Collaborative Network for Industry, Manufacturing, Business and Logistics in Europe

D4.2

Platform User Experience from Supplier's & Buyer's Point of View

Project Acronym	NIMBLE	
Project Title	Collaboration Network for Industry, Manufacturing, Business and Logistics in Europe	
Project Number	723810	
Work Package	WP4	Use Case Experimentation, First-Round Validation and Evolution
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Dissemination Level	PU	
Contractual Delivery Date	28/02/2018	
Actual Delivery Date	23/06/2018	
Version	V1.0	

Abstract

The NIMBLE project aims to perform research leading to the development of a cloud and IoT federated platform specifically targeted to supply chain relationships and logistics. Core capabilities will enable firms to register, publish machine-readable catalogues for products and services, search for suitable supply chain partners, negotiate contracts and supply logistics, and develop private and secure information exchange channels between firms, in a B2B only environment. The intention is to support a federation of such NIMBLE instances, all providing a set of core services, and each potentially specifically tailored to a different aspect (regional, sectorial, topical, etc.).

The main goal of this document is present the results of the first validation and re-design activities focused on the end-user experience (UX) of buyers and suppliers on the NIMBLE platform. The findings will be taken on board as additional requirements for the second development phase in which value added services will be included in the platform.

NIMBLE in a Nutshell

NIMBLE is the collaboration Network for Industry, Manufacturing, Business and Logistics in Europe. It will develop the infrastructure for a cloud-based, Industry 4.0, Internet-of-Things-enabled B2B platform on which European manufacturing firms can register, publish machine-readable catalogues for products and services, search for suitable supply chain partners, negotiate contracts and supply logistics. Participating companies can establish private and secure B2B and M2M information exchange channels to optimise business workflows. The infrastructure is being developed as open source software under an Apache-type, permissive license. The governance model is a federation of platforms for multi-sided trade, with mandatory interoperation functions and optional added-value business functions that can be provided by third parties. This will foster the growth of a net-centric business ecosystem for sustainable innovation and fair competition as envisaged by the Digital Agenda 2020. Prospective NIMBLE providers can take the open source infrastructure and bundle it with sectorial, regional or functional added value services and launch a new platform in the federation. The project started in October 2016 and will last for 36 months.

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Document History

Version	Date	Comments
V0.1	20/02/2018	Initial version and structure
V0.2	04/04/2018	Version for internal review
V0.3	16/04/2018	Comments by Silvia Salvetti
V0.4	23/04/2018	Revisions by Wernher Behrendt
V0.5	27/04/2018	Refactoring to show buyers and suppliers
V0.6	02/05/2018	Refactoring to include Suppliers' figures
V0.7	21/05/2018	Reformatting of content
V0.8	22/05/2018	General update on contents
V0.9	23/05/2018	Final version received by coordinator
V1.0	23/06/2018	Final revisions and submission

Table of Contents

List of Figures

Acronyms

Table 1: Acronyms table

Acronym	Meaning
B2B	Business to Business
IoT	Internet of Things
NIMBLE	Collaboration Network for Industry, Manufacturing, Business and Logistics in Europe
PaaS	Platform as a Service
UX	User Experience

1   Introduction

NIMBLE is creating a B2B platform geared towards improving the efficiency of supply chain creation and operations. At its core lie several services which enable companies to publish digital versions of their catalogues, containing the range of products they sell and business services (e.g. transportation, packaging and so on) they provide, and in turn enables other companies to efficiently search and find required counterparts. In addition, once potential partners find each other they are able to initiate a negotiations process through the platform and finally establish a supply chain relationship among them, including the creation of private information exchange channels.

NIMBLE envisions an easy-to-use front end, which will serve as a single point of interaction for external companies, while hiding all the complexities of a cloud based platform at the back-end. Thus, users will enjoy the automation without suffering from the complexity of achieving it.

1.1   NIMBLE Core Services

In WP3 of NIMBLE, a number of core services were implemented, that are deemed to be necessary in order for a B2B platform to enable basic interaction between the participants. These core services are: (1) registration of individuals and of companies; (2) publishing of products and services in order to present a catalogue or portfolio; (3) basic matchmaking in the form of simple search over the products, the companies or individuals; (4) getting in contact with candidate suppliers or customers and to enter business negotiations; (5) close deals and initiate real business transactions; (6) enable users and companies to share information from business management level down to machine-level data exchange. Of these six core functionalities, the first four are fundamental and the last two are viewed as important elements to extend the real world into Cyberspace.

1.2   WP4 – Use Case Experimentation

WP4 initiates the test and validation of NIMBLE's core services in order to facilitate the development and assure for an adequate re-design of the activities focusing on capturing the end-user experience (UX). The work is carried out together with relevant experts from the use case companies, considering the viewpoint of the major roles that users may play: (i) as buyers of supplies and as buyers of products, searching for products, (ii) negotiating terms and closing deals, (iii) as suppliers, getting catalogues online, also negotiating terms and closing deals, (iv) as data sharing parties in a supply chain, invoking data sharing policies, and (v) as logistics services suppliers ensuring on-time, efficient delivery. The findings will be taken on board as additional requirements for the continuous development, in which value added services stepwise aim to be included in the platform. Each deliverable in WP4 aims to give an overview of the core services' functionality from the user

experience point of view, in order to provide support to the developers in their development processes. Also, the deliverables highlight potential strands for prioritizing among functionalities. Deliverables in WP4 are presenting platform user experiences from a Buyer's (this D4.2), Supplier's (this D4.2), Data Sharer's (D4.3), Logistics Supplier's (D4.3) and from the platform owner's point of view (D4.4). A final deliverable (D4.5) will also summarize major requirements pertaining to the whole platform and for the basis for development in the second half of the project.

WP4 is built upon input from WP1 Use Case Requirements and Collaboration Design and WP3 Core Business Services for the platform, i.e. a usable prototype platform to start validation. The results from WP4 will feed into WP5 Value-Added Business Services for the further development of the advanced collaboration platform.

1.3   The User Role as a Buyer

Companies will be able to use NIMBLE in various ways, and act in different roles, depending on their reasons for collaboration, and this deliverable will focus on the buyer's and the seller's points of view. As such, some of the analyses, argumentations, and the reflections reported in this deliverable, are done from the buyer's perspective. In practice this means that we have constantly kept in mind what are the main concerns, the main focus and the most important aspects for an actor who is in the role of a buyer. This also goes for the validations, carried out by the four Use Cases that has taken place in relation to the first release of the NIMBLE core services.

The buyer role can be represented by one or more users in a company. Buyers look for and expect to find, products on the NIMBLE platform. Two main types of companies are considered: industrial manufacturers that produce goods so they need to source materials and pieces, and vendors or retailers that are interested in selling finished products to end consumers. For that reason, a given user who enters with a buyer role in the platform may turn into a supplier role for a retailer user, using both the search service (as buyer) and the catalogue publication service (as supplier).

1.4   The User Role as a Supplier

The supplier role in NIMBLE is represented by the user or company that aims at publishing products in order to be sold. The supplier needs some tool to publish the product catalogue to make the company reachable by potential buyers that look for services, products or materials and can arrange their supply through NIMBLE. The platform becomes a powerful marketing channel for them and they will try to highlight particular technical specifications of their products in order to distinguish themselves from competitors through specific products.

On the one hand, the suppliers are especially interested in having quick and user-friendly publication mechanisms available, with a self-directed learning process, in order to avoid spending time and effort in learning how to use the platform and to take advantage of it. On the other hand, suppliers also want to understand how the search service works and how their potential customers are using it. Using this

knowledge, they can increase the chances that their products appear in searches performed by the buyers.

2   NIMBLE Validation Results

We first describe the validation process for the NIMBLE core services, followed by the presentation of results and findings from the UX validation work. See also D4.1 for the detailed validation plan.

The results come from exposure of users mostly to Release 1 (December 2017) and some to Release 2 (March 2018). The results do not cover Release 3 (June 2018).

The validation process

The validation process covers two aspects: firstly, a functionality test validating the business services (practical/technical aspects) developed so far. The UX-test includes end-users' experiences of the functionalities (learnability, ease of use, perceived usefulness, robustness, and trust).

Focus in the validation is as follows:

- Functionality test

  It concerns for now the basic business service functionalities i.e. to *register* a company in the platform, *publish* products and services, making them discoverable, and participate in resulting supply chain engagements including *negotiation* of deals and *initiation* of transactions. During the project, these basic functionalities will be enhanced with more advanced functionalities such as enabling the selective sharing of data among partners.

- UX test

  Gathering of UX data provides thorough insights in how the users perceive the NIMBLE platform and its business services. The UX builds on knowledge and experience of the user, the user's concerns, expectations, skills and abilities. Hence, the UX test answers to what extent the users are satisfied with the business services, whether these answer to their needs and expectations and how they feel about using the NIMBLE platform itself. It also covers their perceptions of the practical aspects such as utility, ease of use and efficiency of the system, i.e. the usability of the platform
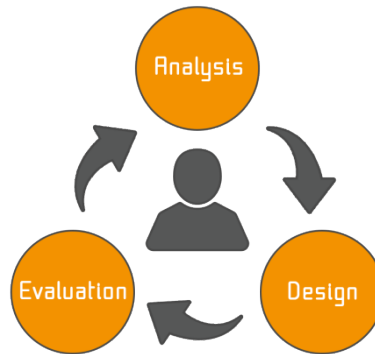
Figure 1 – The User-Centered Design cycle

2.1   Demo workshop 1: First reflections on the NIMBLE core services

Demo workshop 1 took place in Biella, in November 2017. The Use Cases got the first glimpse of the NIMBLE platform, and their first reflections on the NIMBLE services (Register, Publish, Search and Negotiation) were gathered on the project's Confluence platform. Below we report on the use cases' feedback and reflections from a buyer's and supplier's perspective regarding the core services: (1) registration, (2) publishing, (3) search, and (4) negotiation. We comment on features of each core service..

2.1.1   Registration

Language: NIMBLE will have to consider in what languages the NIMBLE platform will be available. Functional registration: Single sign on mechanism was asked for.

Access: It is also important to be able to differentiate between roles in one company that is registering, when the company has more than one user of NIMBLE. This requires first of all an advanced role (company mentor), who in turn should be able to assign further personnel to certain classes of relation types, and also to define what "parts" or services in NIMBLE, that these specific personnel have the right to access, i.e. possibility to restricted access.

Creating an account: Registering on NIMBLE should involve creating an account. It would be valuable if a company via their account could handle all their collaboration partners, and categorise them into different groups. This is vital if a company wants to be able to direct certain initiatives directly to a chosen collaboration partner group. Thus, in the function "My account" it should be possible to manage "My key partners" and categorize these partners in various ways.

Trustworthiness/security: In order to enhance trustworthiness and for security reasons, the registering company should provide the Certification of the company, as well as any legal disclaimer the company would like to inform about.

2.1.2 Publishing

The service *Publish* is important for buyers and suppliers since it lays the foundation for the core service Search (for products and services), presented below.

Relevant product characteristics: The product characteristics need to be clear for the buyers, i.e. how to choose products/services and what characteristics are possible to add (all relevant product characteristics), e.g. unit (and different categories of these), which means that taxonomies for core groups of information and accessories must be added.

Availability: It is preferable for buyers to get an overview of the availability of a certain product, i.e. current stock. The article code is also important, as well as the possibility to address different market channels and segments.

2.1.3 Search

Filtering: In the search service the function filtering is extremely important. It must be possible to make queries in the platform, and it would be preferable if the platform suggests (and search) for related synonyms.

Navigation: It would be preferable if NIMBLE also could offer added value, by facilitating and performing smart searches, i.e. suggest keywords, recognize synonyms etc.

2.1.4 Negotiation

Collaboration function: The Collaboration functions must be more elaborated. For now, the use cases asked for the possibility of direct communication channels. The platform should provide this, and hence be able to handle both the communication content and the communication process, in short, the platform should offer chat and message functions at a minimum.

Linkage: The use cases also expressed a wish for being able to link to their own internal systems e.g. ERP, when collaborating.

Templates: Another idea was that the platform should offer templates for various business activities, such as orders, invoices, bills etc.

Legal aspects: The platform could also provide information on legal aspects, not least country specific laws and regulations, in order to facilitate business activities with other countries.

Traceability: The use cases asked for the function traceability of orders, as well as traceability of production processes.

Collaboration: The most important function for a buyer would be the direct communication channels.

2.2   Demo workshop series 2: Use case validation of NIMBLE Release 1

The validation of release 1 of the NIMBLE platform was carried out through workshops organised by each Use Case.. In order to carry out the workshops, the Use Cases were provided a validation plan with attached questionnaires guiding the validation process (see Appendix A). The individual use case participants were asked to fill in a questionnaire from the buyer's perspective. As an outcome of the questionnaires, each use case summarized required functions in priority lists (high, medium, low priority). The results are reported below. Table 2 gives an overview of the workshop settings.

Table 2: The Workshops

Use Case Workshop	Date	Who participated
Use Case Eco House	January 18, 2018, between 10.00 - 17.15 CET.	Nine people participated in the workshop, of which six represented; Construction company Supplier of bathrooms Tile suppliers Bathroom appliance supplier Logistics company In addition, three developers from NIMBLE were remotely connected.
Use Case White Goods	February 26, 2018, between 14.00 - 17.00 CET.	Three people participated, in the roles as: Buyer Supplier Moderator Also, three persons from LTU was attending, in their role as WP leaders.
Use Case Textile	February 28, 2018, between 16.00 - 18.00 CET.	Five people participated taking on the roles as; Suppliers Seller of Fabrics Buyer of fabrics Remotely connected was also one person from LTU, in the role as WP leader.
Use Case Furniture	March 7, 2018, between 15.30 - 18.30 CET.	14 people took part in this workshop, taking on the roles as; Buyer Supplier Manufacturer Logistics Retailer Four developers from NIMBLE were remotely connected.

Figure 2 – Images of Furniture workshop at Micuna

The Figure 3 – Users validating the main core services in the furniture workshop below illustrates how the users involved in the furniture section experimented with the different processes. As it can be seen in the figure, some users move from one role to another at certain points during the validation workshop. For example, three users moved from playing a buyer role to playing a supplier one at the time of testing the publishing process, so the perception of this process becomes particularly important for those supplier companies who publish their products on the platform. Shifting perspective from publishing to search is important to assess the buyer's impression when a product is presented on the platform.
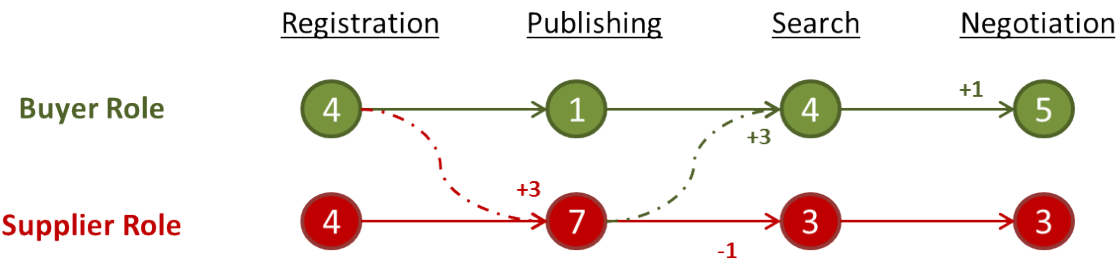
Figure 3 – Users validating the main core services in the furniture workshop

The aforementioned role switching was planned and executed in order to gather a greater number of surveys from the users in particular in the publication and search services. This led to gathering more

responses from suppliers regarding the publication process and more responses from buyers regarding the search process. This is illustrated in the next Figure 4 – Relation between roles and services in the furniture workshop.
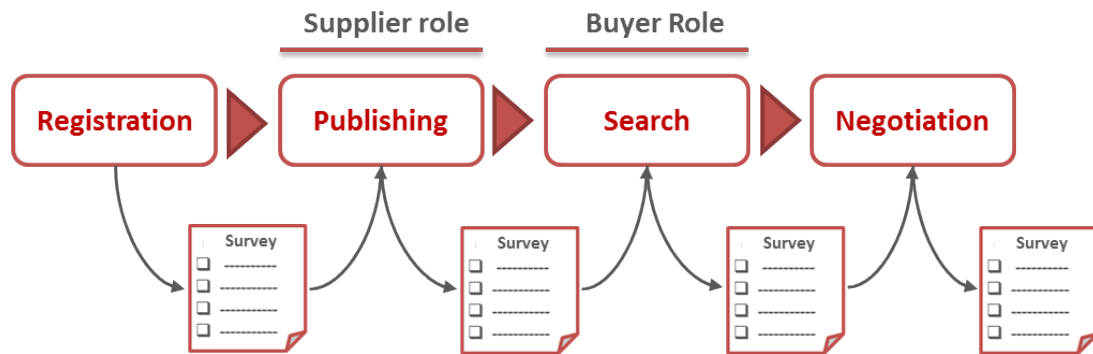
Figure 4 – Relation between roles and services in the furniture workshop

2.3   Workshop Results

As expected, the workshops revealed some problems and issues in the platform's core services: registration, publishing, search and negotiation. First of all, some information resources and supporting texts were considered to be missing. Therefore it is crucial to analyse the results of the validation questionnaires filled by the workshop attendants.

The information gleaned from the questionnaires concerns learnability, ease of use, robustness, efficiency, comprehensibility and usability.

Further aspects of the validation addressed navigation, flexibility in the interactions, efficiency, speed of response when performing specific tasks, quick recovery from made mistakes, usability, user-friendly interface and user satisfaction in the end.

Below we present an aggregated summary of the results from the questionnaires on 1) Registration service, 2) Publishing service, 3) Search service and 4) Negotiation service. Depending on the service, in total four to nine respondents answered the surveys in the role as buyer or supplier.

2.3.1   The Registration Service - Learning, Ease of Use, Robustness and Trust

The first step for a buyer or a supplier to be able to access the platform in order to browse, search for products or start publishing a product catalogue is the registration phase. An agile, friendly and intuitive registration will ease the access of users of any role, while a tedious registration process will discourage potential users of the platform. It is particularly important that all the essential information

from users and companies to is properly collected and saved during the registration process,. For ease of registration mandatory information fields should be marked in the interface. Security is also an important issue. Last but not least, GDPR compliance should be indicated to the end user so they can accept the terms of use before submitting their registration to the NIMBLE platform.

2.3.1.1   Assessment of functionality – Registration

(5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

From the responses we can conclude that the registration service is quite intuitive. This is the most positive aspect revealed by the collected feedback, while at the same time, users are often particularly concerned about the security of data submitted to the platform and the success of the registration process itself. But still, it should be noticed that, during the workshops, some users experienced problems related to a slow reaction of the system during the registration, due maybe to specific network troubles or saturation of traffic.

Note that the following tables show already the aggregation over all workshops.

No.		
–	In which branch do you operate?	Eco House (E) Textile (T) White Goods (W) Furniture (F)
–	What role do you represent? (buyer, supplier, logistic supplier)	Buyer / Supplier

THE REGISTRATION PROCESS

No.	Statement to be assessed:	1	2	3	4	5	0	/
–	The **registration** process is intuitive		T	W W W FFF	E FF FF	F		
–	The core service **register** responds quickly to my commands	F F	E FF FF	F T	W W W	F		
–	The core service **register** starts quickly	FFF	FF	T	W W FFF W		E	
–	How confident are you that you registration process is successfully fulfilled?	FFF	E T	W FF W	W F	FF		

THE FUNCTIONALITY REGISTER IN GENERAL							
Learnability							
In the following section we want to gain insights into your view of the learnability of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)							
– The menu navigation is intuitive	F	E F T	W W F W	F	FFF		
– The register content is intuitive	F	T	E W W FF	F W	FFF		
– The register functions are intuitive	F	E F T	W W F	FF W	FF		
– Realising where I am in the registration process is easy			E W F T W	W FFF FF	F		
– I can easily and quickly understand the registration process		E F	W F T W	W FF FF	F		
– The registration process needs be more self-explaining		F FF	FFF W	E W F	W	T	
– I imagine that most people would learn to register very quickly		E T	FFF F W	W W FFF			
– I found to register very awkward	FF	W FF FF	F T	W W	E		
– I needed to learn a lot of things before I could get going with registration	FFF W	W FF	W	E FF	T		
Ease of Use							
In the following section we want to gain insights into your view of the ease of use of the offered service. Marc the alternative between (5 = agree							

absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)							
– The structure of the register functionality is understandable		E W F T	F W	W FF FF	F		
– The design and name of menus and buttons is easy to understand	T	E F	W W F W	FFF	FF		
– I feel confident while registering on the platform		E F T W	W FFF	W FF	F		
– When I make a mistake registering on the platform, I recover easily and quickly	W T	E FF W	W	FFF	F		
– I can quickly find what I want in registration process		E W W F T	W F	FF FF			
– I thought there was too much inconsistency in the registration process	F W	FFF	W W FFF		E		T
– The main screen for registration is self-explaining		E W EE T	W W FF	FF			
– The registration process has some annoying features	T F	W W FFF	W	F	E F		

Perceived Usefulness

In the following section we want to gain insights into your view of the perceived usefulness of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

– Using NIMBLE in my job would enable me to do my tasks more quickly	T F	E FF W	F	F	W		W FF
– I am pleased with the offerings of the system	T	E F W	FFF	W F			W FF

–	I find the system useful in my job		E F W	FF	W F			W FF
	Robustness							
–	When I make a mistake while registering, I find support easily and quickly	FF	EW W T	FF		F		F

Trust

In the following section we want to gain insights into your view of the trust of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

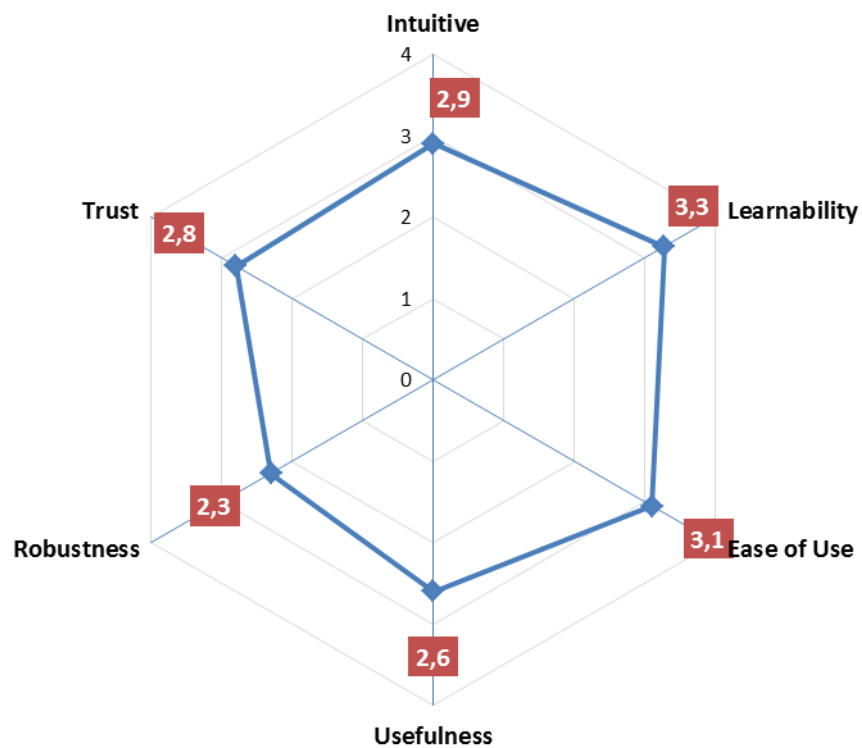|								
–	I feel in control when registering		E W W FFF T	W F	FFF			
–	I feel confident while registering		W W FF T	W F	FF FF		E	

Figure 5 – Distribution of results on registration

2.3.1.2 The Functionality Registration in General

Striving towards functions that are easy to learn, easy to use, perceived as useful, robust and are trusted, the validation shows that there is further work to do on the functionality of the registration. The findings on the four user characteristics are presented below.

Learnability

The navigation menu enabled users to quickly and intuitively understand the registration process. Most of users agree that the registration process is quick to learn. However, some of the users were missing some explanatory texts in the interface..

It can be concluded that few users found it difficult to start the registration process and in very few cases did they feel uncomfortable with the process.

Ease of Use

Concerning the ease of use of the platform there is room for improvement. It is clear that a proper structure and design of the navigation menus greatly eases the use of the platform enabling to complete the registration process successfully.

According to the majority of respondents at the different workshops, both the structure and design of menus and buttons is easy to understand. Several respondents found the main registration screen not self-explaining enough and they felt that there is not an easy and quick recovery when a mistake is made during the process.

Areas of improvement are the use of dropdowns for some input fields, an indication of mandatory fields, and the translation of the registration form and the navigation menus into user's mother languages.

Perceived Usefulness

The user perception of the registration service is not completely satisfactory, but since registration is a necessary step for any secure networked software system and since the process needs to be done only once, we will give more emphasis to the work processes that follow once the user and the company are registered.

Robustness

Robustness refers to the support offered by the platform when users make some mistake e.g. during the registration process. In the light of the surveys, such support is not easily found when a mistake is made during the process, so this could be significantly improved.

Trust

Trust is strongly related to two statements: the level of control that users feel they have in the process and how confident they feel when registering on the platform. In general, users do not feel to be in control, so according to the survey answers the feel undecided about this aspect. However, most of them feel reasonably confident with the registration. In order to improve the trust in the registration process, some basic recovery functions could be added as well as some mechanism to change the password to access the platform.

Open Answers – Registration

The survey on the registration service was followed up by open questions that were aimed to provide comments on the function and the process. Here we report on the issues brought up where users freely express their concerns.

White goods:

The users from the White goods Use Case brought up the following points:

- **Data format**: It is important to understand what data format should be specified in the fields.

- **Data verification and authorization**: Data verification and authorization needs to be enhanced.

- **Mandatory fields**: For a user it is of value to easily recognize which fields are necessary and these could be marked with an *.

- **Drop lists**: A drop-down list would be convenient. It should also be possible to add the identity/role of the user registering.

- **Basic functions**: Basic functions such as "Save draft", "Cancel" and "Submit" should be added.

Textile:

The Textile Use Case brought up the following points:

- State of the art: The registration process is far behind, in terms of functions and usability, from the best practices in commercial environment.

- Keeping internal: It is not possible to offer NIMBLE outside the consortium for now.

- Basic functions: Required basic functions mentioned below are not yet available:

    - "password lost"

    - "password change"

    - social networking registration

- - privacy statement is missing

    - privacy acceptance is missing (the website is not fulfilling GDPR)

- Tutorial: No tutorial is available

- Product categories: categories of product are not available (for traditional fabric production).

Furniture:

The Use Case Furniture brought up the following points:

- **Easiness of registration**: The registration is easy but it is only in English, which is a problem,

- **Support and guidelines**: Registration could be improved with support and well defined guidelines.

- **Stuck in procedures**: "The process is easy but I cannot finish the registration." "I do not have an opinion because I cannot do the registration".

-

2.3.2   The Publishing Service - Learning, Ease of Use, Robustness and Trust

The publication service is one of the most important aspects from the point of view of any supplier company in order to place their products in the market. This makes the companies visible at NIMBLE and enables them to attract customers and start establishing negotiations with other companies. Nevertheless, some buyers replayed on the statements and saw publishing as the foundation for what they could search for.

The generated product data sheets allow the supplier to transform a potential buyer into its customer, so, the more information there is on the platform, about the company and its products, the greater the customer confidence and the feeling of security during commercial transactions, which becomes crucial in on-line processes.

It is important for companies to have available quick, safe and intuitive mechanisms to upload and publish their products on the platform so they can be found by potential buyers. The key product information such as the description, price, technical features, available stock and pictures should be easily uploaded. The capability to add new product properties to better describe the products is useful. Furthermore, a given product could be available in different configurations w.r.t. product size, colours and even additional particular properties such as package sizing. The users should be able to enlarge the product pictures published on the platform in order they could check some particular details.

In the end, the products published on NIMBLE should be presented in both visual and schematic manner, so they could be properly classified into families as categories. The catalogues should show the list of products at a glance, avoiding a heavy use of the scrolling function.

2.3.2.1 Assessment of functionality – Publishing

(5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

No.	
•	In which branch do you operate?
•	What role do you represent? (buyer, supplier, logistic supplier) **BUYER** / **SUPPLIER**

THE PUBLISHING PROCESS

No.	Statement to be assessed:	1	2	3	4	5	0	/
•	The **publish** process is intuitive		E T FF FF W	W FF	FF			
•	The core service **publish** responds quickly to my commands		E F	T F	W W F FF FFF			
•	The core service **publish** starts quickly	T	F E	E F FFF	W W FF	F		
•	How confident are you that you publishing process is successfully fulfilled?		E W FF	F FFF	FF W			

THE FUNCTIONALITY PUBLISH IN GENERAL

Learnability

In the following section we want to gain insights into your view of the learnability of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

No.	Statement	1	2	3	4	5	0	/
•	The menu navigation is intuitive		E W W T F	FFF	FF FF			
•	The publish content is intuitive	T	E W F	FFF FF W	FF			
•	The publish functions are intuitive		E T	W W	FF			

		FF	FF FF				
• Realising where I am in the publish process is easy	T	W F	E FFF FF	FF W			
• I can easily and quickly understand the publish process	F	E F FFF T	W F	FF W			
• The publish process needs to be more self-explaining		E FFF		FF FF W	W M F		T
• I imagine that most people would learn to publish very quickly	W F	E T F W	F FF FF	F			
• I found to publish very awkward		FFF	FF W	FF	E W		T
• I needed to learn a lot of things before I could get going with publishing	T	FFF	FF	W W FF	F		E

Ease of Use

In the following section we want to gain insights into your view of the ease of use of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

• The structure of the publish functionality is understandable		E FF T	F W	FFF FF	W		
• The design and name of menus and buttons is easy to understand	F	E F T	FF	W W FF FF			
• I feel confident while publishing on the platform	T F	E FF	FF	W W FFF			
• Using the publish service for the first time is easy	W T F	E FF W	FF	F	FF		
• When I make a mistake publishing on the platform, I recover easily and quickly	T	E FF W	FF	W FFF			
• I can quickly find what I want in the publish process	T	E W	F FF	FF	F		

			FF W				
• I think that I would like to use the publish service frequently	T	E	FFF W	W FF	FF		
• I thought there was too much inconsistency in publish process		M T F	L W W FF FF E	F			
• The main screen for publish is self-explaining	T	E F	W W FFF	FF	F		
• The publish process has some annoying features	T	FF	FF W	FFF	W		E

Perceived Usefulness

In the following section we want to gain insights into your view of the perceived usefulness of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

• Using NIMBLE in my job would enable me to do my tasks more quickly	T	E FF	F W	FF FF			W
• I am pleased with the offerings of the system	T	E W F	FFF W	FF			
• I find the system useful in my job	T F W	L E	FF	FFF			W
Robustness							
• When I make a mistake while publishing, I find support easily and quickly	T	W FF	FFF W	E			

Trust

In the following section we want to gain insights into your view of the trust of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

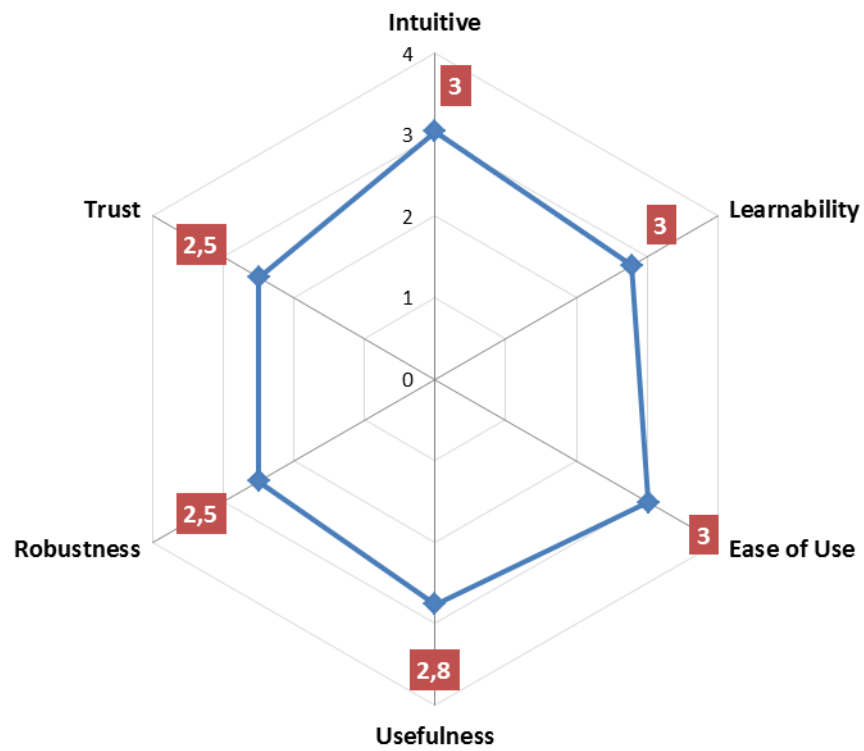|							
• I feel in control when publishing	E T F	W F	FFF F W	F			
• I feel confident while publishing	T F	W FFF	F W	E FF			

Figure 6 – Distribution of results on publishing

2.3.2.2 The Functionality Publishing in General

Overall, most of users involved in the workshops, both from the point of view of the supplier role and the buyer role, consider that the publish process is not intuitive enough. Also, most users are undecided about how confident they feel that the publishing process is successfully fulfilled. However, most of them checked that the service responds quickly to their commands and many of them consider that the service also starts quickly.

Learnability

The main view of learnability in the publishing process is quite undecided in almost every respect. It can be concluded from the responses that the suppliers have a more positive perception about the learnability of the publish process than the buyers.

For example, the buyers consider that the navigation menu is not intuitive enough. While many users in the supplier role find this intuitive, most uses in the role of buyers do not agree on that. The same occurs with the publication of content. Suppliers are more comfortable than buyers regarding this aspect.

It should be specially remarked that most users consider that the publish process should be more self-explanatory. They do not find it so easy and quick to understand at first glance. They find the process a bit unfriendly and they claim to need to learn some basics before they can start publishing products on the platform.

Above all, we must not forget that the publish service is particularly oriented to supplier companies, and in this regard, the reduction of the learning time is probably the most relevant aspect to be improved.

Ease of Use

The ease of use of the publication service is directly related to the structure and design of menus and buttons of the interface. After analysing the answers of respondents, it can be concluded that the publishing service has an understandable structure and a proper design so options can be easily found in the interface. However, the publication mechanism itself is not so easy from the users' point of view. They do not feel comfortable enough when publishing products and they also do not feel confident on how they could take control of the situation when some mistake is done during the process. They find this is a consistent service but with some annoying aspects.

Most users would like to use the publication service often, and this is a very positive aspect overall.

Perceived Usefulness

It is clear that the usability of the publication service is better perceived by the supplier than the buyer. This is visible in the results of the surveys at the arranged workshops, although not in a decisive way.

It seems that NIMBLE may lead to doing the job more quickly according to the opinion of many users. However, some features are still required to be implemented in order to achieve a more complete user satisfaction towards the system. Also some modifications should be made regarding the publication service to improve the way the products and its particular characteristics are described in NIMBLE. This would significantly improve the perception of users about the usability of the platform. For example, some field values could be selected from dropdown lists, such as the Incoterms[1] and the measuring units.

In conclusion, the offerings of the system are not completely satisfying so the users do not find the system very useful in their job yet.

Robustness

Robustness refers to the support in situations when the users makes mistakes in the publishing process. Most of survey answers reveal that users have not found an easy and quick way to recover when they have made a mistake.

Trust

Trust is connected to both statements of users feeling in control and feeling confident when publishing. The conclusion that can be drawn from the user feedback is that they do not feel in control and confident when publishing products on the platform.

Open answers

The survey statements on the publishing service was followed up by open answers that were aimed at providing comments on the function and the process. Only users from the textile case and the furniture case found the questions on publishing applicable from the buyers' point of view. Here we report on the issues brought up from the two use cases' points of view where the users freely express their concerns.

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[1] https://iccwbo.org/resources-for-business/incoterms-rules/incoterms-rules-2010

Textile:

The users from the Use Case Textile brought up the following points:

- **State of the art**: users argued that in general the registration process is far behind, in terms of functions and usability, from the best practices in commercial environment. The software is far behind real commercial simply basic one and it ignores the simplest functions.

- **Keeping internal**: In the current state it cannot be offered outside the consortium.

- **Missing functions**: More specifically, they pointed out that no message of "Save" confirming the publication is available. When you modify the fields it is not clear if the changes have been saved. The user experienced it as poor at the point in time and not respecting ergonomics principles, such as the feedback messages when an action is performed. Fundamental fields are missing.

- **Tutorial**: There is no tutorial

- **Property of content statement**: There is no property of contents statement.

- **Mandatory fields**: It is not clear which fields are mandatory.

- **Product categories**: The category of fashion traditional fabrics is missing

- **Filtering function**: There is no filter regarding the minimum quality of published pictures

- **List on standard inputs**: There is no predefined lists of standard inputs (delivery, payment)

Furniture:

The users from the Use Case Furniture brought up the following points:

- **Missing dimensions**: There are missing dimensions for packaging volume

- **Custom property**: Custom property must be Boolean

- **Understanding classifications**: "Commodity" classification is difficult to understand.

2.3.3   The Search Service - Learning, Ease of Use, Robustness and Trust

In the light of the survey answers, the users do not find the search process intuitive enough. We could assume that this is not a crucial process for the supplier companies, but nevertheless they are users of the platform and for sure they are interested in searching similar products to what they produce in order check the competence, as well as checking how their own products are visible in the platform.

It is particularly important for suppliers that the search process was easy and understandable, to the users of the platform - some of them potential costumers - should be able to perform these searches in a

quick and comfortable manner. The search functionality is the tool available for suppliers to check the visibility of their products to its potential future buyers.

2.3.3.1 Assessment of functionality – Search

(5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

No.								
	In which branch do you operate?							
	What role do you represent? (buyer, supplier, logistic supplier)	BUYER / SUPPLIER						

THE SEARCH PROCESS

No.	Statement to be assessed:	1	2	3	4	5	0	/
	The **search** process is intuitive		E FFF	F	W W FF	F		T
	The core service **search** responds quickly to my commands			FF	E W W FFF	FF		T
	The core service **search** starts quickly			FF	E W W FFF	FF		T
	How confident are you that your search result is adequate?		E FF FF	FF	W F			W T

THE FUNCTIONALITY SEARCH IN GENERAL

Learnability

In the following section we want to gain insights into your view of the learnability of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

No.	Statement	1	2	3	4	5	0	/
	The menu navigation is intuitive	F	L W E	W FFF	F	F		T
	The search content is intuitive		L W W F E	FFF	F	M F		T

The search functions are intuitive		W W F F	L FF E	F	F F		T
Realising where I am in the search process is easy		F	E W W FF	FF	FF		T
I can easily and quickly understand the search process	F	E F	W F	F FF		F	T
The search process needs more self-explaining		F F	F F	F	W W FF		T
I imagine that most people would learn to search very quickly	F	E FFF	W F	F	W F		T
I found to search very awkward	F	W FF	W F	E FF F			T
I needed to learn a lot of things before I could get going with search	FF	W F	FF	E FF	W		T

Ease of Use

In the following section we want to gain insights into your view of the ease of use of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

The structure of the search functionality is understandable		FF	E F	W W FF	F	F	T
The design and name of menus and buttons is easy to understand		L M E	W W FFF	F	FF		T
I feel confident while searching on the platform		E F	W W M M FF	M	F		T
Using the search for the first time is easy	F	E FF	F	W W F	F	F	T
When I make a mistake searching, I recover easily and quickly		E W E	FFF	W FF	F		F T

Statement							
I can quickly find what I want in the search process		E FFF F	F	W FF			W T
I think that I would like to use the search process frequently		E FF	W FF	W FF	F		T
I thought there was too much inconsistency in search process	F	F	FF FF	E W F			W T
The main screen for search is self-explaining	F	E W FF	W FF E	FF			T
The search process has some annoying features	FF	F	W W FF	E FF			T

Perceived Usefulness

In the following section we want to gain insights into your view of the perceived usefulness of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

Statement							
Using NIMBLE in my job would enable me to do my tasks more quickly		E FF	FFF		W F	F	W T
I am pleased with the offerings of the system		L M F E	FFF F	W F			W T
I find the system useful in my job		E FF	M M F	W	F	M	W T
Robustness							
When I make a mistake while searching, I find support easily and quickly		E	E W W FFF FF		F		F T

Trust

In the following section we want to gain insights into your view of the trust of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

Statement							
I feel in control when searching		FF E	W FFF F	W	FF		T
I feel confident while searching		FF	F	E W	FF		T

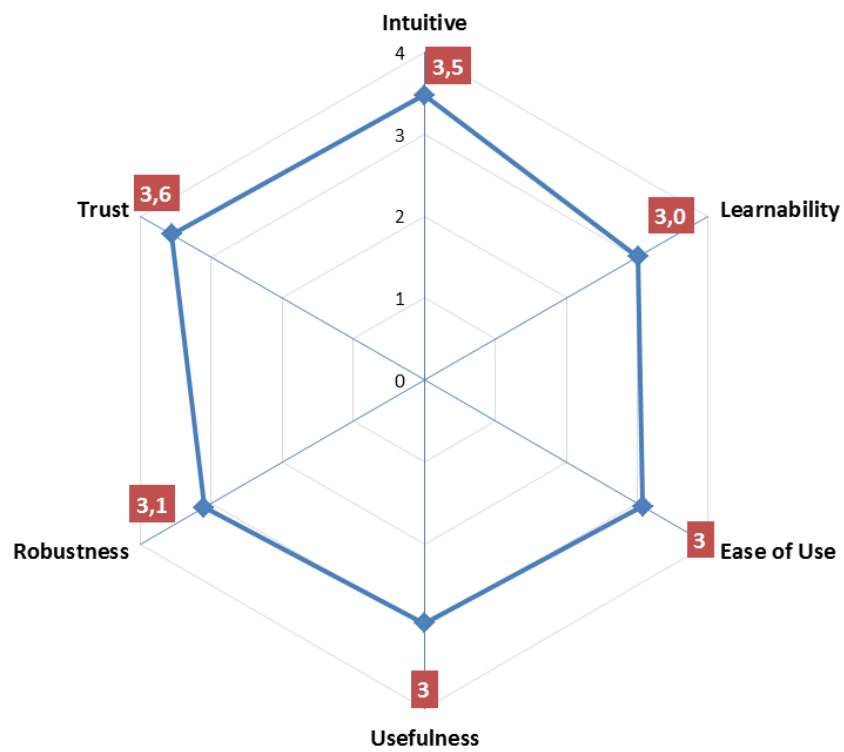|					W FF			

Figure 7 – Distribution of results on search

2.3.3.2 The Functionality Search in General

Taking the survey answers submitted in the workshops regarding the search process, both suppliers and buyers consider this is an intuitive process. NIMBLE should enable easy and logic searches so users could seek products in a quick and friendly manner.

The participants in the workshops appreciated the starting of use and the quick response of the search process through the platform. However, most of them found the results not to be adequate enough according to the search parameters introduced in the platform, which led to doubts and a not so positive feeling about the search process.

Learnability

Regarding the ease to learn how to search products in the platform, the most remarkable aspect for the participants seems to be that the navigation, the function and the content are quite intuitive.

The answers reveal that there is a positive reaction to where the user is navigating during the search process and for them this is easy to understand. Although they did not found the searches awkward, they feel quite undecided about how quick is for most users start using the search functionality properly. Most responses reveal that users are not sure about the ease, the quickness and the necessity to have some basics in order to fully understand how to start using the search functionality.

Therefore, it should be remarked the necessity for an auto explicative search process. Currently, this function is not self-explaining enough and therefore feels awkward for many users, and they actually need to learn some basics before carrying out the process successfully.

Ease of Use

Regarding the ease of use, many positive aspects have been appreciated by the end users, such as the design of menus and the used terminology. They found this easy to understand and also consider the structure of the search functionality to be understandable.

However, they do not agree that it is quick to get what they want from the search process, expressing the need of having an self-explanatory main search screen. Additional features can be implemented in order to improve the comfort of users and the search results retrieved by the platform. As an example, additional filters could be included in order to refine the search according to more particular features.

The users feel undecided regarding the other aspects, such as feeling safe while using this service, the appearance of incoherence during the process and the capability of being able to recover easily and quickly from made mistakes. Furthermore, they also feel neutral about the ease of using the search service for the first time.

In the end, the search service is not unpleasant according to the feedback from users, who also consider that they would use it very often. However, this service may improve in terms of ease of use, adding more filters as just pointed out and making them user-friendly and adding lists of search categories.

Perceived Usefulness

The widespread view of the users regarding the usefulness of the search process is quite neutral. They are not particularly satisfied with what the system offers, even with the use that they could make of NIMBLE in their daily job and how this could support them to make their tasks more quickly.

Robustness

This feature, based on the ease and velocity of support when users make mistakes during the search process, has received a neutral rating by the users so this could not be properly assessed through the arranged workshops.

Trust

The trust refers to how the users feel in control and confident when searching through the NIMBLE platform. Although this feature has received various ratings, most users felt quite confident while searching.

Open answers – Search

The survey statements on the search service was followed up by open answers where aimed to provide comments on the function and the process. Only two of the use cases made comments. Here we report on the issues brought up by the White goods use case and the Textile use case where users freely expressed their concerns.

White goods:

The Textile Use Case brought up the following point:

- **Features**: Enable more features for convenience

Textile:

The Textile Use Case brought up the following points:

- **Product category**: Since traditional fashion fabric category is missing, as well as traditional yarn and natural fiber ones, the process of search is not possible.

- **Survey not applicable**: Because of this reason the rest of the questionnaire is not applicable.

2.3.4   The Negotiation Service - Learning, Ease of Use, Robustness and Trust

The main view of the functionality of the negotiation process is mainly negative or marked as undecided, i.e. the negotiate process is not at all intuitive, the service negotiate does not respond quickly to commands, and it does not start quickly.

The final characteristics of the negotiation process refer to how confident feel the users about the success of the negotiation fulfilment. In this regard, most participants from both the buyer and the supplier role, answered that they do not feel that the negotiation has been successful.

It becomes clear that the success of the negotiation depends in large part on the proper publication of product catalogues and an optimal product search. But though these services could be validated in all the workshops without significant obstacles, many users had various problems related to the service configuration which prevented the negotiation service to be adequately validated experienced by all users.

2.3.4.1   Assessment of functionality – Negotiation

(5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

No.								
Figu	In which branch do you operate?							
Figu	What role do you represent? (buyer, supplier, logistic supplier)	L:BUYER / SUPPLIER P: Not stated						
THE NEGOTIATION PROCESS								
No.	Statement to be assessed:	1	2	3	4	5	0	/
Figu	The **negotiate** process is intuitive	E E T W	W W F	FF FF	F F	F		
Figu	The core service **negotiate** responds quickly to my commands	F	E E T W F	W W FFF	F F			

			F					
Figu	The core service **negotiate** starts quickly	T	W W F	FFF W FF	EE F	F		
Figu	How confident are you that you negotiation process is successfully fulfilled?	EE T W F	FF W F	FF	W F F			

THE FUNCTIONALITY NEGOTIATE IN GENERAL

Learnability

In the following section we want to gain insights into your view of the learnability of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

Figu	The menu navigation is intuitive		W W W F	E F FF	F F		F	T
Figu	The negotiate content is intuitive		E W W W F	F	FF FF	F		T
Figu	The negotiate functions are intuitive	E	W W W	FFF	F FF	F		T
Figu	Realising where I am in the negotiating process is easy		W F	W W FF F	E F F		F	T
Figu	I can easily and quickly understand the negotiating process	W	E W W FF	F	F F	F	F	T
Figu	The negotiating process needs be more self-explaining		W FFFF F	F	W F	F W	E	E T
Figu	I imagine that most people would learn to use negotiate very quickly		W W FF F	E FF F	W	F		T
Figu	I found too negotiate very awkward	F	FF FF	W FF	E W	W		T

		5	4	3	2	1	0	/
Figu	I needed to learn a lot of things before I could get going with negotiation	F F	FF F	E FF W	W	W		T

Ease of Use

In the following section we want to gain insights into your view of the ease of use of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

		5	4	3	2	1	0	/
Figu	The structure of the negotiation functionality is understandable		W W	W FF	E FF FF		F	T
Figu	The design and name of menus and buttons is easy to understand		E W W W	FF FF	FFF			T
Figu	I feel confident while negotiating on the platform		E W FF	F W FF	W F		F	T
Figu	Using the negotiation service for the first time is easy	W	E W FF F	W F F	F		F	T
Figu	When I make a mistake negotiating on the platform, I recover easily and quickly		E W W F	FFF F W F				F T
Figu	I can quickly find what I want in the negotiating process	F	E W F F	W W F F	FF			T
Figu	I think that I would like to use the negotiation service frequently	E	W W W F	FFF F	F	F	F	T
Figu	I thought there was too much inconsistency in the negotiating process	F F	W FFF F FF	W	E W			T
Figu	The main screen for negotiation is self-explaining	W	E W F FF	W FFF F				T

Figur	Question	5	4	3	2	1	0	/
Figu	The negotiation process has some annoying features	F		W W FFF F F	E W F	F		T

Perceived Usefulness

In the following section we want to gain insights into your view of the perceived usefulness of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

Figur	Question	5	4	3	2	1	0	/
Figu	Using NIMBLE in my job would enable me to do my tasks more quickly		E W F FF	FF W	F	W F F		T
Figu	I am pleased with the offerings of the system		E W W FF FF	FF	W		F	T
Figu	I find the system useful in my job	E F	W W F F	FFF	W		F	T
	Robustness							
Figu	When I make a mistake while negotiating, I find support easily and quickly		W W F	E FFF F	W			F T

Trust

In the following section we want to gain insights into your view of the trust of the offered service. Marc the alternative between (5 = agree absolutely, 4 = agree, 3 = undecided, 2 = disagree, 1 = disagree absolutely, 0 = I don't know, / = not applicable)

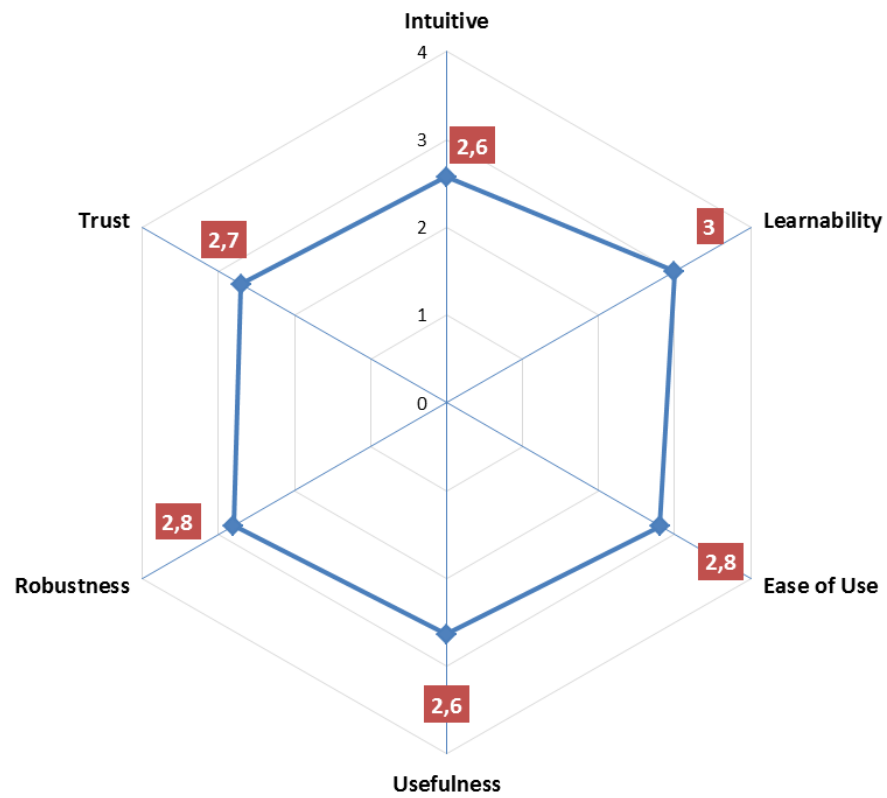| Figur	Question	5	4	3	2	1	0	/
Figu	I feel in control when negotiating		E W W F	W FFF FFF	F			T
Figu	I feel confident while negotiating		W W FFF F	F FF	W F		E	E T

Figure 8 – Distribution of results on negotiation

2.3.4.2 The Functionality Negotiation in General

The functionality of the negotiation process is in line with the other core services explored in terms of learnability, perceived usefulness, robustness and trust. However, it should be noticed that in many cases, the negotiation process could not be successfully experienced during the arranged workshops.

Learnability

There is a mix of views regarding the learnability of the negotiation service. In general, the menu navigation, negotiation content, and the functions were considered as not intuitive enough, by the users. Users also found the negotiating process difficult to understand, not self-explaining; it looks a bit awkward for them and they feel that they need to learn some basics before carrying out the process.

Ease of Use

Given that many negotiation relationships between participants in the workshops could not be finished due mainly to technical issues, many negative opinions were collected about the negotiation process regarding different aspects. Despite this setback, users were of the view that the negotiation service is easy to use.

A detected feature to be improved is the one related to the reuse of historic orders and the predefined processes to execute an order.

As remarkable negative aspects, the users could not find quickly what they want in the negotiation process, the buttons are not easy to understand and some basics are required to start using the service properly, so this is not so self-explaining in the main screen. They also do not feel confident with the recovery when mistakes are done. The users consider that they will not use this service very often.

Perceived Usefulness

Regarding the usefulness in the job, most respondents did not find the service useful enough.although some specific features received different ratings, as for example how the negotiation service would enable the user to do the job quicker. The users are not fully satisfied with the offerings of the platform regarding the negotiation service.

Robustness

Regarding the robustness, as commented earlier, users do not feel that the recovery from mistakes is supported enough in the platform.

Trust

At large, the users do not feel much in control and confident when negotiating, so it becomes necessary to improve this aspect of the negotiation service. On a more positive point, the approach and the basis of the negotiation service are in the right direction according to the feedback retrieved by the users. Although many negotiation processes could not be successfully finished during the workshops, the security and the trust were highly appreciated by the users, maybe because the problems were related to technical aspects and not to the definition of the negotiation service itself.

A detected improvement stressed by the users is the inclusion of information in the service about the company with which the negotiation is running, as well as a business historical regarding past negotiations arranged through NIMBLE.

Open answers - Negotiation

The survey statements on the negotiation service was followed up by open answers where aimed to provide comments on the function and the process. Three use cases provided comments. Here we report on the issues brought up by the use cases White goods, Textile and Furniture where users freely express their concerns.

White goods:

The users from the White goods Use Case brought up the following points:

- **Scope of improvements**: There is scope of improvements of the platform.
- **Aligning with established platforms**: The NIMBLE platform could be aligned more with well-established buyer – seller platforms (E-bay etc.)
- **Automatization**:
  - Enable built-in automatic features
  - Less manual
- **Feature drop down list**: Include drop-down list

Textile:

The Textile Use Case brought up the following points:

- **Product category missing**: Since traditional fashion fabric category is missing, as well as traditional yarn and natural fiber ones, the process of search is not possible.

- **Questionnaire not applicable**: Because of this reason the rest of the questionnaire is not applicable

Furniture:

The Textile Furniture brought up the following point:

- **Negotiation process**: The negotiation process does not work, request information?

3 Summary of Findings about the User Experience

In this section, the buyers' and suppliers' views of the functionality of each service are summarized, starting with high priority issues.

3.1 High-Priority Issues

3.1.1 Dashboard

Regarding the dashboard, following issues are of high importance:

- Enabling a stage gate overview, see the status of every order in the overview
- Having a common thread of history (in negotiation and orders) in one container
- Supplier basket is needed as a container for multiple business process instances.
- A product category column, speaking names (e.g. Ikea naming schema) will be confusing.
- A flexibility that allows the selection of most relevant criteria (tile color instead of product name). Otherwise, people will start naming their products like "grey tiles" and "blue tiles".

3.1.2 Registration process

Regarding security issues, following issues are of high priority:

- Enabling recovering of the password and change
- Getting user consent and authorization for data processing for GDPR
- Mechanism of role/permits assignment, e.g. mechanism of permissions and roles that is on ECAS portal.

Regarding some data, the following features are requested:

- Field for the VAT number
- Delivery terms, e.g. INCO terms

- Certification of user belonging to a Company

Other issues:

- After clicking "save", some verification that data are saved or not

- Assignment of registered user to an already existing company

- Some key additional information of the company, such as VAT number, activity of the company and website/social media accounts

- When logged in the platform, not only the name of the user but the name of the company to which the user belongs should be indicated in the top header

3.1.3   Publishing process

- Two kinds of measures are important to be indicated in the platform: the size of the product itself and the size of the package containing the product (logistics size). This approach is also followed by platforms such as Amazon.

- Actually the custom properties cannot be defined as Boolean data types

- The field to introduce the product description should be larger

- The uploaded catalogue (My Catalogue) should be browsed in a more schematic way. Actually the only visualization is a big sequence of product cards containing the main properties. A more practical approach is showing all the uploaded products at a glance, avoiding so many properties.

- The INCOTERMS options should be selectable from a dropdown menu

- The platform should warn if some product with the same name (or ID) already exists

3.1.4   Search process

Regarding the selecting of products, following issues are of high importance:

- Selecting multiple products in one request (shopping basket)

- Product filtering and sorting (e.g. per type)

- A direct link to the ordering/negotiation from the product search results

Regarding information request, following issues are of high importance:

- Cancelling an information request should be possible within the business history

- Requests should be grouped by threads

- The search could be improved by filtering by specific property values (price, destination, method of payment...)

- Some basic information of the company that provides the product/service is missing once this is found in the platform

- The search is not effective sometimes, so it returns products which have nothing to do with what was searched for in the text field

- Some information of the organization which sells the product is missing

- A search option based on browsing categories could be nice in order to make it more intuitive to the user

- The white spaces in the text introduced for search often causes that no results are found

3.1.5   Negotiation process

Regarding the negotiation process, following issues are of high importance:

- A clearer page, fields must be explained

- Updating of orders and negotiations should be possible, i.e. to add some information

- Filtering of the business history (which supplier did business with me, which tasks are still open, etc.)

- From a business point of view, it is not "correct" that who demands the service also indicates the price

- In a negotiation about the transport, it should be possible to indicate the dates desired for the transport

- It is important to show some information about the company with which the user is negotiating

- At one occasion, an ongoing negotiation about supplying some wooden board, was lost. No successful negotiation was achieved in the end.

- The platform often hangs during the negotiation process, which stopped users from performing successful negotiations

- The negotiation process required the validation of the involved users/companies by the administration, which is an important bottleneck. This should be done automatically or by the company representatives.

3.1.6 Order process

- Every stakeholder should have access to every option throughout the process. E.g. if a new information request is posted in the negotiation step, the processes need to be grouped in a thread.

- Payment options should be part of the company settings and automatically filled

- Validation of orders when it is submitted

- Templates for delivery addresses so it can be selected during order/negotiation.

- Order IDs (from customer and supplier) should get form fields in the order process, allowing creation of a traceable history

- Information should be transferred from negotiation to order

- Enabling reuse of historic orders

- Predefined processes to execute an order, i.e. visualize a bar with steps for the process. Something like a Wizard or guide is useful.

- Having a consistency between what the Dashboard says and what the Authorization mail said

- The 'total amount' (Requested quantity * Unit price) should be automatically calculated by the platform

3.1.7 Other issues

- Making support mail template work in Google Chrome

- Making a clear difference between Price/unit field and total price requested

- An online chat to link producer and buyer immediately

3.2 Medium-Priority Issues

Here follow a summary of the buyers' views of the functionality of each service that have a medium priority.

3.2.1   Registration process

Regarding the registration process, following issues are of medium importance:

- Enabling the chance to put the same delivery address of the company with only one check box, without having to reinsert it

- Possibility to input more than one delivery address

- Regarding payments, to have a list of pre-defined terms, not a free field

- Having a clear indication of mandatory vs. optional fields

- A list of existing companies to associate to new users

- We suggest to write an information document for the registration and in general one (or more) about the platform (how the software works, what happens behind the screen)

- The registration process can be better explained (user registration, company registration, and members invitation

- The interface should be also available in Spanish language

- A brief summary of the data introduced should be prompted just after registering

3.2.2   Publishing process

- Items in the top menu are in grey color, what seems to be disabled. If they are enabled, a clearer color should be used instead

- Once a member of the company has been invited, the text field where the email has been introduced should be empty. In Release 1, it looks as if the invitation has not been successfully sent

- Different sales options should be reflected in the platform (i.e.: sale of individual items, sales by determined volumes)

- Many properties should provide a dropdown menu to select one of the possible choices

- The name of the Units (i.e.: the dimensions) could be selected from a dropdown list (cm, m, Kg, etc.)

- The textbox to introduce the Unit seems to be already filled but it should be filled. This is somewhat confusing if some specific explanation is missing.

- It is not possible to upload products of different categories in the same batch process

- Some properties appear twice in the publishing form (in the default group of properties and in the properties extracted from the taxonomy). This becomes a bit confusing so it is not clear if it is needed to fill them both or which is the one that should be preferably filled.

- The meaning of "Commodity" classification is not clear
- The images of the products could be enlarged when clicking them
- The uploading of image packs should work not only with zip compressing but also ".rar" files

3.2.3   Search process

Regarding the search, following issues are of <u>medium</u> importance:

- Visualization of the search needs improvement (UB search function)
- Having a filter option to better select product categories (like Amazon)
- Shorten the time between catalog updates and availability of the items in search results (e.g. pictures take a while to display)
- The filters are not user-friendly enough
- A menu/list with searching categories would be useful
- The autocomplete search could be a great feature
- When some product has been found, it could be useful to be able to inspect the whole catalogue of the company that supplies it
- The search function should be supported by using more dropdown lists instead of free text fields
- When a fitting product, such as a "handle", is searched in the platform, many other items with apparently no relationship with that product appear (A2B transport services, warehouse design, logistics services...). Maybe this is due to the use of this word in the description or in some property values of these services.
- The images in the search results should be enlarged when clicking them
- The logo of the company that supplies the product or the service should appear
- If many companies are published in the platform, the search could become complicated in order to find results if the user does not enter the right words
- The search should be available entering the text in Spanish
- Some option to export the list of elements found in an Excel file could be very useful

3.2.4   Negotiation process

Regarding the negotiation process, following issues are of medium importance:

- Buyer should just need to insert the requested quantity, the system should do the calculation (of the price)

- Decreasing the delay between Negotiation actions and communication on Buyer platform

- A solicitation of changed status in the process via email will help

- Requested, rejected etc. is to connect to the platform and check dashboard

- In some negotiation processes, additional fields are missing to perform an optimal negotiation

3.3 Low-Priority Issues

Here follow a summary of the buyers' views of the functionality of each service that have a low priority

3.3.1 Registration process

- Company registration, the button "Delivery address" = company address (relates to the delivery/invoice terms during ordering)

- Registration is not in the account settings, although you can enter information. It is confusing to enter information on this page.

- After the registration, the platform should redirect you to the home page

- At simultaneous open registration from two devices, a detection, a message, that there are two devices open at the same time with the same account.

- Refresh button missing

- Apparent Bug in clicking "Company Legal Name" area in Profile section

- Extra feature like "save draft" – "Cancel" – "Continue" would help the process

3.3.2 Publishing process

- Publishing through the excel file, fields which are Boolean could be filled by using a checkbox.

- The validation of the excel file could be made when this is intended to be close. This way the validation could be more agile so it is not needed to do it against the server each time

- Icons with information mark do not display any support information

3.3.3   Search process

- If you click on "search product category" with an empty field, you get nothing; it should be better to get all the categories, in that case.

- Enabling a button "save with no category", in case you want to save the product with no categories; or if NIMBLE's target is to have all the product into categories, it is necessary to upload all the sectorial ontologies

- Provide a drop down menu in Search tab to suggest search terms (like Google)

- Provide more functionality to ease navigation of results

- Some registry of last personal searches would be nice

- In the search results, the field for the description of the product/service is too small, and the mouse has to be used to read the full content

3.3.4   Negotiation process

- Refresh button missing

- Some option to print directly the documents received during the negotiation could be useful

4   Summary – Buyers' and Suppliers' points of view

This section highlights the buyers' and suppliers' views of the NIMBLE core services. In general, the results should be interpreted in the light of that the validation concerns the release 1 of the demo where the functions are yet to be improved.

Registration:

The individual buyers' point of view differs slightly regarding the registration service. The most positive views were about knowing where the users are in the process and understanding the design and names of menus and buttons. The most negative views were about feeling confident that the registration process was successfully fulfilled. Another negative view was that the main screen for registration is not self-explaining. The registration process was perceived as a simple process but a bit immature; the process was not that intuitive. Several users had difficulties in stating their views. The perceived usefulness of the service is in general not clear yet and the service is not completely trustworthy.

Some of the high priority issues are:

- Enabling recovering of the password and change

- Acquisition of the consensus for the data treatment and authorization of data, as for GDPR

- Mechanism of role/permits assignment, e.g. mechanism of permissions and roles that is on ECAS portal.

- After clicking on "save", some verification and feedback is needed

- Assignment of registered user to an already existing company

- Some key additional information of the company, such as VAT number, activity of the company and website/social media accounts

- When logged in the platform, not only the name of the user but the name of the company to which belongs should be indicated in the top header

Publishing:

The service Publish is important for the buyers since it lays the foundation for the core service Search (for products and services), presented below. Only four users had an opinion of this service from a buyer's point of view. The publishing process was viewed not that easy to understand and all three users were not as it is now pleased with the service. This can be interpreted as that this service is not relevant for a buyer.

Some of the high priority issues:

- Two kinds of measures are important to be indicated in the platform: the size of the product itself and the size of the package containing the product (logistics size

- Actually the custom properties cannot be defined as Boolean data types

- The field to introduce the product description should be larger

- The uploaded catalogue (My Catalogue) should be browsed in a more schematic way.

- The INCOTERMS options should be selectable from a dropdown menu

- The platform should warn if some product with the same name (or ID) already exists

Search:

The buyers' points of views of the search service were more positive than those above. The service responded quickly and started quickly. Also users felt confident while searching. The most negative views concerned that the users could not find quickly what they wanted in the search process and that the main screen was not self-explaining. But also here several users had difficulties in stating their views. One reason depends on the lack of relevant taxonomy for some of the involved industries.

Some of the high priority issues are:

- Selecting multiple products in one request (shopping basket)

- Product filtering and sorting (e.g. per type)

- A direct link to the ordering/negotiation from the product search results

- Cancelling an information request should be possible within the business history

- Requests should be grouped by threads

- The search could be improved by filtering by specific property values (price, destination, method of payment...)

- Some basic information of the company that provides the product/service is missing once this is found in the platform

- The search is not effective sometimes, so it returns products which have nothing to do what introduced in the text field

- Some information of the organization which sells the product is missing

- A search option based on browsing categories could be nice in order to make it more intuitive to the user

- The white spaces in the text introduced for search often cause that no results are found

Negotiation:

The buyers' point of view differs regarding the negotiation service, but the majority of the views indicated that the negotiation process was not intuitive and it did not respond quickly to commands. The most negative views were about being not confident that the negotiation process is successfully fulfilled, the users could not easily and quickly understand the negotiating process, and that there was too much inconsistency in the process. The users did not feel confident while negotiating. The most positive views regarded the structure of the negotiation functionality, that it was understandable. But also in this service, several users had difficulties in stating their views.

Some of the high priorities are:

- A clearer page, fields must be explained

- Updating of orders and negotiations should be possible, i.e. to add some information

- Filtering of the business history (which supplier did business with me, which tasks are still open, etc.)

- From a business point of view, it is not "correct" that who demands the service also indicates the price

- In a negotiation about the transport, it should be possible to indicate the dates desired for the transport

- It is important to show some information about the company with which the user is negotiating

- At some moment, the ongoing negotiations carried out about supplying of wood board, have been lost. No successful negotiation has been achieved in the end.

- The platform often hangs during the negotiation process, what has often avoided performing successful negotiations

- The negotiation process has required the validation of the involved users/companies by the administration, what has become an important bottleneck. This should be done automatically or by the company representatives.

5   Continuous development process

The development and validation process of NIMBLE business services has been redesigned from consisting of one validation round to three with three demo releases in WP4. The development process is now agile with several iterations demanding continuous feedback from the use cases that is analysed and fed into the development process. The communication between the developers and the use case actors is carried out in the project portal with changelogs targeting the services and the priority issues. The changes are carried out by the developers, see Figure 9 – Examples of changelog content in the NIMBLE portal. The early phase of the validation is represented by internal use case users to secure quality and trust before involving external users.

This agile development process increases the transparency of the status of the business services development which will lead to higher commitment from the different project stakeholders. Communicating WHAT is achieved in the development process enable users to understand the process, to proactively act on the changes and hence to actively to contribute to further development. Open communication between the developers and the users aim to assure for thriving towards the same goals. A new task is introduced in the NIMBLE-project, T4.6 focusing on a continuous validation of the new developments coming from T2.5 and T3.9.

Updates on dashboard and search

- Improved dashboard functionality (separate tabs for sales/purchases, direct links to business processes, improved sorting)
- Improved text-based search results
- Added explorative search functionality

Updates on publishing and catalogue services

- Improved catalogue management (minimized visualization, added search and filter functionality)
- Added option to assign custom categories to published products
- Added form input controls during the product publishing
- Added boolean and quantity types for custom properties
- Improved visualization of product properties
- Increased the maximum allowed content size for product description and properties
- Added UI tests (based on Selenium)

Updates on business process services

- Added Product Parts Approval Process (PPAP)
- Added UI tests (based on Selenium)

Figure 9 – Examples of changelog content in the NIMBLE portal

As another example, NIMBLE has a support function in which testers (users validating the demo) can pose their questions and concerns while testing. This online support makes it easier for the users to give feedback on the demo and is hence keeping up the user interest.

6   Lessons Learned for Future Validation - Continuous test feedback

Here we outline some lesson learned for future development and validation of the NIMBLE platform.

In general, the individual users base their expectation of NIMBLE core functions on using existing well-known platforms as Amazon and Ali Baba. This makes it important to handle and meet the expectations in the future releases diminishing the expectation gaps in order to make the users committed. It also points to use current platforms as benchmark for further development of functions for UX.

As the functions on the NIMBLE platform will be developed and be more advanced, different releases call for continuous validation, re-thinking and redesigning in accordance of an agile approach. A further lesson learned is to do continuous validation work of the NIMBLE business services, by investigating user experience in accordance to following themes, broken down into different principles in accordance to ISO 9241:

- Learnability: how easily can a new user learn to navigate the interface?

- Flexibility: how many ways can a user interact with the system?

- Robustness: how well are we supporting users when they face errors?

- Efficiency: how quickly can users perform tasks?

- Errors: how many errors do users make, and how quickly can they recover from errors?

- Satisfaction: do users enjoy using the interface, and are they pleased with the results?

- Clear understanding: how well can users understand what they are seeing?

- Operability: how much control does the user have within the interface?

- Attractiveness: how visually appealing is the interface?

- Usability compliance: does the interface adhere to standards?

Also, when the NIMBLE platform reach a level of becoming an attractive B2B-platform, external users SMEs will be involved and interviewed about future possibilities of NIMBLE concerning collaboration and enhanced value through-out the value chain.

Below are the themes that should be reported upon.

- Context: Where are the users? What are the conditions under which they work?

- User's view on NIMBLE's idea: What are their incentives to use the platform? What future situation do they want to reach? "What's in it for me?"

- Business services (current): What are their views of NIMBLE's current business services?

- Business services (wish list): What type of functionality are they expecting from the NIMBLE B2B platform? Which functions are desirable and which are less important?

- NIMBLE collaboration value: What will the value be using a B2B-platform like NIMBLE?

- Areas of improvement: Problem formulation? How can a B2B-platform support information exchange and collaboration in the supply chain?

We can also conclude that the governance and ownership of the NIMBLE platform are important for attracting future users and would assure sustainability of the platform. A lesson learned is to continue the work with investigating "who" will own NIMBLE and how NIMBLE should be governed. Therefore, a process for this work should be outlined.