying and detailing all the possible touch points between the actors involved in the service and the platform.

5.1.1 Innovation Management service: customer's perspective

Innovation Management service can be presented to a customer as:

"Find a new partner belonging to the MANU-SQUARE network that can support you in one or more innovation stages (e.g. idea generation, concept development, design, engineering, etc.), relying on efficient procedures and on the reliable information."

The service has been designed to support a customer in:

- **Finding an Innovation Manager compliant with his/her needs:** a customer that is looking for a project partner usually has specific requirements, based on modus operandi he/she usually adopts the project to be developed. The platform has to support the identification of possible partners based on these requirements (e.g. language, location, competences, skills, experiences, certifications, etc...), facilitating the best choice based on clear and reliable information.
- **Managing RFP³:** there are huge benefits, if the request for proposal (RFP) process is strategically managed adopting standard and organised procedures. First of all, it allows to promote competition among Innovation Managers; secondly, to obtain complete, structured and comparable proposals; finally, to have traceable and structured information. An efficient RFP management system is not always easy to develop, in particular for small companies that do not have resources for dedicated software and resources. Innovation Management service, thanks to its efficient procedures and interfaces, supports effective RFP management, avoiding most common criticalities.
- **Setting-up innovation project:** to ensure the success of a project, specific and actionable terms have to be designed to make execution possible and to facilitate informed actions and decision making. The platform supports project set-up providing a specific structure to ensure the complete and effective project definition.
- **Managing and closing the project:** project execution is a critical element that has to be carefully managed, even if supported by an effective project set-up. For this reason, the platform has to provide the necessary functionalities to support project development and monitoring, in particular providing specific support in case of disputes between the involved players.

³ RFP: a Request for Proposal is a request addressed towards all potential partners/suppliers and service providers to participate in the bidding process for certain innovation project, product or service. The idea of this request is to collect several business proposals submitted by all potential partners/suppliers and service providers and to select one or some of them to complete the requested project. A RFP has to be submitted during the initial study phase of a project. It is in the form of a document, in which the customer can state what he/she is looking for and also specify evaluation and assessment criteria driving the partner selection.

Figure 11 outlines the Innovation Management service from the customer’s perspective, highlighting the touch points⁴ between the platform and the customer. The service has been designed passing through different design stages, ended with a workshop involving 18 people from HOLONIX, IBM, CSEM, INESC, INNOVA, SINTEF and SUPSI.

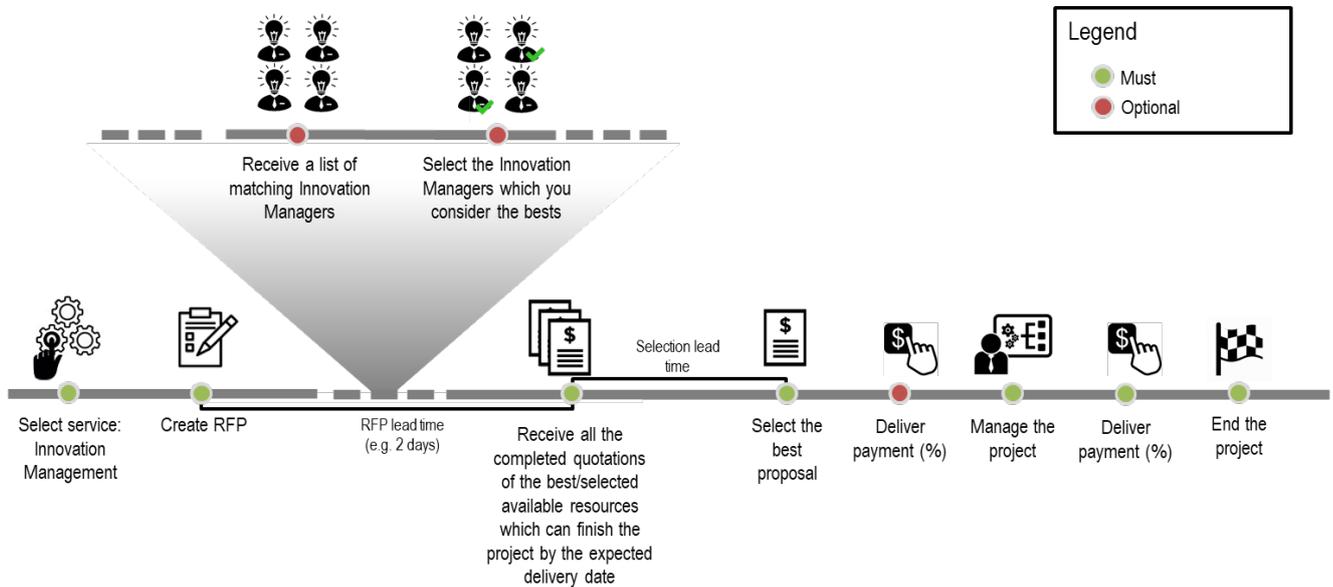


Figure 13 Innovation Management service: touch points with the platform from customer perspective

The service is triggered by the customer, who selects the Innovation Management service to create a new (RFP). The RFP is developed thanks to one or more interfaces, with both pre-defined and customizable fields. Thanks to the matchmaking functionality, the platform is capable of identifying and filtering a list of Innovation Managers having compliant competences and experience, and who can take care of the innovation project following the proposal selection. At this point, the service can follow two different paths depending on the customer’s choice:

- **Automatic RFP delivery:** the platform, thanks to the intelligent ranking (optimization), is capable to select the best percent (a reasonable number has to be set) of matching Innovation Managers who will receive the RFP. If an Innovation Manager refuses to complete a proposal, an additional Innovation Manager receives the RFP, in order to try to guarantee a minimum number of completed proposals (more details in section 6.2.2).
- **Manual RFP delivery:** the platform provides a complete list of the matching Innovation Managers, from which the customer can select those, to whom the RFP will be delivered.

Table 8 summarized pros and cons of the two options that will be made available through the platform.

Table 7 Pros & cons of automatic/manual RFP delivery

Automatic RFP delivery	<ul style="list-style-type: none"> • RFP is delivered to the highest ranked Innovation Managers • Customers will receive a minimum number of quotations automatically • The customer exploits the detailed and deeper knowledge that the platform has on its ecosystem • Minimize customers’ efforts and interactions 	<ul style="list-style-type: none"> • Customer has not complete control (about how many and which Innovation Managers receive the RFP)

⁴ A touch point is any interaction (including encounters where there is no physical interaction) that might alter the way that your customer feels about your product, brand, business or service.

Manual RFP delivery	<ul style="list-style-type: none"> • Customer has more control (on how many and which IMs receive the RFP) 	<ul style="list-style-type: none"> • If all the selected suppliers reject RFP, the request for new proposals has to be handled manually by the customer • The platform knowledge and experience is not completely exploited
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Whatever path the customer decides to follow, when the RFP deadline has expired, he/she receives a set of proposals from the selected Innovation Managers. From this set of proposals, the customer has to select the best in order to start the project. Payment can be managed in different ways, depending on customer's and Innovation Manager's requirements. Some options, not necessarily the only ones, are the following:

- Customer directly pays the Innovation Manager (not recommended: increases risks for involved players and reduces the control of the platform). In this case, the customer has to notify the platform that the payment has been made; Innovation Manager has to notify that the payment has been received.
- Customer pays 100% of the project amount to the platform that releases the payment to the Innovation Manager, in different tranches, or at the end of the project.
- Customer pays a percentage of the project amount to the platform that releases the payment to the Innovation Manager at the end of the project together with the customer's final payment.

When the project starts, the platform, thanks to a dedicated dashboard and to different functionalities (e.g. GANTT, task manager, project status, document sharing, etc.), supports the effective and efficient development of the project, facilitating the interaction between customer and Innovation Manager. This phase can also involve resolution of disputes if any occurs. These are managed through the mediation of the platform. Finally, when the project has been completed, the last step is the evaluation of the Innovation Manager by the customer.

Even though a first complete draft of the service has been designed involving different contributors, for each touch point different open issues remain as described in Table 9.

Table 8 Service from customer perspective: question marks

Touch point	Open issues
Select service: Innovation Management	NA
Create RFP	<p>Which are the most relevant parameters to be included in a RFP (e.g. quotation lead time, project lead time, characteristics of the innovation managers, past projects, etc...)?</p> <p>Which are the most relevant information that the customer has to provide to ensure that the search results match with its expectations?</p> <p>Which are the parameters relevant for the Innovation Managers ranking? How do customers prefer to weigh them?</p> <p>Do customers think that it is necessary to have an agreement (e.g. NDA) at this stage?</p> <p>How do customers expect the structure of the proposal to be created (pre-defined format, selection of the required fields, customizable)?</p> <p>How do customers expect the platform supports the creation (online form or upload files)?</p>
Receive all the completed quotations of the best/selected available resources which can finish	<p>How long are customers willing to wait for receiving project proposals?</p> <p>Which is the optimal number of proposals that customers want to receive?</p>

the project by the expected delivery date	
Select the best proposal	How many days do customers require to select the best proposals?
Deliver payment (%)	<p>What kind of payment/incentives would customers offer to the Innovation Manager (money payment, IPR sharing, revenue sharing, % of organisation sharing)?</p> <p>How do customers expect to manage payments? (within the platform, independently, etc.)</p> <p>How do customers expect to manage project agreements? (digital contract, physical contract, etc.)</p> <p>Are customers willing to pay a first percentage before project-begin? (the left-over percentages will remain on the platform until the end of the project to manage any issues/claims)</p> <p>When do customers expect to deliver the complete payment? (e.g. 30 days after project completion)</p>
Manage the project	Which functionalities/tools do customers expect to support project management (GANTT, task manager, project status, document sharing, etc...)?
End the project	How do customers expect to assess the obtained results to update Innovation Manager's reputation?

5.1.2 Innovation Management service from the supplier's perspective

Innovation Management service can be presented to an Innovation Manager as:

"Increase the opportunity to find new innovation projects compliant with your expertise and competences from reliable customers relying on efficient procedures and guaranteed transactions".

The service has been designed to support the Innovation Manager in:

- **Create a complete and effective profile:** in the digital era, a good and effective profile, describing competences and experience using right keywords, can have a huge impact in creating business opportunities. The MANU-SQUARE platform supports profile creation, thereby providing structured templates and, thanks to the Semantic Infrastructure and the knowledge behind it, it is capable to suggest best fields to be added in order optimize matching results.
- **Increase the number of received RFPs:** the main goal of any supplier is to find new customers to increase revenue. The MANU-SQUARE platform is an additional channel, through which Innovation Managers can reach new customers.
- **Manage project RFP:** same as for customers, there are incredible benefits to strategically manage proposals adopting standard and organised procedures. The Innovation Management service, thanks to its efficient procedures and interfaces, supports effective proposals management, avoiding most common issues.
- **Set-up the project:** to ensure a successful project, the proposal has to include all the necessary elements in order to avoid misunderstanding and disputes. The platform provides all the necessary fields that have to be included for a detailed and complete project creation.
- **Manage and close the project:** project execution is a critical element that has to be carefully managed, even after an effective project set-up. For this reason, the platform has to provide the necessary functionalities to support project execution and monitoring, in particular providing specific support in case of disputes between the involved players.

Figure 12 represents the first-stage draft of the Innovation Management service, highlighting the touch points between the platform and the supplier. The service has been designed passing through different design stages and ended with a workshop involving 18 people from HOLONIX, IBM, CSEM, INESC, INNOVA, SINTEF and SUPSI.

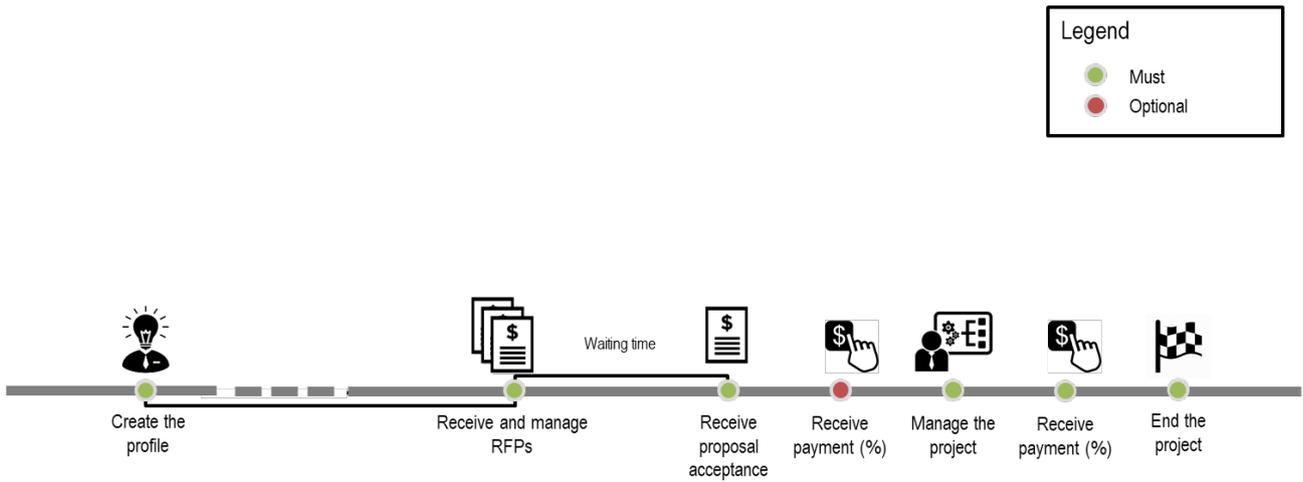


Figure 14 Innovation Management Service: touch points with the platform from supplier perspective

If the Innovation Manager has created an effective profile, when a customer creates a RFP that matches with his/her competences and expertise, the matching tool will identify him/her. If the Innovation Manager is between the best profiles identified profiles, he/she will receive a RFP. He/she has to assess the project feasibility and makes a proposal, detailing what he/she is going to do, for example, timing, main outputs, budget, and costs. The proposal is evaluated by the customer. If it is accepted, the project can start. As discussed in the previous section, payment remains an open issue that will be further analysed. Project management can also involve resolution of disputes, if any occurs. These are managed through the mediation of the platform. Finally, when the project has been completed, the last step is the evaluation of the customer. Even though a first complete draft of the service has been designed involving different contributors, different open issues remain for each touch point (see Table 10).

Table 9 Service from the supplier's perspective: issues and question marks

Touch point	Open issues
Create the profile	Which are the most relevant parameters to characterize Innovation Manager's profile? Which are the most relevant information that an Innovation Manager need/want to provide to ensure that the search results are optimized?
Receive RFP	Which structure should a RFP have (pre-defined online format, file)? Which information does an Innovation Manger expect to find in a RFP? What is the minimum number of RFP that an Innovation Manger wants to receive every week? What is the maximum number of RFP that an Innovation Manger wants to receive every week?
Receive proposal acceptance	NA
Receive payment (%)	How do you expect to manage payments? (within the platform, independently, etc...) How do you expect to manage project agreements? (digital contract, physical contract...) Are you willing to pay a first percentage before project-begin? (the left-over percentages will remain on the platform until the end of the project to manage any issues/claims) When do you expect to deliver the complete payment? (e.g. 30 days after order completion)
Manage the project	Which functionalities/tools do you expect to support the project management (GANT, task manager, project status, document sharing, etc.)
End the project	How do you expect to assess the customer to update his/her reputation?

5.2 Business Process Alignment

As reported in §3, a workshop has been carried out to validate the Innovation Management service. In particular, session 2 of the workshop allowed to i) investigate some of the issues and question marks reported in Table 9 and Table 10; ii) understand if more platform-to-user touch points are necessary to satisfy both customers' and Innovation Managers' needs; defining the detailed service business process.

5.2.1 Issues and question marks solved in session 2

Table 11 resumes the answer to the question marks that have been discussed during session 2.

Table 10 Question marks solved in session 2

Touch point	Question marks and related answer
Create RFP	<p>Q: Do customers think that it is necessary to have an agreement (e.g. NDA) at this stage?</p> <p>A: Yes, a NDA could be necessary if customer and Innovation Managers require to exchange relevant information. In particular, after a first selection, when the proposal has to be detailed, a NDA is often required.</p>
Manage payment	<p>Q: How do customers expect to manage payments? (within the platform, independently, etc...)</p> <p>A: Currently there is not a clear idea. Ideally, Innovation Managers and customers prefer to be independent of this aspect, but also the adoption of a platform-based payment could be a valid option.</p>
	<p>Q: Are customers willing to pay a first percentage before project-begin? (the left-over percentages will remain on the platform until the end of the project to manage any issues/claims)</p> <p>A: This depends on the type of project, its budget, and length. Different payment options should be enabled.</p>

5.2.2 Detailed service business process

Session 2 of the workshop has been used to validate and detail an Innovation Management service draft. The session started from the service drafts reported in Figure 13 and Figure 14 and additional touch points were highlighted to stimulate the discussion.

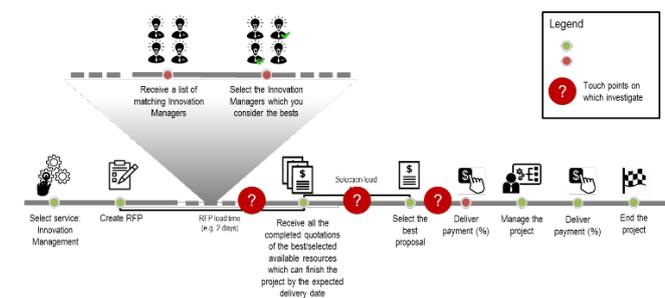


Figure 15 Innovation Management Service: possible additional touch points with the platform from customer perspective marked by the red question mark symbols

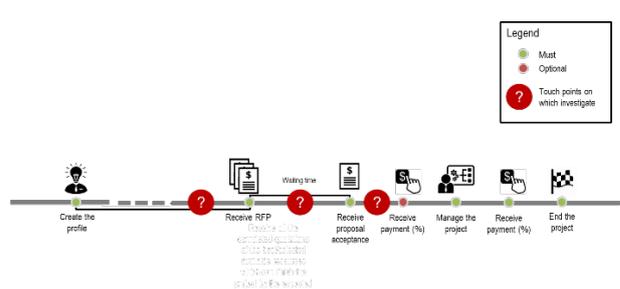


Figure 16: Innovation Management Service: possible additional touch points with the platform from supplier perspective marked by the red question mark symbols

The following sections describe in detail the BPMN model shown in Figure 15. The model is divided in three horizontal lanes, representing all actors involved in the service: from the top, customer, MANU-SQUARE platform, and Innovation Manager. Each activity is represented with a number in a light blue circle. Each number is reported in the text between two parentheses to detail how the process works. To facilitate the description and provide a readable scheme, the business process has been divided into 5 parts:

- From service selection to RFP delivery

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- From RFP delivery to high level proposal selection
- From high level proposal selection to final proposal delivery
- From final proposal to project start
- From project start to project end

It is necessary to mention that profile creation is not included in the business process. More details about profile creation will be provided in WP4 where the profiling functionality will be developed.

D5.1 – Services Design and Characterization

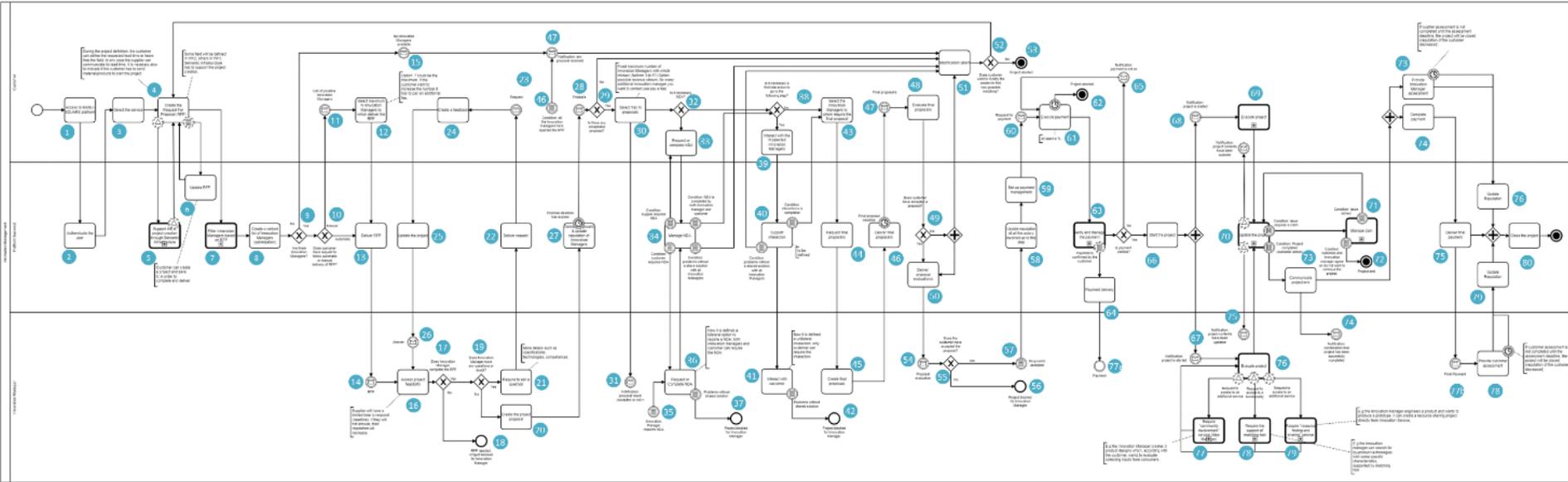


Figure 17 Innovation Management service: the entire business process

5.2.2.1 From service selection to RFP delivery

The service is triggered by the customer. After the authentication (1,2), the customer is addressed to the user-dashboard, which is the “homepage” that resumes active and past projects, new notifications, and tasks to be developed. From this interface, the customer is able to access the service selection interface, where he/she can trigger the Innovation Management service, creating a new RFP (3). The RFP is created through a dedicated interface (4) with advanced functionalities (5). In addition to the static and pre-defined fields, such as the description of the project, requirements, expectations, etc., the customer finds dynamic fields that are updated thanks to the support of the Semantic Infrastructure. For example, if the customer selects “Engineering” as Innovation phase, in which he/she wants to be supported, the interface automatically suggests related competences (e.g. the most used in other RFPs, in which “Engineering” has been used as innovation phrase) and related fields to be completed (e.g. engineering type, product, process, sector, etc.). The more the customer details the RFP, the more effective the matching will be. During the RFP creation, the customer has to specify:

- Which RFP delivery option he/she will adopt (manual or automatic)
- Which payment procedures he/she will adopt (if alternatives will be provided).
- If a NDA is required
- Other mandatory parameters (more details in section 6)

After RFP creation, the customer can save the information inserted up to that point (6), in case he/she needs further modification, or can confirm the RFP, thereby starting the Innovation Manager selection process.

Through support by the matchmaking tool, the platform identifies matching Innovation Managers by using most of the data collected during the RFP creation (7). If no Innovation Manager matches (9), the customer immediately receives a notification (13). In this case, he/she can decide to modify the project or to abort it. If the platform identifies one or more Innovation Managers, the process can follow two different paths (10) as described in section 5.1.1:

- Upon manual selection, the customer is able to access a new interface (11), where he/she can select max N⁵ Innovation Managers who he/she considers to be the best from a ranked list (based on reputation, matching %, other parameters) (8). The platform delivers the RFP (12) to the selected ones (14).
- After RFP creation, the customer is redirected to the user-dashboard, if automatic selection (done by the platform) is adopted. The platform delivers the RFP to the first X⁶ Innovation Managers in the list (12). These are selected starting from the top of the matching list created by the matching tool (based on reputation, matching %, other parameters) (8). It could happen that X is higher than the number of matching Innovation Managers. If an Innovation Manager prefers to reject a proposal (17), the platform delivers an additional to the highest-rank Innovation Manager available, who has not been involved yet. This allows to obtain the optimum number of proposals in order to guarantee a wide range of choices to the customer.

⁵ Max N: maximum number of Innovation Managers to who RPF can be delivered manually (to be defined). This constraint has been introduced in order to avoid that the customer involves a large number of Innovation Managers, which invest time completing the proposal but with limited possibilities of success.

⁶ Max X: maximum number of Innovation Managers, to whom a RPF can be delivered atomically (to be defined). This constraint has been introduced in order to avoid that the platform involves a large number of Innovation Managers, which invest time completing the proposal but with limited possibilities of success.

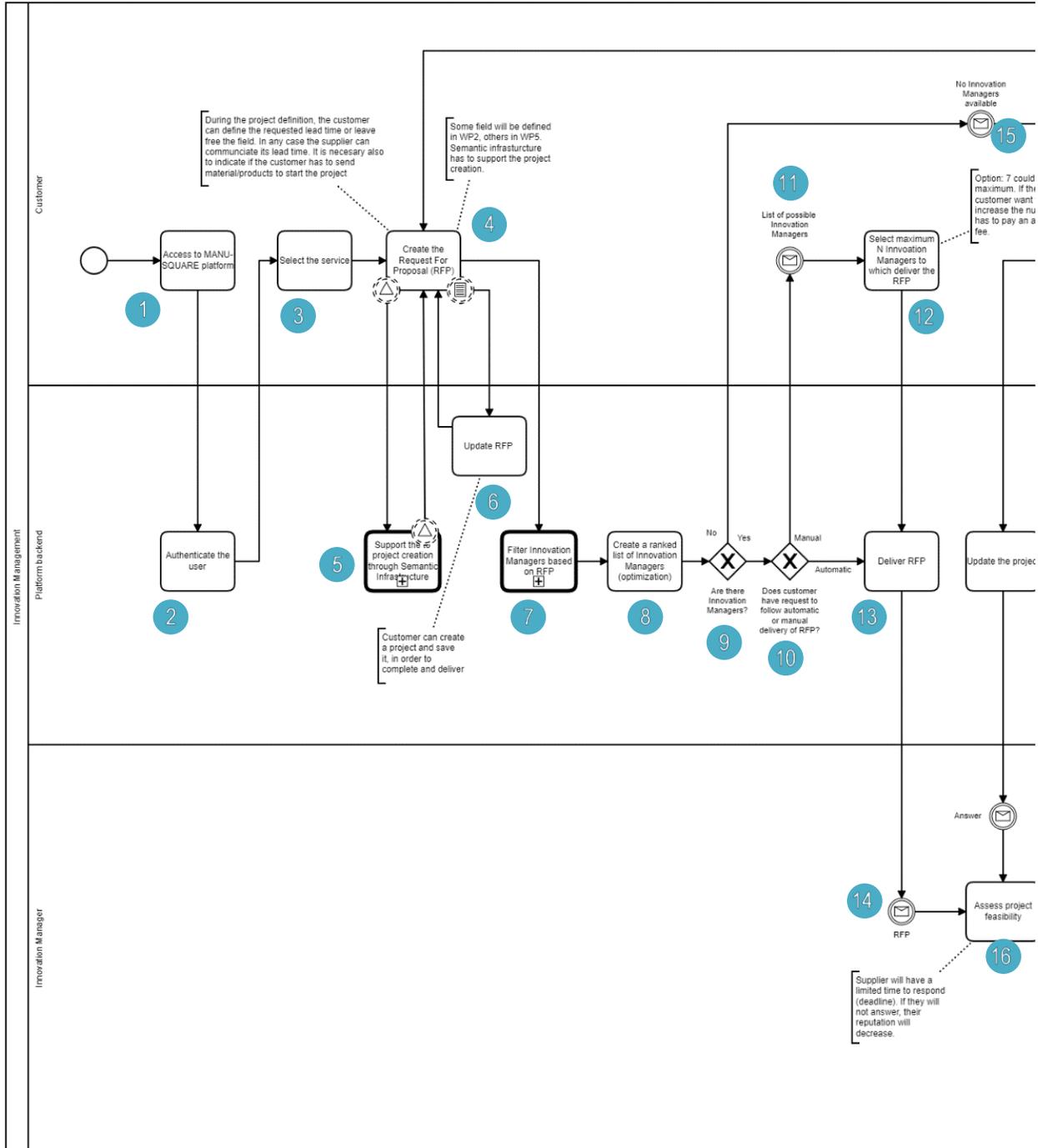


Figure 18 From service selection to RFP delivery

5.2.2.2 From RFP delivery to high-level proposal selection

Each Innovation Manager receiving the RFP (15) has to assess its feasibility (16) and decide if to complete it (20) or to reject it (16). However, if the Innovation Manager accepts the RFP and thereby agrees to prepare a proposal. If the proposal is however not sent within the agreed on time period (i.e. until the deadline), the reputation mechanism will

be affected negatively.. In case the Innovation Manager has any question or doubt (19) and needs to contact the customer, he/she has to use a question and answer procedure (21, 22, 23, 24, 26).

All the completed proposals are collected and delivered to the customer at the same time, after the proposal deadline has expired (27). The customer analyses these proposals to have a first impression, on what kind of support the Innovation Managers can provide and what are the main elements of their proposals. At this point, the customer can select the Innovation Managers with the most interesting proposals.

The customer receives max N/X^7 proposals (28). If the customer finds any of those acceptable, he/she can select max Y^8 proposals, which enter the final selection stage.

⁷ Max N/X : depending on the delivery paths that the customer has decided to follow, he can receive maximum N proposals (manual) or X proposals (automatic)

⁸

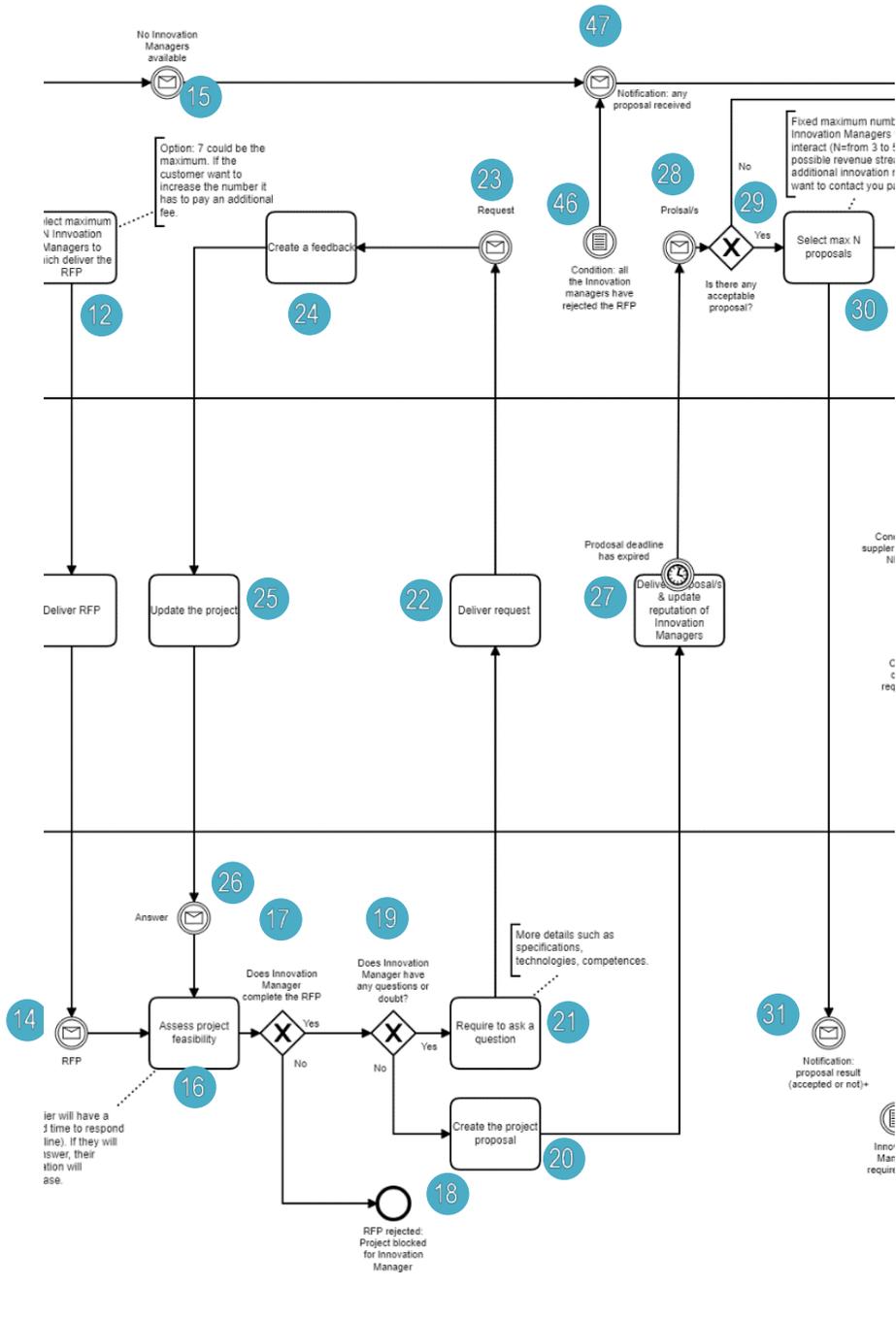


Figure 19 From RFP delivery to high level proposal selection

5.2.2.3 From high level proposal selection to final proposal delivery

The final selection stage will consider those Innovation Managers, whose high-level proposal has been selected. This may involve a NDA (32, 33, 34, 35, 36, 37) that can be requested by both customer and Innovation Managers, in order to protect relevant information. The final selection stage can pass through a direct interaction (to be defined, if managed

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by the platform, which has to provide the tools for video or audio calls, or managed independently by the users) (39, 40, 41).

After this optional interaction, the customer can select the Innovation Managers, to whom the request for a detailed proposal is sent. This has to include details about what the Innovation Manager is going to do, main outputs, costs, budget, and deadlines (43, 44, 45). It can also include files as additional documentation. The final proposal is part of the contractual agreement between the customer and Innovation Manager. It must include all the necessary information to avoid any misunderstanding and disputes. The customer receives all the final proposals simultaneously (47) after the deadline has expired.

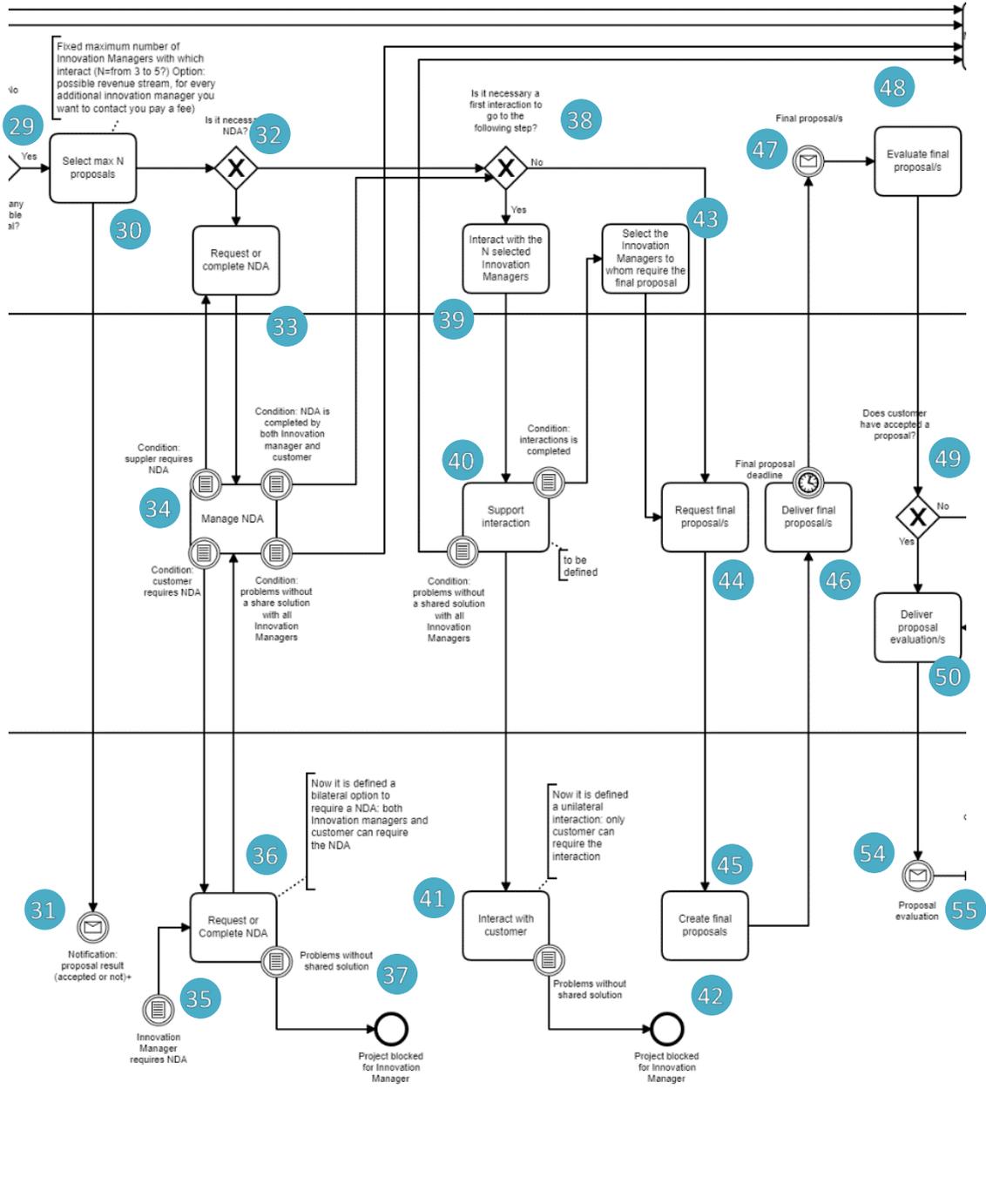


Figure 20 From high level proposal selection to final proposal delivery

5.2.2.4 From final proposal to project start

If any proposal is compliant with the expected requirements, the customer can modify the project by passing through all the previous activities (from 4 to 48) or abort. If one proposal fits with customer's requirements, it has to select it during the proposals' evaluation (49). In any case (rejected or accepted), each Innovation Manager receives an evaluation of the proposal he/she has delivered (50, 54). If the proposal has been rejected, the process can be considered closed.

In case of the his/her proposal has been accepted, the Innovation Manager has to wait the preliminary payment of the customer, if this has been required.

Payment is currently an issue. It will be discussed in more detail in D5.2. People involved in the workshop in Milan have not a clear preference, yet. Many options remain open: payment will be managed by the platform, supported by external plug-ins, or managed independently by the involved actors; payment procedures can be defined in the final proposal or in the RFP; the customer can pay in different instalments at the begin, at the end or during the project (64, 77a, 77b).

When payment set-up has been completed, the project can start (66), delivering a notification to both Innovation Manager and customer (67, 68).

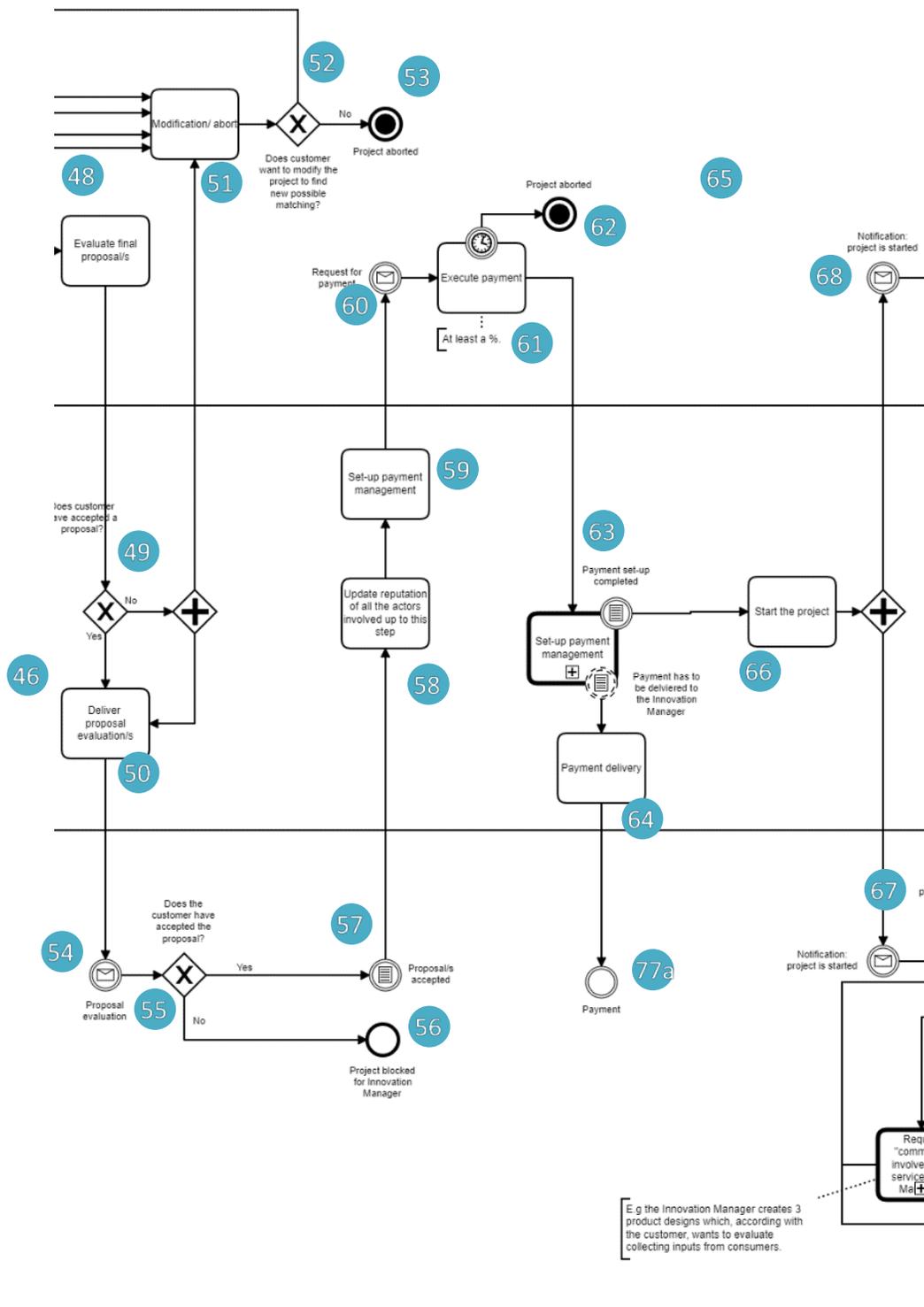


Figure 21 From final proposal to project start

5.2.2.5 *From project start to project end*

Project execution is managed through a unique interface, where the customer and Innovation managers can access all functions (e.g. document sharing, task management, etc.) to support project development and monitoring (70) and also to require related services⁹ (77, 78, 79). Tools could be provided both directly by the platform and by third party plugins. Particularly relevant for this service is the Idea Manager tool (77), developed in WP4, which allows to collect feedbacks and comments from a pool of contributors. For example, if the innovation project requires to develop a product concept, the Innovation Managers can collect evaluations from contributors belonging to the MANU-SQUARE ecosystem, identifying what changes they would make, which is the most appreciated concept between different choices. From this interface, in case of any issue that cannot be solved independently by the two involved players, the customer and the Innovation Manager can require a claim. The platform is capable to support claims (71) thanks to a specific management procedure that will be detailed in D5.2.

When the project has been completed, the customer has to confirm it and deliver a notification to the Innovation Manager (74). The customer has eventually to deliver payments (74) according to the agreements defined during the project definition (59) and to assess the Innovation Manager (73), evaluating the outputs, the quality of the service, etc... The Innovation Manager has to assess the customer (78) evaluating the collaboration, prompt payments, etc... These assessments are used to update reputation of both customer and Innovation Manager (76, 79). At this point, the project can be closed (80).

⁹ For example, if the project requires to design a product, the Innovation Manager can require the production of different prototypes using the "Resource Finding and Sharing" function.

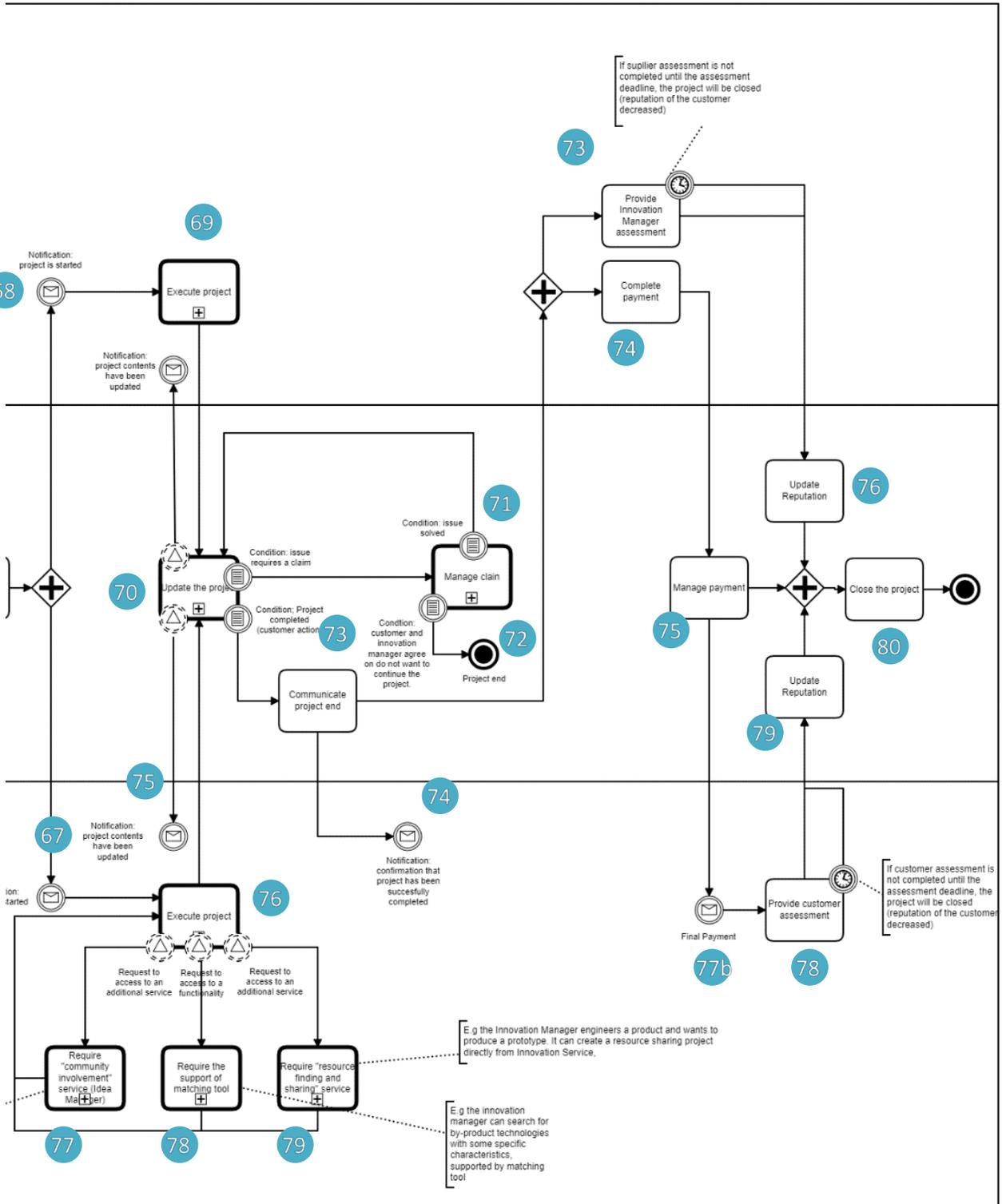


Figure 22 From project start to project end

5.2.2.6 *Interaction between users and platform*

As mentioned in §5.2.2, one of the aims of the workshop was to better define the touch points characterizing the interactions between the user and the platform. An interface has to be developed for each of them to allow users to properly exploit the Innovation Management service. To sum up, the most relevant user interfaces, that should be included in the MANU-SQUARE web-platform, are the following ones:

- User dashboard
- Service selection
- RFP creation
- Manual RFP delivery
- Proposal creation
- Proposal visualization and selection
- Payment set-up
- Final proposal creation
- Final proposal evaluation and selection
- Payment set-up
- Project execution

A last consideration worth of mention is the role of the block chain all along the service delivery process. Even though it has not been mentioned during the process description, this is the tool that allows the tracking of all the exchanged information and the reference mean that guarantees that, in case a dispute arises, the platform can provide support..

5.3 **Service Canvas**

Based on the descriptions above, services canvases in Figure 23 and Figure 24 are drawn from the customer and innovation manager perspectives, respectively:

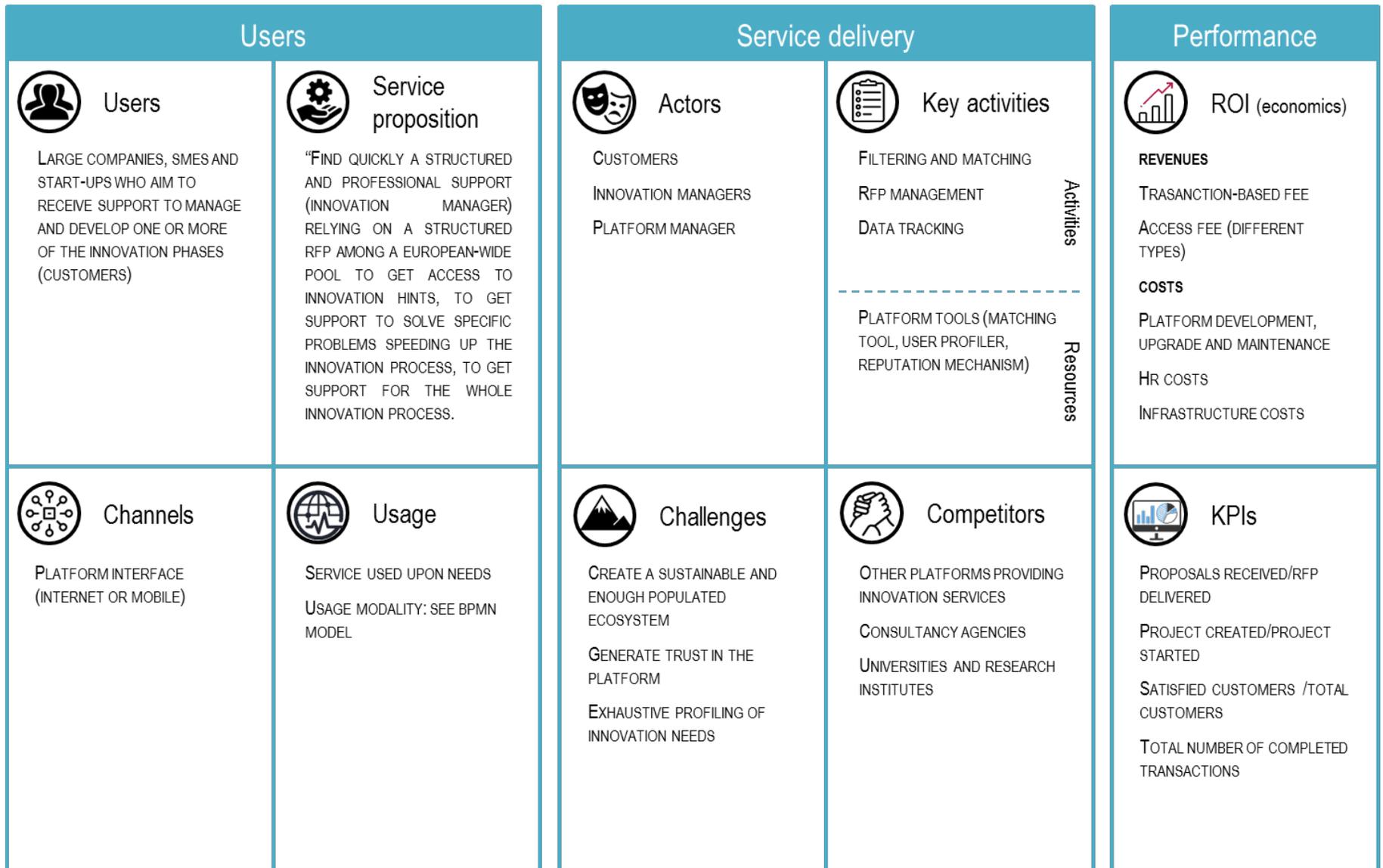


Figure 23 Innovation management service canvas – customer perspective



Figure 24 Innovation management service canvas – innovation manager perspective

6 SERVICES CHARACTERIZATION

In the previous sections, the MANU-SQUARE services have been described detailing the sequence of activities and the interactions taking place between the platform and the users. In order to design the supporting tools towards the platform implementation, a more detailed service characterization is required to define working parameters: a set of preliminary considerations, to be used as inputs for T5.2 and WP4, has been drawn during the workshops. Attention has been paid to two aspects that are relevant to start designing the services and the related business model:

- values conveyed through the platform services from the users’ point of view (what a user is willing to pay for);
- quantitative information characterizing the different service steps (times, quantities, frequencies).

What has been discussed with use cases for both types of services (innovation manager and resource sharing) is reported in what follows.

6.1 Value definition

The definition of the value proposition is of paramount importance for the development of the platform business model. Being it a multi-sided platform, each user will identify different values in the interaction with the platform and, as a consequence, targeted offers should be shaped. Before setting payment schemes and price ranges to assess the economic sustainability of the platform business, it is necessary to identify the value for each user. With this aim, a definition of the value proposition for each type of provided service has been developed highlighting what could be the value elements included in each service. Then, users have been asked to rank those value elements and what they will be willing to pay for getting the service, how frequently they expect to use it, and what impact it could have on the company turnover.

6.1.1 Capacity sharing service: customer’s perspective

The value proposition has been defined as follows:

“Find **quickly** the **right** (fitting your requirements), **sustainable** suppliers that you can **trust** among a **European-wide pool** to manage fluctuating production demand or to build / extend production capacity **without owning production means** relying on a structured **RFQ** and **information sharing** system and on a **transaction management system**”

Highlighted elements are the elementary pieces of value identified within the overall service. For each element, a brief description is provided along with the relative importance assigned by the user during the workshop based on an out of 4 scale: 1= negligible; 2= nice to have; 3= very important; 4= essential.

Table 11 The relative importance of the identified value elements for customer

Value element	Description	Relative importance
Quickly	The use of the platform can speed up the search of a supplier: the value lies in the time saving	3

D5.1 – Services Design and Characterization

Right	Thanks to the matchmaking mechanism and to the wide pool of suppliers, the use of the platform, makes the identification of a supplier fitting the customer's requirements easier	3
Sustainable	The integration of the sustainability assessment layer allows the explicit inclusion of sustainability considerations into the search.	3
Trust	The reputation mechanism ensures that suppliers proposed by the platform can be trusted, thus reducing the risk related to deal with unknown value chain partners.	4
European-wide pool	The search is carried out in a European-wide pool of suppliers. It is not always possible to have visibility on such a wide spectrum of options.	3
Without owning production means	The possibility to efficiently find suppliers through the platform can reduce the need to invest in equipment.	1
RFQ	The Request for Quotation process is managed by the platform thus reducing the burden for users.	4
Information sharing	The platform can be used as the reference virtual repository of shared data.	3
Transaction management	The platform makes available a transaction management system that can reduce the efforts of users in managing the relationship.	1

6.1.2 Capacity sharing service: supplier's perspective

The value proposition has been defined as follows:

"Have access to a **large cross-sectorial market** from a **European-wide pool** through a **structured user profiler** tool to sell **unused capacity** (production, knowledge) relying on a **trustworthy** and structured **RFQ, information sharing** (e.g. documents), **reputation management**, and **transaction management system**"

Highlighted elements are the elementary pieces of value identified within the overall service. For each element a brief description is provided along with the relative importance assigned by the user during the workshop based on an out of 4 scale: 1= negligible; 2= nice to have; 3= very important; 4= essential.

Table 12 The relative importance of the identified value elements for supplier

Value element	Description	Relative importance
Large cross-sectorial market	The platforms can attract new customers across sectors, that otherwise would not be reached or reached with higher costs.	3

D5.1 – Services Design and Characterization

European-wide pool	The match making is carried out based on a European pool of potential customers. It is not always possible to have visibility on such a wide spectrum of options, in particular for SMEs.	3
Structured user-profiler	The user profiler tool of the platform will enable a structured and updated profiling of the supplier available in the platform for customers' search.	4
Trustworthy	The reputation mechanism ensures that customers proposed by the platform can be trusted, thus reducing the risk related to deal with unknown value chain partners.	4
Sell unused capacity	Orders brought by the platform allows to increase the level of utilization of the available capacity that would otherwise remain unused generating economic losses.	3
RFQ	The Request for Quotation process is managed by the platform thus reducing the burden for users.	4
Reputation management	Thanks to the reputation mechanism of the platform, suppliers are selected also in a meritocratic way, thus rewarding the achievement of good results and good behaviour.	4
Information sharing	The platform can be used as the reference virtual repository of shared data.	4
Transaction management	The platform makes available a transaction management system that can reduce the efforts of users in managing the relationship.	1

6.1.3 Innovation management service: customer's perspective

The value proposition has been defined as follows:

“Find **quickly** a **structured and professional support** (Innovation Manager) relying on a structured **RFP** among a **European-wide pool** to get access to **innovation hints**, to get support to **solve specific problems speeding up the innovation process**, and to get **support for the whole innovation process (idea generation, concept development, design, engineering)**”

Highlighted elements are the elementary pieces of value identified within the overall service. For these elements the scaling described above were also used. Table 13 summarizes the relative importance of the value elements stated by the use case companies.

Table 13 The relative importance of the identified value elements for innovation manager

Value element	Description	Relative importance
Quickly	The use of the platform can speed up the search of an innovation manager.	3
Structured and professional support	The service offered by the innovation managers of the platform is structured according to the MANU-SQUARE rules, so the level of quality is stable and the initial selection to accept a new innovation manager ensures that the support will be professional.	3
RFP	The Request for Proposal process is managed by the platform thus reducing the burden for users.	2
European-wide pool	The match making is carried out based on a European pool of potential innovation managers, increasing the spectrum of accessible competences and excellences.	4
Innovation hints	Thanks to the platforms it is possible to access a pool of ideas supporting the identification of possible innovation hints that otherwise would not be identified or only with higher efforts.	2
Solve specific problems speeding up the innovation process	Relying on an innovation manager allows a company to solve specific problems (need of a material with particular features, need for a technology fulfilling some needs, etc.) related to the overall innovation process. The time it takes to find a solution is drastically reduced thanks to the platform service.	4
Support all the innovation process	Innovation managers are available to provide support for any step of the innovation process from idea generation to engineering (different customers could value in a different way the support depending on the interested phase).	3

From the customer’s point of view, the most important features are the possibility to find solutions to specific innovation problems getting access to a European-wide pool of possible innovation managers so to make sure that the highest competences in a specific field are reached.

6.1.4 Innovation management service: innovation manager’s perspective

The value proposition has been defined as follows:

“Find **new customers** that you can **trust** drawing from a **European-wide pool** of innovative companies leveraging on your **certified reputation** and being facilitated by **information sharing** and **transaction management** systems.”

Highlighted elements are the elementary pieces of value identified within the overall service. For each element a brief description is provided along with the relative importance assigned by the users (represented during the workshop by INNOVHUB and CSEM) during the workshop based on an out of 4 scale that has been described previously above.

Table 14 The relative importance of identified value elements for innovation manager

Value element	Description	Relative importance
New customers	The platforms can attract new customers, that otherwise would not be reached or reached with higher costs.	4
Trust	The reputation mechanism ensures that customers proposed by the platform can be trusted, thus reducing the risk related to deal with unknown value chain partners.	2
European-wide pool	The match making is carried out based on a European pool of potential customers giving the possibility to enter new market that would otherwise remain unexplored due to lack of resources.	3
Certified reputation	Thanks to the reputation mechanism of the platform, suppliers are selected also in a meritocratic way, thus rewarding the achievement of good results and good behaviour.	1
Information sharing	The platform can be used as the reference virtual repository of shared data.	2
Transaction management	The platform makes available a transaction management system that can reduce the efforts of users in managing the relationship.	2

The highest score is assigned to the possibility to reach new customers, followed by the access to a European-wide pool. This means that the main value perceived by innovation managers is the possibility to increase their customers' base through the use of the platform. Given the nature of the offered service that prevents the full automation of the process since any innovation project has its own peculiarities that have to be discussed between the parties, trust and reputation mechanism are not considered so relevant as well as the information sharing and the transaction management system. The payment scheme for the services offered to innovation managers should thus be linked in some way to the numbers of new customers. INNOVHUB stated that the use of the platform is interesting, if it generates business for an amount between 5 and 10% of the annual revenue. In this case, they would be willing to pay a fixed amount to become users of the platform. To be evaluated are possible payments of additional variable amounts (i.e. a small percentage of the generated turnover) related to the actual turnover generated through the platform. The implementation of this option is still to be investigated, since a wise way has to be identified to keep the MANU-SQUARE platform informed about the actual transaction between the two users.

6.2 Characterization of service parameters

During the workshop, the industrial partners have been asked what, in their opinion, should be the working parameters related to the different activities in order to consider the platform service valuable and efficient.

Following a preliminary list of questions prepared to guide the discussion, it has been possible to collect the information reported in the next sections for the two types of services.

6.2.1 Resource finding and sharing service: working parameters

In order to manage and execute the service from the platform point of view, there is need for defining some working parameters that will set out the constraints and borders of the service process. The main parameters that need to be

clarified in this service are concerned with the quotation and payment processes. Discussions with the use case company, JPM, have revealed the following aspects regarding these parameters. Please note that these values are relevant for the industry sector that JPM operates in and may vary to others. As such, they should be considered as examples.

The quotation period that the customer is willing to wait for will vary according to the type and nature of the RFQ:

- If it's an industrialization project (meaning Manufacturing only), it shouldn't be less than 3 days and no more than 4 weeks between a RFQ and the official proposal.
- If it's an engineering project (meaning study, development and project), that shouldn't be less than 1 week and no more than 8 weeks.

According to JPM, five quotations are more than enough to have a general analysis and track-record to perform a selection between suppliers. The company would like to wait and collect all the quotations until the deadline. However, they can start to discuss the quotations rather sooner than later. Once all quotations are received and the deadline has passed, the standard period for selecting a quotation would be one week.

When it comes to payment, the company expects to do the payment outside of the platform. The financials and payment terms for any project are between customer and supplier and should be done outside of the platform.

However, they believe that one of the added-value of the MANU-SQUARE platform compared to existing platforms is handling and tracking the contractual agreement. All information should be digitally available in the platform, nevertheless, there will be always a physical side of the agreements (visit's, audit's, signatures, etc). The standard delivery period of the payment in JPM's industry is 30 days from the invoice.

6.2.2 Innovation management service: working parameters

A first point to be discussed is related to the set of information to be entered when the project is created in order to make sure that the following search process is properly informed. A preliminary mock-up showing how the page of the platform could look like (see Figure 11) has been prepared as a base for the discussion.

The screenshot shows a web browser window with the URL <http://www.manusquare.eu/openinnovation/openinnovationmanagement/search>. The page has a navigation bar with tabs: Capacity Sharing, Knowledge Sharing, By-product Sharing, Innovation Management (selected), and Community involvement. The main heading is 'Innovation Management'. The form is titled 'Project creation' and includes the following sections:

- Project name:** A text input field.
- Describe your project:** A large text area.
- Tags:** A text area for entering tags.
- Project characteristics:**
 - Innovation phase:** Checkboxes for Idea development, Concept development, Design, Engineering, and Industrialization.
 - General characteristics:** Three dropdown menus (Sector1, Category1, Product1, Innovation t) with 'Add' buttons.
 - Budget:** A text input field with '10000' and a dropdown arrow.
 - RFQ deadline:** A date picker set to '25/02/2019'.
 - Project deadline:** A date picker set to '31/04/2019'.
 - Anonymous RFP
- Describe the relevance of your ideal Innovation Manager characteristics:**
 - Reputation:** A slider control.
 - Distance:** A slider control.
 - Minimum matching prob.:** A spinner set to '75'.
 - Minimum completed projects:** A spinner set to '50'.
 - Skills:** A text area with an 'Add a new required skill' button.
 - Innovation Manager Types:** Checkboxes for Companies, Designers, Sector experts, Innovation managers, R&D consultants, and Engineers.

At the bottom of the form, there are 'Save project' and 'Create project' buttons. A footer bar shows '10205 Registered users' and '30250 Completed projects', along with a 'Return to homepage' button and a small navigation menu with 'Suppliers', 'Customers', and 'Innovators'.

Figure 25 Mock-up of the page for the project creation once the Innovation Management service has been chosen

Since it is difficult to standardize the innovation process, when a new request is created, it would be useful to add a box, in which the current status is described and the goals to be accomplished are pointed out with reference to it. Also, the possibility to choose the type of innovation that is of interest (product innovation, process, technological,

material, etc.) has been identified as an useful input at this phase. This should be complementary information to the indication of the innovation phase.

The deadline that can be indicated at this point is the high level proposal one only, since depending on the type requested innovation the whole process could take different time.

The budget box has to be removed, since for the customer looking for an innovation manager could be difficult to set a value for something that is not known.

The setting of the parameters to guide the match-making process (right side of the page) should contain distance, language, and country, whilst the matching probability is not considered to be useful in this step (nonetheless, it should be indicated, when the list of possible innovation managers is provided). At this stage, it would also be nice to give relevance to the possibility to be supported by the innovation manager in the search of funding opportunities.

The process is called Request for Proposal instead that Request for Quotation in order to emphasize the difference between the capacity sharing service and the innovation management service.

On the other side, when the innovation manager creates his/her own profile to be used by the match-making algorithm, the following information have to be included:

- Field of interest
- Expertise
- Experience
- Innovation phases involvement
- Type of innovation? Innovation of materials, new processes.

Once the request for proposal is created, the search for the innovation manager starts. How the process should take place and, in particular, what should be the timeline has been discussed with the users (INNOVHUB, CSEM, and TRUDEL). In Figure 26 the sequence of event is described and possible time intervals are identified.

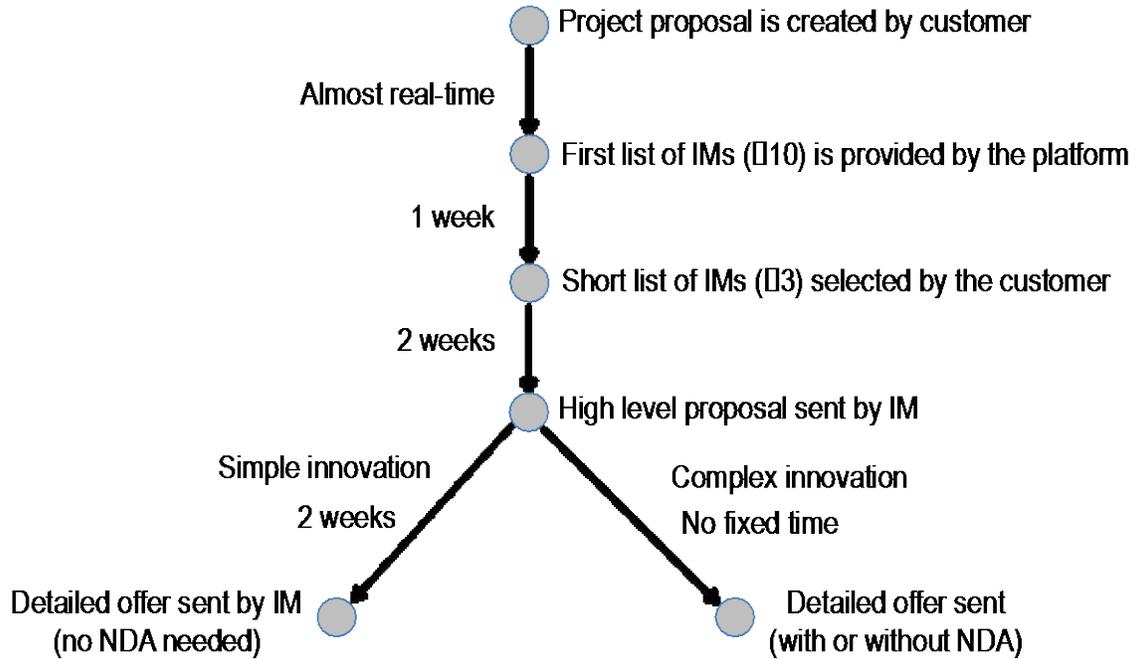


Figure 26 Expected sequence of activities and related timeline for the Innovation Manager search service

The short list of selected IMs are requested to send a high level of proposal. In order to prepare it, possible interaction between the customer and the Innovation Manager can take place, yet at this step no NDA is still required.

At this point, it emerged during the discussion that two different scenarios could appear:

- Requested innovation content is simple and a detailed offer can be sent in 2 weeks, during which the two parties can interact. The content of innovation is such that NDA is not requested. Possibility to ask for an agreed postponement of the deadline should be included.
- The innovation content is more complex, and it takes longer to prepare a detailed offer. Since the innovation spectrum is very wide, it is not possible to fix a time interval to have the detailed offer ready. It could depend on many aspects and in this context a longer time could not mean inefficiency. In this scenario most likely a NDA is requested before proceeding with the exchange of confidential information to prepare the final offer. Since the deadline is not fixed, users have to force to notify the platform when the NDA process has started and when the offer has been sent.

An open issue is the type of NDA to be signed. The MANU-SQUARE platform could provide a standard template that would facilitate the process, yet several companies are obliged to either to use their own NDA or at least be allowed to add changes/additions to an external NDA. To be further discussed the possibility to leave the possibilities to choose between the MANU-SQUARE standard and a proprietary form.

Given the nature of the offered service and the necessary interaction between the customer and the innovation manager, the role of the platform needs to be further studied in order to identify the best payment scheme to be used. Since the belonging to the community is a value in itself, in this case one possibility is to pay to access such community and then to use the match making service for free.

7 CONCLUSION

This report presented the design and characteristics of the MANU-SQUARE platform services "Resource finding and sharing" and "Innovation management". Taking the Deliverable1.2 "Service definitions" and Deliverable1.3 "Use case descriptions" as the starting point, the deliverable has described the services in detail from both customer and supplier perspectives, and presented BPMNs of the two service, aligned with the business processes. Value propositions of the services have also been described and evaluated.

The interaction with the industrial partners allowed the integration of the users' perspective into the service definition. Even though a wider industrial validation is planned in the next steps of the project; some evidences already emerged to guide further implementation of the MANU-SQUARE services. The specific value elements identified within the services (mainly: matchmaking, RFQ, information sharing, user profiling, reputation management, and tracing and tracking of information) have been proven to be of interest for the provision of both types of service: interviewed companies consider them as a way to increase their business by either improving the efficiency of related activities (lower costs) or increasing the customers' base (increased revenues).

The discussion was fruitful to update the BPMNs of the services that are now complete enough to inform the following project activities (WP4 and T5.2), yet some open issues remain that will require further attention in the near future. The main ones are:

- The complete automation of the RFQ process should not be the only available option. While automated RFQ may increase the efficiency, companies expressed the necessity of having control over the RFQ process, especially when it comes to selecting, to whom to send the RFQ and evaluation of the quotes.
- The integration of the payment process within the services offered by the platform is still an open discussion. While the business model of the platform might require that the payment process should be handled through the platform, the companies prefer financial terms and payments to be handled between the customer and supplier directly. If the payment is managed by the platform, proper mechanisms and policies must be developed to make it attractive for users. This will be discussed with the relevant partners of the consortium.
- The content of the project management sub-service needs to be evaluated in more detail considering the realistic aspects of the business involving physical meetings (e.g. visits) besides digital communication and coordination.

Further work will identify the business models of the platform by utilizing the outcomes of the described and characterized MANU-SQUARE services.