



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



D7.3
Value Proposition of NIMBLE for the Textile Manufacturing Supply Chain

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Table of Contents

1	Intro	oduction	6
	1.1	Objectives	6
	1.2	Methodology and tools	
	1.3	Connection with Other Deliverables	6
2	Valu	ue Proposition validation	7
	2.1	Stakeholder target groups	7
	2.2	A guide for interviews	9
	2.3	Stakeholders' interests and strategies	10
		2.3.1 Scenario based design of future use	10
	2.4	Future scenarios for NIMBLE improvement and adoption	11
		2.4.1 Connection with NIMBLE expected benefits	15
	2.5	Synthesis of the value proposition assessment for the textile use case	16
	2.6	Final usability validation	
	2.7	Standard usability scale (SUS)	20
	2.8	SUS results and discussion	22
3	Tec	hnical Validation	24
	3.1	Platform Validation	24
		3.1.1 Platform Architecture	24
		3.1.2 Component Description	
	3.2	Technical consideration on the value proposition	28
4	Con	nclusion	30
ΑN	INEX.	A	31
ΔΝ	NFY	R	32



List of Figures

Table of Contents	2
List of Figures	3
List of Tables	3
Document Information	4
NIMBLE in a Nutshell	5
Figure 1 Collaborative design scenario Ecosystem Canvas (from D8.12)	8
Figure 2 Certification of origin Ecosystem Canvas (from D8.12)	8
Figure 3 Collaborative design scenario Entity Portrait Canvas (from D8.12)	17
Figure 4 Certification of origin scenario Entity Portrait (from D8.12)	
Figure 5 Evaluation of Nimble Value Proposition for textile use case: a sum up	19
Figure 6 The SUS scale	21
Figure 7 NIMBLE MVP infrastructure (from D3.1)	25
List of Tables	
Table 1 Connection between interviewed stakeholder and textile scenarios related to interests.	
Table 2 Template for scenario description	
Table 3 The Fashion Manufacturer - Future Scenario	
Table 4 The IT problem solver Future Scenario	
Table 5 The Business Networker Future Scenario	
Table 6 matching of the interviewed stakeholders with future scenarios	
Table 7 Match of expected benefits and future scenario for Collaborative design and p	roduction
Table 8 Match of expected benefits and future scenario for Virtual catalogues and se	
Table 9 Match of expected benefits and future scenario for IoT machine connection elaboration	
Table 10 Match of expected benefits and future scenario for Automatic origin of declaration	
Table 11 The SUS questionnaire	22
Table 12 Overview of SUS results	23
Table 13 Overview of Nimble components into the textile scenarios	26
Table 14 Overview of the specific developments of the textile scenarios	27



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NIMBLE in a Nutshell

NIMBLE is the collaboration Network for Industry, Manufacturing, Business and Logistics in Europe. It developed 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 work-flows. The infrastructure is 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 42 months.



1 Introduction

1.1 Objectives

This document describes how the value proposition for the Textile Manufacturing use case has developed within the NIMBLE project. D7.3 describes the results of the discussion with 5 selected stakeholders, that have been synthetized in three scenarios for future development. At the end a synthetic overview of the value proposition is provided, together with the results of the SUS (Standard Usability Scale) questionnaire.

It is also an objective of this deliverable to describe how the platform functionalities have been implemented giving an evidence of the integration of the software modules into the NIMBLE platform, as required by T7.3 (technical assessment of the platform features).

1.2 Methodology and tools

The setup of the Value Proposition analysis was made using the Platform Design Toolkit described in D8.12 *Project Business Plan*.

Both business and technical qualitative evaluation were performed by means of interviews with 5 selected stakeholders, belonging to the most critical stakeholder segments for the textile use case. The results of this discussion are presented by a metamodel, provided by the scenario-based design methodology. Derived scenarios for future development are hence summarized into a value proposition canvas. A final usability evaluation has been gathered using the SUS method.

1.3 Connection with Other Deliverables

D7.3 is the evolution of what was described in D1.1 Requirements and Collaboration Design for Manufacturing and Logistics in Four European Use Cases and D1.2 Requirements for Business Models and Collaboration Patterns in Supply Chains, and provides a more focused description of the Business Case in terms of connection and integration with the NIMBLE concept.

D8.12 *Project Business Plan* provides the detailed description of the Platform Design toolkit and methodology that was used in section 2 of this document.

The outcome of the SUS questionnaire provides also a final usability validation, in connection with the work carried out into D4.2 *Platform User Experience*.



2 Value Proposition validation

In the vision of the Textile use case, NIMBLE represents a platform for a fast and reliable data exchange service, based on IoT, M2M and B2B data transfer. The platform itself acts as a virtual working place where textile industries can monitor/exchange/provide data to fulfil the purposes of the selected 4 main scenarios (1. Collaborative design and production; 2. Dynamic, real-time access to supplier virtual catalogues and inventories for fast design development; 3. Full manufacturing, product traceability and real time vision of production to provide customers with information about their orders and deliveries; 4. Automatic preferential origin certificate declaration, including ethical and environmental fulfilment evidences).

The main value of the platform is the standardization of company interaction with new customers/suppliers (mainly B2B), without having to set up a new channel (and format) of communication and using their legacy systems. They can find all the data needed through the platform.

2.1 Stakeholder target groups

The aim of this activity is to identify strategic stakeholders to be interviewed in order to perform the final assessment of the NIMBLE value proposition for the textile use case.

This work leverages on D8.11 and D8.12 outcomes.

According to D8.11, the relevant target groups for NIMBLE are:

- 1. Manufacturing supply network stakeholders;
- 2. Manufacturing B2B service providers and intermediaries;
- 3. Digital platform and infrastructure providers;
- 4. Technology and Service Providers.

D8.12 provides the Ecosystem Canvas for the textile scenario nr. 1 – Collaborative design scenario and for scenario nr 4 – Preferential certificate of origin declaration.

As depicted in the following picture (ref. to D8.12), the main target peers for scenario 1 are fabric producers' designers (producers) and clothing designers (consumers).



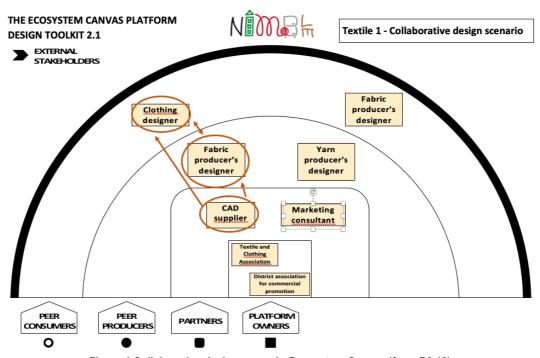


Figure 1 Collaborative design scenario Ecosystem Canvas (from D8.12)

In the case of the fourth scenario, as depicted by the <u>Ecosystem Canvas</u> below, the IT providers can be partners (although the ownership could still be an option) offering integration services (for linking the software for certification of origin between the platform and the peers' backend) to the target producer and consumer peers. The producers are EU companies of the textile and clothing sector looking for a tool that can increase their reputation and bring their brand into new markets. The consumers are (mainly) non-EU companies trading textile and clothing products that can exploit the platform to quickly find companies with proved certification of origin, which is a distinctive element for their customers (in particular in the luxury segment).

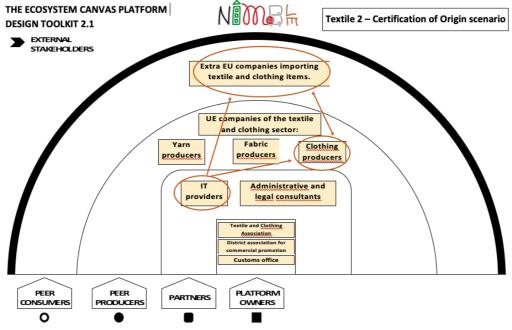


Figure 2 Certification of origin Ecosystem Canvas (from D8.12)



Considering also the typology of stakeholders defined for each scenario of the textile use case in D1.1, we selected 5 representative stakeholders to be interviewed for the assessment of the value proposition:

- 1. Federico Tonin, from Orange Pix¹ (Technology and Service Providers)
- 2. Luca Cinguino, from Marchi e Fildi² (Manufacturing supply network stakeholders)
- 3. Franco Borlo, from Robinson³ (Digital platform and infrastructure providers)
- 4. Roberto Ciliesa, from Pneutronic⁴ (Manufacturing supply network stakeholders)
- 5. Massimo Perona, from Co.me.ca⁵ (Manufacturing supply network stakeholders)

The selection takes into account the concrete possibility to identify target groups of the interviewees as early adopters of the platform services. Therefore, the Manufacturing supply network stakeholders, embracing all the suppliers and the manufacturers, have been put as first, according to their primary role in the textile supply chain.

2.2 A guide for interviews

To assess the value proposition of the textile use case and to depict the future scenarios for the evolution of the platform, structured interviews with the selected stakeholders were conducted. Interviews were based on open answers and they addressed the following topics:

- Do you usually use internet platforms to sell/buy products/services or networking with other companies?
- Do you have business partners abroad? Can a federated collaboration network such as Nimble have a positive impact on your business internationalisation?
- As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?
- How did you find the user' registration?
- How did you find the selling/buying research experience?
- In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

Interviews were carried out by a professional economic journalist.

Before interviewing people on Nimble functionalities, some preliminary questions to collect personal data and habits toward technologies were asked. Template for preliminary questions is reported in Annex A. The whole text (translated from Italian to English) of interviews is available in Annex B.

-

¹ https://www.orangepix.it/

² http://www.marchifildi.com/

³ https://www.robinson.it/dnn

⁴ http://www.pneutronic.it/home.html

⁵ The company has not a website



2.3 Stakeholders' interests and strategies

In order to better understand stakeholders' interests, a map of the contribution they provided to each textile scenario is presented below.

Table 1 Connection between interviewed stakeholder and textile scenarios related to his own interests.

	Scenario 1 – Collaborative design and production	Scenario 2 – Virtual cata- logues and services	Scenario 3 – IoT machine connection and data elab- oration	Scenario 4 – Automatic origin certifi- cate declara- tion
Federico Tonin		X		
Luca Cinguino	х	Х	х	х
Franco Borlo	х	Х	х	
Roberto Ciliesa		Х	х	
Massimo Perona		X	х	

As the reading of the whole text of interviews shows, stakeholders share some evaluation about barriers in the adoption of the NIMBLE platform and opportunities for continuous improvement of the platform itself.

To ease the merge of those similarities, we decided to create some scenarios for the future development of the platform, that put together similar comments. Differences among stakeholders' opinions have been used to derive three different scenarios. Stakeholders background and personalities were merged too, to devise three ideal stakeholders that foster the implementation of the related future scenario.

Considering that the platform continuous evolution and improvement is a matter of design, we considered that the scenario-based method was suitable to identify such a design space, providing story telling instead of a requirement list. A precise requirements list for the future development can be easily derived from the future scenarios.

Moreover, the use of such a metamodel offers an interpretation of the material collected by interviews.

The following paragraph provides the literature insight on scenario-based design.

2.3.1 Scenario based design of future use

DOMINA UX experts, together with Piacenza, decided to follow the scenario-based method to qualitatively evaluate with stakeholders the value proposition of the NIMBLE platform for the textile use case.

The scenario-based method belongs to the user centred approach. The scenarios will allow to figure out the main gaps and challenges for future progress of the project and the platform evolution, as requested by WP7 objectives in the DOA.

The design of an innovative interactive system is an ill-defined problem. Ill-defined problems are those that do not have clear goals, solution paths, or expected solution. Well-defined problems have specific goals, clearly defined solution paths, and clear expected solutions (Schraw,



Dunkle, Bendixen 1995). Ill-defined problems tend to evoke a problem-solving strategy termed solution-first (Cross 2001). In the solution-first strategy, designers generate and analyse a candidate solution as a means of clarifying the problem state, the allowable moves, and the goal (Rosson, Carroll 2009).

The outcome of interviews is presented as stories of future development. Scenario-based design is a relatively lightweight method that provides an outline of use. And it is suitable to depict future use of the NIMBLE platform, starting from the current gaps and identifying challenges for future progress. Barriers are transformed into opportunities. Stakeholders interests, strategies and feedback become a setting, or situation state, with one or more actors with personal motivations, knowledge, and capabilities, and various tools and objects that interact with the platform. Scenarios match concreteness and flexibility, envisioning a concrete design solution. Since in the NIMBLE project we are coping with a vanguard research, we need the scenarios to describe the limitations end-users are facing with current systems and how they envision a system that overcomes those limits. Scenarios are the outgrowth of the collected interviews and matches in a stereotype description the gathered feedbacks. This lightweight method will provide us both an evaluation of the whole process by Piacenza and Domina stakeholders and a sketch of future use of the platform. The results of the use of scenarios will be a design space, not a design.

The template we use for scenario description is shown in the following table.

SCENARIO Nr. [Name] **PERSONA** Age [Name] Job [category] DESCRIPTION **DEGREE OF INTERNAZIONALIZATION: none** beginner well-established [presence of international partnerships in the interviewees' business network] **EXPECTED USE OF** [Expected use of the platform after the project end] THE PLATFORM **REASONS OF USE** [description] **EXPECTED** [description] **OUTCOME BARRIERS** [description] **OPPORTUNITIES** [description]

Table 2 Template for scenario description

2.4 Future scenarios for NIMBLE improvement and adoption

In the following, we can find the three scenarios that were derived by the full interviews (available in Annex B).

The scenarios of future developments are:

- The fashion manufacturer
- The IT problem solver



The business networker

Table 3 The Fashion Manufacturer - Future Scenario

SCE- NARIO	Nr. 1	Name: THE FASHION MANUFACTURER	
PER- SONA	Age 52	Name: Luca C.	Job: R&D manager - Marchi & Fildi yarns manufacturers

DESCRIPTION: My company, an Italian yarn manufacturer, is well-settled in several international markets. As producers, and buyers of raw material as well, the topics of traceability, remote networking and virtual sampling, are very significant to us. They are the pillar to settle a profitable business relationship with our suppliers as well as with our customers.

DEGREE OF INTERNA	AZIONALIZATION: none	beginner	well-established X
EXPECTED USE OF THE PLATFORM	Once a week		
REASONS OF USE	Simplify the connection v	vith our partn	ers and find new ones.
EXPECTED OUTCOME	More flexibility and time savings in managing the orders, improved capabilities to answer to our customers' needs by means of co-design of the items, virtual sampling, virtual catalogues and granted certifications.		

BARRIERS The current section of the platform related to "delivery and trading", "track and trace" and "LCPA details" do not completely fulfil our needs to share info about the orders with our customer and/or suppliers. The upload of a virtual catalogue on Nimble is complex: this is a barrier especially for SMEs that may not have a dedicated internal IT team to manage it. The platform issues by default a certificate of origin integrated with the invoice, but many other ethical and environmental fulfilments evidences are useful to optimize international transactions.

OPPORTUNITIES For the whole fashion supply chain could be of great interest the development of four topics:

- 1) a more user-friendly tool to upload virtual catalogues
- a trustworthy and dynamic method of virtual co-design useful to develop new items directly with the customers or to adjust the existing ones accordingly to their needs
- 3) the possibility to share certifications of goods issued and granted on Blockchain
- 4) a more detailed data sharing with regard to life cycle management of the products.



Table 4 The IT problem solver Future Scenario

SCE- NARIO	Nr. 2	Name THE IT PROBLEM SOLVER	
PER- SONA	Age 68	Name Franco B.	Job: Business partner – Robinson software house

DESCRIPTION I'm a seasoned veteran in the IT service providing, and my business are especially settled in the textile manufacturing chain. Next to digital products with standard functionalities, my company creates customized software solutions on the basis of our clients' needs.

DEGREE OF INTERNA	AZIONALIZATION: none	beginners X	well-established
EXPECTED USE OF THE PLATFORM	OF Seldom		
REASONS OF USE Offering our software house services and find new partners. Improve networking with IT providers from countries.			
EXPECTED OUTCOME	in terms of time davings and case of connection. Improve		

BARRIERS The procedures of the platform have some lacks in terms of usability. Some functions are too complex. The dashboard, the research experience and the platform, as a whole, are not intuitive enough, and this may deter the members from using it on an ongoing basis.

OPPORTUNITIES With reference to the subscribers having troubles with Nimble's most complex functions, such as the upload of virtual catalogues or the track and trace of the orders, the lack of usability may be fulfilled by a beneficial solution for both service providers and platform members. The IT providers, as we are, may include in their digital products more advanced, collaborative and interactive functions. In this way the scope and the functionalities of standard off the shelf software can be widened exploiting data exchange functions (collaborative design and production) and IoT interfaces (IoT machine connection and data elaboration).



Table 5 The Business Networker Future Scenario

SCE-NARIO Nr. 3 Name THE BUSINESS		Name THE BUSINESS NETW	ORKER
PER- SONA	Age 36	Name Federico Tonin	Job CTO & Co-founder - Web agency Orange Pix

DESCRIPTION: I'm engaged in marketing and communication strategies, focused on the web. I continually need to broaden my network and look for new strategies useful to improve my business. My web agency usually develops marketing campaigns for textile and fashion with an international audience target, but we still do not have a business network abroad.

DEGREE OF INTERNA	AZIONALIZATION: none X beginner well-established
EXPECTED USE OF THE PLATFORM	Once a day
REASONS OF USE	Networking with marketing and commercial aims. Improvement of business opportunities by means of focused remote connections.
EXPECTED OUT- COME	Enhance of partnerships / internationalisation. To improve our networking and establish new business agreements.

BARRIERS The platform aims are correct, but it still works too slowly, and sometimes the procedures are ambiguous. In the role of a service provider, I found the research experience complex and the instant messaging service too basic.

OPPORTUNITIES Implementation of the platform functions with a more user-friendly perspective. Some beneficial could come from: more detailed members business profiles, development of a live chat useful to support a direct connection among the members, supporting group chats, videocalls and sharing of videos. New functions of back-office for the customers and information sharing should be welcome too.

The scenarios for future development presented above leverage on the content of the interviews with the stakeholders (Annex B). The five interviewed stakeholders were merged into three main characters, that represent the ideal stakeholder of each scenario, providing a storytelling as validation of the value proposition of the current version of the platform and a useful guideline for future developments. The following table shows how the real stakeholders and the content of the related interviews were merged into the scenario for future developments.

Table 6 matching of the interviewed stakeholders with future scenarios

Scenario	Interviews referred to
1 – THE FASHION MANUFACTURER	2 Luca C. / 4 Roberto C.
2 – IT PROBLEM SOLVER	3 Franco B. / 2 Luca C / 4 Roberto C. / 5 Massimo P.
3 – THE BUSINESS NETWORKER	1 Federico T. / 3 Franco B. / 5 Massimo P. / 2 Luca C.



We referred the interview 2/4/5 to the Scenario 2, because they underline the same topics highlighted by "The IT problem solver" in term of improvement chances. Obviously, they do not have the capabilities to offer substantial solutions, but their contribution played an important role in identifying Nimble's barriers and opportunities. Par. 2.4.1 will highlight the connection between future scenarios and Nimble expected benefits.

2.4.1 Connection with NIMBLE expected benefits

For each use case, D1.1 identified expected outputs or benefits of the NIMBLE platform. In order to elicit the perceived consideration and awareness from stakeholders of the benefits stated at the beginning of the project, the following tables show which future scenario address which expected benefits, for each textile scenario depicted within the Nimble project.

Table 7 Match of expected benefits and future scenario for Collaborative design and production

Collaborative design and production			
Expected benefits	Appreciation and awareness by stake- holder		
time saving	Future scenario n.1		
trust in the data exchange	Future scenario n.1		
track data exchange	Future scenario n. 1 Future scenario n. 3		
easy exchange of data with new suppli- ers/customers in the platform	Future scenario n. 1 Future scenario n. 2 Future scenario n. 3		

Table 8 Match of expected benefits and future scenario for Virtual catalogues and services

Virtual catalogues and services		
Expected benefits	Appreciation and awareness by stake- holder	
Support of a real time remote virtual co-de-	Future scenario n.1	
sign process	Future scenario n. 2	
Shared tracing of all changes/sugges-	Future scenario n.1	
tions/feedback	Future scenario n. 2	
Reduction of physical sampling	Future scenario n.1 (partially observed)	
Reduction of order input errors	Future scenario n.1 (partially observed)	
Time saving in sharing the catalogue with potential customers	Future scenario n.1	
Statistics on the visualization of the catalogue	Future scenario n.1	



Among the expected benefits, the reduction of physical sampling and of input errors were partially observed by the stakeholders. The environmental impact of these benefits was not directly discussed, too. Hence it was not properly addressed by interviewed as a direct value proposition of the project.

Table 9 Match of expected benefits and future scenario for IoT machine connection and data elaboration

IoT machine connection and data elaboration		
Expected benefits	Appreciation and awareness by stake- holder	
Real time monitoring of production	Future scenario n.1 Future scenario n.2	
inner control of the material and fabric work-flows	Future scenario n.1 Future scenario n. 2	
better service and update of expected deliveries and communication to customers	Future scenario n.1 Future scenario n. 2	
Full production traceability	Future scenario n.1 Future scenario n. 2	

Table 10 Match of expected benefits and future scenario for Automatic origin certificate declaration

Automatic origin certificate declaration		
Expected benefits	Appreciation and awareness by stake- holder	
Textile and clothing companies: an easy way to produce a document required by law	Future scenario n.1	
IT provider, commercialising the service	Future scenario n. 2	

Beyond the textile scenarios, the interviews draw attention to one of the first reasons that moves the users closer to internet platforms: **the networking**. In the Nimble use-cases the interviewed stakeholders highlight the requirement to improve their network by means of a trustworthy and not dispersive tool. The platform may be, first of all, the right place to increase business partnerships and to approach new customers and new international markets. Such a significant need is clearly detailed in in the future scenario 3, that sketches the benefit of a "Business Networker" approach.

2.5 Synthesis of the value proposition assessment for the textile use case

The synthesis of the value proposition leverages on the previous work performed on two of the textile scenarios: the collaborative design and the certification of origin, represented by the following pictures. Please refer to D8.12 for full details.



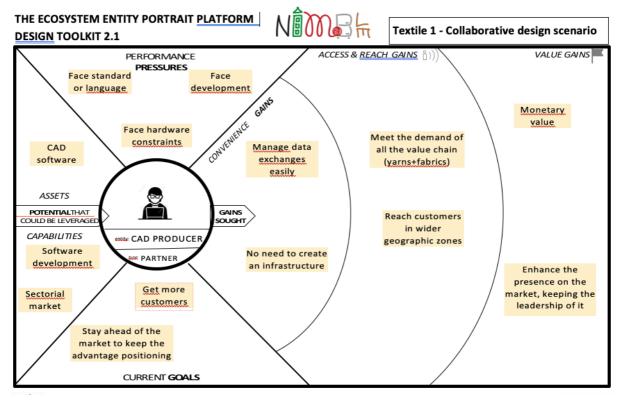


Figure 3 Collaborative design scenario Entity Portrait Canvas (from D8.12)

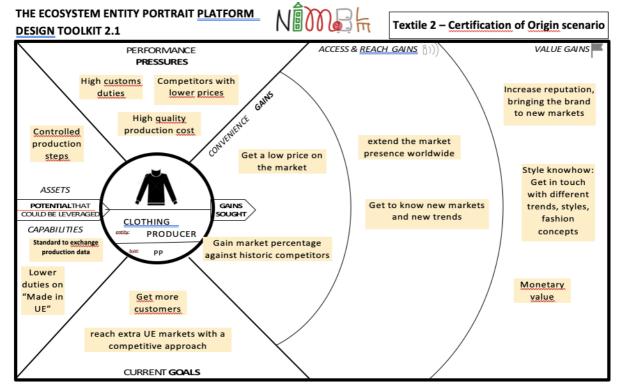


Figure 4 Certification of origin scenario Entity Portrait (from D8.12)

According to the insights we got from stakeholders evidence, detailed in the par. 2.4 2 and into the related interviews, the following Value Proposition Canvas identifies the Jobs-to-be-done within the textile use case, the pains the users face when trying to accomplish their Jobs-to-



be-done and the gains they perceive by getting their jobs done. The canvas highlights also the most important components the Nimble platform offers, and how we relieve pain and create gains for the textile users.

Following this canvas, it is possible to highlight on the left the *Nimble product & services* tailored for the textile UC:

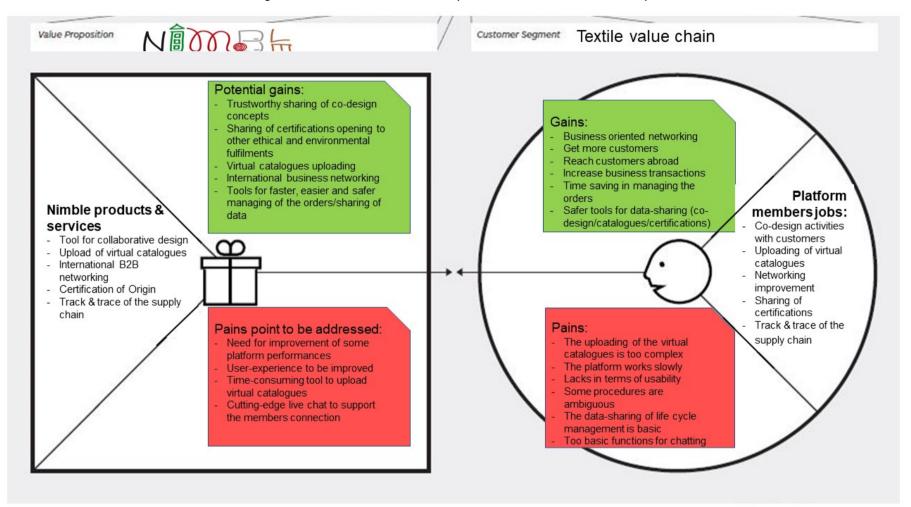
- The list of the *potential gains* corresponds to the developed features within the Nimble project;
- The list of *pain points to be addressed* correspond to the further development the platform needs, according the narrative of scenarios of future use.

On the right side of the canvas we can find the user's point of view. According to the platform meme jobs the users need to carry out, they have a clear picture of the gains and pains they encounter using the Nimble platform.

- The *gains* list confirms the value proposition of the platform, giving evidence of the fact that users clearly perceive Nimble benefits;
- The *pains* list highlights the improvement the platform needs to perform, in order to exploit at better its benefits. Pains become in fact opportunities for improvement.



Figure 5 Evaluation of Nimble Value Proposition for textile use case: a sum up



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2.6 Final usability validation

WP7 aim is not to provide a context-specific usability inspection, that was already performed within WP4, but a final validation about the platform features, functionalities, usability and quality of results, as specified in the project Description of Work. To fulfil this aim, after the interview, stakeholders were asked to answer to the Standard Usability Scale questionnaire (ref. to par. 2.7), that is quite general, but brings a crucial benefit: SUS results can be compared also across different domains and different systems. In fact, despite their level of detail and indepth analysis, a consequence of the context-specific usability analysis is that it is very difficult to make comparisons of usability across different systems. Comparing usability of different systems intended for different purposes is a clear case of "comparing apples and oranges" and should be avoided wherever possible. It is also difficult and potentially misleading to generalise design features and experience across systems. If there is an area in which it is possible to make more generalised assessments of usability, it is the area of subjective assessments of usability. Subjective measures of usability are usually obtained through the use of questionnaires and attitude scales, which are not specific to any particular system (Brooke 1996).

To be effective and widely adopted, subjective metrics must be capable of being administered quickly and simply, but also have to be reliable enough to be used to make comparisons of user performance changes from version to version of a software product. This is the case of the System Usability Scale (SUS), that is a simple, ten-item scale giving a global view of subjective assessments of usability.

The use of SUS in each NIMBLE use case will allow a comparative cross-domain final usability evaluation, that will be presented in D7.4

2.7 Standard usability scale (SUS)

Basically, SUS is a Likert scale. Users were requested to evaluate the system they just tested as a whole. Responses were on a five-point scale from 1 (totally disagree) to 5 (totally agree). The mean of global values gathered with SUS represents the level of average satisfaction of the sample. The score calculation is the following:

- For odd items (1, 3, 5, 7, 9) the calculation is: score assigned by the participant -1;
- For even items (2, 4, 6, 8, 10) the calculation is: 5 score assigned by the participant;
- The new scores are added;
- The obtained value is multiplied by 2,5 (the resulting score oscillates between the lowest value "0" and the highest value "100").

This type of calculation is needed to properly refer to the user judgment: since questions are highlighting both positive and negative issues, while the answer scale does not change, it is necessary to properly weight users' scores.

SUS presents the items to participants as 5-point scales numbered from 1 (anchored with "Strongly disagree") to 5 (anchored with "Strongly agree"). After completion, it is possible to determine each item's score contribution, which will range from 0 to 4. For positively-worded items (1, 3, 5, 7 and 9), the score contribution is the scale position minus 1. For negatively-worded items (2, 4, 6, 8 and 10), it is 5 minus the scale position. To get the overall SUS score, multiply the sum of the item score contributions by 2.5. Thus, SUS scores range from 0 to 100 in 2.5-point increments. For further details, please refer to Lewis (2009).





Figure 6 The SUS scale

It is important to highlight that SUS is not a diagnostic method: it is used to classify the ease of use of a system, object, application or service.

The main advantage of the SUS scale is that, giving a 0-100 score, we can compare the score collected in different situations, even if the object of the test, the context and the end-users are different.

Hence at the end of the interview, participants are asked to fill in the SUS questionnaire.

Table 11 shows the SUS questionnaire:



Table 11 The SUS questionnaire

Strongly	Strongly
disagree	agree

1	I think that I would like to use this platform frequently	1	□ 2	3	□ 4	□ 5
2	I find the platform unnecessarily complex.	1	□ 2	□ 3	□ 4	□ 5
3	I thought the platform was easy to use	1	□ 2	□ 3	□ 4	□ 5
4	I think that I would need the support of a technical per- son to be able to use this platform	1	2	3	4	5
5	I found the various functions in this platform were well integrated	1	2	3	4	□ 5
6	I thought there was too much inconsistency in this platform	1	2	3	4	□ 5
7	I would imagine that most people would learn to use this platform very quickly	1	2	3	4	□ 5
8	I found the platform very cumbersome to use	1	□ 2	□ 3	□ 4	□ 5
9	I felt very confident using the platform	1	□ 2	□ 3	□ 4	□ 5
10	I needed to learn a lot of things before I could get go- ing with this platform	1	□ 2	3	4	□ 5

2.8 SUS results and discussion

In the following table the SUS results are presented, combining the single scores of each interviewee with the final average satisfaction score:



Table 12 Overview of SUS results

NAME	SCORE
Luca C.	50,00
Massimo P.	32,50
Federico T.	70,00
Roberto C.	37,50
Franco B.	47,50
AVERAGE	47,50

Although the average score put SUS in the "poor" range, to have a believable overview of Nimble's barriers and future opportunities, an in-depth analysis of each stakeholder answers is needed.

Their responses are conditioned by different business backgrounds and different degrees of knowledge of the digital technologies. The highest score (70 = good SUS) comes from Federico Tonin, aged 36 with a degree in Computer Science Engineerign. Federico, because of his technical background, including expertise in software development, feels very confident with digital technologies and as a consequence he had no trouble with the platform in terms of user experience. On the other hand, Massimo P. gave the worst score (32.5 = poor SUS) but, as highlighted in his interview, he has no professional background with B2B platforms and socials as well. Among these two opposite opinions, three medium response underlines how Nimble validation troubles may be connected with its B&B approach, more technical than a social networking one. Actually, the real use of the Platform after the project end is feasible, but it requires that users receive an "ad hoc" training on how to exploit and use its functionalities. For that an intro section with an on-line tutorial could be useful.



3 Technical Validation

3.1 Platform Validation

3.1.1 Platform Architecture

The Textile application scenario exploits and leverages the NIMBLE MVP Platform, output of WP3 activities and deployed on IBM servers. This NIMBLE Instance - part of the federation and used in sharing with the White Goods Textile use case and the related technical partners - is enriched by the integration of the following components developed in WP5 and which provide added-value to the user:

- Collaborative design frontend plugin: to add the collaborative design feature into the MVP frontend
- Collaborative design component, i.e. the service that implements the collaborative design
- CAD plugin, i.e. the component used to upload textile products to the NIMBLE platform
- IoT component, i.e. the micro-service to manage product order, process steps and related deadlines
- introduction of the feature for enabling/disabling collaborative design functionalities into Cloud run-time component
- Development of PCO handling feature in the Catalogue component

The components and related integration are available in the GIT repository of NIMBLE platform (https://github.com/nimble-platform).

The following picture (from D3.1) presents an overall view of the NIMBLE integrated cloud platform, addressing the main requirements of security, scalability, extension and federation. The figure shows the Core Components, which are a part of the platform and the main interactions between the various components.



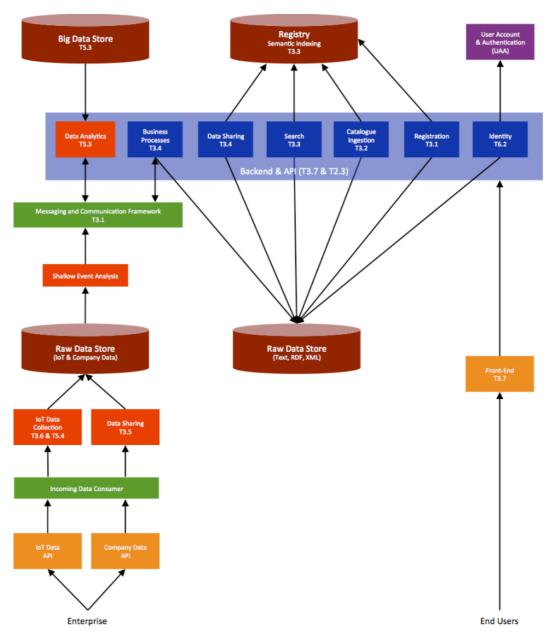


Figure 7 NIMBLE MVP infrastructure (from D3.1)

3.1.2 Component Description

According to the component and microservice descriptions provided into D3.1, the following table gives the evidence of which component were used to realize the textile scenarios.



Table 13 Overview of Nimble components into the textile scenarios

	Scenario 1 – Collaborative design and production	Scenario 2 – Virtual cata- logues and services	Scenario 3 – IoT machine connection and data elab- oration	Scenario 4 – Automatic origin certifi- cate declara- tion
Portal Component	х	х		х
Identity component	×	Х	х	х
Catalogue component	х	Х		х
Collaboration component	х			
IOT component			x	
Cloud run-time component	Х	Х	Х	х



The following table describes specific development carried out to fulfil the textile scenarios needs.

Table 14 Overview of the specific developments of the textile scenarios

	Scenario 1 – Collaborative design and production	Scenario 2 – Virtual cata- logues and services	Scenario 3 – IoT machine connection and data elab- oration	Scenario 4 – Automatic origin certifi- cate declara- tion
Portal component	Modified front- end by the inte- gration of col- laborative de- sign plugin	No modifica- tions, same us- age as in MVP		Modified front- end adding the list of countries where PCO is available
Identity component	No modifica- tions, same us- age as in MVP	No modifica- tions, same us- age as in MVP	No modifica- tions, same us- age as in MVP	No modifica- tions, same us- age as in MVP
Catalogue component	No modifica- tions, same us- age as in MVP	Integration of CAD plugin to upload textile products		Development of the feature for PCO handling
Collaboration component	Integration of new service			
IOT component			Custom development of micro-service to manage product order, process steps and related deadlines	
Cloud run-time component	Introduction of the feature for enabling/disa- bling collabora- tive design functionalities	No modifica- tions, same us- age as in MVP	No modifica- tions, same us- age as in MVP	No modifications, same usage as in MVP

The above-mentioned components are integrated and deployed into NIMBLE platform in order to support the textiles functions. By performing a set of use cases, which involve textile stakeholders, the components features have been tested and validated accordingly.



3.2 Technical consideration on the value proposition

As documented, in this and in previous deliverables, a wide set of features useful for the textile sector and related stakeholders have been developed, deployed and validated in the NIMBLE platform.

Although the project could not cover every aspect of the textile sector and stakeholders, the goal of this paragraph is to perform a step forward to the project contents in order to suggest useful enhancements.

First of all, the IoT scenario enables tracking production phases of a fabric, including delays. Although this feature could be implemented as a separate component of the project, its integration into the NIMBLE platform gives a quite important advantage. Consider the case of a fabric manufacturer (e.g. Piacenza) that performs one or more production step(s) by involving a third-party company (e.g. to perform the spinning phase). If both the manufacturer (e.g. Piacenza) and the third-party company adopt the NIMBLE platform, the third-party company could use the platform to notify the advances of a particular order. Clearly, this solution has important economic aspects to consider. In fact, the adoption of an existent platform requires less economic efforts and it gives the possibility to involve also SMEs companies. These typically have not enough economic resources and technical skills to develop this type of solution. The same consideration is also valid for other manufacturing sectors.

Second, the introduction of Preferential Certificate of Origin (PCO) document and order tracking feature (IoT) are the basic building blocks to perform production chain traceability and certification. Therefore, the introduction of these features makes possible the adoption of block-chain technologies to trace production items and related documents (e.g. PCO, invoices, advices). The approach followed in the IoT component could be extended to introduce traceability of textile items. More precisely, each production phase performs a transformation on an input item to modify some properties of that or to create a new item. For example, raw materials are transformed into yarn, this is transformed into fabric that is managed by finishing machines to give a different hand touch. Therefore, each machine of the production process can be equipped (by using a software component) to trace operations and to add useful information (e.g. timing). In order to exploit this opportunity, an information structure (based on JSON format) was designed during the project. This is reported below:



```
"ownerId": "string",
"quantity": integer,
"unitMeasure": "string",
"lotNumber": "string",
"taricCode": "string",
"productCode": "string",
"countryOfTransformation": "string",
"date": "string",
"sources": [
    "ownerId": "string",
    "productCode": "string",
    "lotNumber": "string",
    "quantity": integer
  }
],
"documents": [
    "type": "string",
    "number": "string",
    "producer": "string",
    "date": "string",
    "fileLocation": "string"
  },
]
```

The above structure contains the most useful information for textile process, i.e.:

- Basic details of an item (manufacturer, production date, lot number, product code, TARIC code, country of transformation)
- The set of sources that have been used to produce the item, e.g. for yarn the sources are raw materials, for fabric the sources are yarns
- The documents shipped with the item, e.g. PCO, invoice, advices

Finally, the introduction of blockchain technologies beside the traceability information could increase the adoption of the NIMBLE platform to several sectors and stakeholders.



4 Conclusion

The aim of this deliverable is to describe the Textile use case; during the analysis important concepts have emerged; first of all, the usefulness of the networking functionality of the NIM-BLE platform. Three different scenarios for future development of the platform were drawn, highlighting the stakeholders' need for a higher degree of internationalisation of their business, and giving us also the evidence of the expected use of the platform after the project end, that is expected to be frequently accessed.

The results of the Standard Usability Scale demonstrate how people with digital competences can use the platform without facing so many problems, even if they would like some usability improvements. Other users less skilled face more difficulties that can be overcome with some training and an online guidance.

Final consideration on the economic value of the IOT and Certificate of Origin scenario are given, leveraging on the technical validation.

5 References

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ANNEX A

1. User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	
SURNAME	
COMPANY NAME	
IN COMPANY ROLE	
BIRTH DATE	
EDUCATION LEVEL	

2. Use of technological devices

Internet – frequency of use:	More times a day
	Once a day
	Once a week
	Seldom
Device used to access Internet	Pc
	Tablet
	Smartphone

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders Manufacturing B2B service providers and intermediaries Digital platform and infrastructure providers Technology and Service Providers
Have you ever used a B2B platform for managing your business?	Yes No
If yes – which type of services are you interested in	Product catalogue consulting Finding new business partners Offering your own service To share data
If yes – frequency of use	More times a day Once a day Once a week Seldom
If not – why you don't	



ANNEX B

INTERVIEW 1

1. User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	Federico
SURNAME	Tonin
COMPANY NAME	Orange Pix
IN COMPANY ROLE	CTO – Co-founder
BIRTH DATE	21/01/84
EDUCATION LEVEL	Degree in Computer Science

2. Use of technological devices

Internet – frequency of use:	More times a day X Once a day Once a week Seldom
Device used to access Internet	Pc X Tablet X Smartphone X

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders Manufacturing B2B service providers and intermediaries Digital platform and infrastructure providers Technology and Service Providers X
Have you ever used a B2B platform for	Yes X
managing your business?	No
If yes – which type of services are you	Product catalogue consulting
interested in	Finding new business partners X
	Offering your own service X
	To share data
If yes – frequency of use	More times a day
	Once a day X
	Once a week
	Seldom
If not – why you don't	



1 Do you usually use internet platforms to sell/buy products/services or networking with other companies?

We're a web agency engaged in marketing and communication and we continually need to broaden our network and look for new strategies useful to improve our business. Internet platforms are an essential tool for us, nevertheless most of them are purely social, a kind of approach good for a first networking step but lacking if you have more commercial aims.

2 Do you have business partner abroad? Can a federated collaboration network as Nimble have a positive impact on your business internationalisation?

We operate in Biella, a textile area with a deep international vocation. Most of our customers work in fashion supply chain and they have partnerships all over the world, therefore we usually develop business strategies suitable for an international audience. We often meet buyers and suppliers coming from abroad, but only in our web agency status, for example following workshops and meetings for social/marketing campaigns, therefore the connection with these realities does not go beyond the our commitment on such an activity. A federated collaboration network can be a big opportunity to keep and extend this kind of relationships.

3 As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?

They are exhaustive, but as a web agency it could beneficial for us to have a dedicated section for marketing a communication providers, to implement the platform members business profiles and to develop a live chat useful to support a direct connection between the members, supporting group chats, videocalls and sharing of videos.

4 How did you found the user's registration?

The registration is easy, but the platform could run faster. Moreover, the registration sometimes gives an error in the field related to the validation of the VAT number

5 How did you found the selling/buying research experience?

Form a user point of view it's not so easy to find what you are looking for. For the selling of items and services there are exhaustive descriptions, but the platform works slowly and sometimes the steps to do to reach the right screen are ambiguous.

6 In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

As underlined before, Nimble may be improved from a service provider point of view. In the last few years, service providers and freelance consultants achieved a new and significant role and their skills are even more requested in business, therefore it's could be useful for experts and company as well to have an effective tool to keep in touch, consult and share information and ideas.



INTERVIEW 2

User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	Luca
SURNAME	Cinguino
COMPANY NAME	Marchi & Fildi
IN COMPANY ROLE	R&D Manager
BIRTH DATE	15/02/68
EDUCATION LEVEL	Bachelor's degree Chemical Textile Engi-
	neering

2. Use of technological devices

Internet – frequency of use:	More times a day X Once a day
	Once a week Seldom
Device used to access Internet	Pc X
	Tablet
	Smartphone X

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders X Manufacturing B2B service providers and intermediaries Digital platform and infrastructure providers Technology and Service Providers
Have you ever used a B2B platform for managing your business?	Yes X No
If yes – which type of services are you interested in	Product catalogue consulting X Finding new business partners X Offering your own service To share data X
If yes – frequency of use	More times a day Once a day Once a week X Seldom
If not – why you don't	

1 Do you usually use internet platforms to sell/buy products/services or networking with other companies?

We use platform such as LinkedIn to spread news about our activities and products and to improve our network, as for selling and buying up to now we preferred a direct management



of the business transitions because external platforms aren't equipped to respond to the needs of our customers in terms of detailed descriptions of the goods and transparency.

2 Do you have business partner abroad? Can a federated collaboration network as Nimble have a positive impact on your business internationalisation?

As yarns producer with an headquarter in Italy and offices in Turkey and Brasil we have several partners abroad, our reference markets encompass EU, USA and Far East, moreover we are engaged in European textile organizations such as Euratex, with the aim to play a role in spreading topics related to sustainability in fashion supply chain. Therefore, Nimble is a new and welcome chance to maintain and enhance an international network useful to share ideas and improve business.

3 As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?

The categories are sufficiently exhaustive. As seller, and buyer of raw materials as well, we're very interested in certificate declaration, including ethical and environmental fulfilment evidences, a development of these issues could a great beneficial for us. For ex. the platform issues by default a certificate of origin integrated with the invoice, but the possibility to share certification of goods issued and granted on Blockchain could be a big plus in transparency. For the fashion supply chain could be of great interest also the development of a tool for a trustworthy and dynamic virtual co-design useful to develop news items directly with the customers or to adjust the existing ones accordingly to their needs.

4 How did you found the user's registration?

It works, but it's a little complex

5 How did you find the selling/buying research experience?

Still to improve. For example, acting as manufacturer a fundamental improvement is the development of the sections: "delivery and trading", "track and trace" and "LCPA DETAILS". It could help us save time in the managing the orders by sharing real time useful information regarding life cycle management of the productions with suppliers, other producers, logistic providers and buyers.

6 In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

The aim is excellent, but I think that there are still several details to improve. For example, acting as sellers of textile products the development of an easier tool to upload virtual catalogues could be useful to show our production to potential costumer and verify together if we can fulfil their requirements. The current requires to have an internal IT team to be fulfilled, and this process doesn't suit to SMEs capabilities.



INTERVIEW 3

User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	Franco
SURNAME	Borlo
COMPANY NAME	Robinson srl
IN COMPANY ROLE	Business partner
BIRTH DATE	09/08/52
EDUCATION LEVEL	Electrical Engeneering Technician

2. Use of technological devices

Internet – frequency of use:	More times a day X Once a day Once a week Seldom
Device used to access Internet	Pc X Tablet Smartphone X

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders Manufacturing B2B service providers and intermediaries Digital platform and infrastructure providers X Technology and Service Providers
Have you ever used a B2B platform for managing your business?	Yes X No
If yes – which type of services are you interested in	Product catalogue consulting Finding new business partners X Offering your own service X To share data X
If yes – frequency of use	More times a day Once a day Once a week Seldom X
If not – why you don't	

¹ Do you usually use internet platforms to sell/buy products/services or networking with other companies?



We are IT provider and currently we use internet platforms (i.e. e-commerce) mainly to purchase goods as hardware components and rarely as a tool for networking with other companies. We don't use any platform to sell our products and services online.

2 Do you have business partner abroad? Can a federated collaboration network as Nimble have a positive impact on your business internationalisation?

We do not have commercial partners abroad, however a platform like Nimble could be a useful tool for the internationalization of our company, for example by means of a wider networking, useful to get in touch and settle new partnerships with IT provider operating abroad. Nimble maybe be an opportunity to settle a collaboration net with the aim to share ideas and create collaborative design teams, especially focused on the needs of textile supply chain, the one we especially work with. I think about textile manufacturer managing virtual design solutions for fabrics production sharing data with their customers by means of dedicated tools.

3 As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?

With reference to our sector (IT provider) at this moment the categories are not exhaustive. The platform should implement the categories related to IT and in wider terms all the categories concerning services for companies.

4 How did you find the user's registration

it is not very simple, and the upload of the screens is slow. I noticed a delay in the delivery of the subscription confirmation.

5 How did you find the selling/buying research experience?

I find that the procedure needs to be improved in terms of usability. The research experience should be more intuitive, the dashboard and the platform as a whole should be settled to simplify the understanding of the steps the user have to do to enter the different screens.

6 In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

I evaluate this possibility very positively, but I think that Nimble needs some improvements to reach this aim. First of all, a significative outcome in supporting the fostering and adoption of Nimble platform may come directly from more advanced, collaborative and interactive functions that the IT providers, as we are, can include in their digital products. In this way the scope and the functionalities of standard at shelf software can be widened exploiting data exchange functions (collaborative design and production) and IoT interfaces (IoT machine connection and data elaboration) useful make the Nimble subscribers' experience easier and more approachable. I especially refer to the upload of virtual catalogues and the sharing of life cycle management information. Moreover, a live chat with function for back-office for the customers, networking and information sharing should be welcome.



INTERVIEW 4

User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	Roberto
SURNAME	Ciliesa
COMPANY NAME	Pneutronic srl
IN COMPANY ROLE	Business partner
BIRTH DATE	15/11/76
EDUCATION LEVEL	Bachelor's degree Chemical Textile Engi-
	neering

2. Use of technological devices

Internet – frequency of use:	More times a day
·	Once a day X
	Once a week
	Seldom
Device used to access Internet	Pc X
	Tablet
	Smartphone X

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders X Digital platform and infrastructure providers Technology and Service Providers
Have you ever used a B2B platform for	Yes X
managing your business?	No
If yes – which type of services are you interested in	Product catalogue consulting X Finding new business partners Offering your own service X To share data X
If yes – frequency of use	More times a day Once a day
	Once a week
	Seldom X
If not – why you don't	

1 Do you usually use internet platforms to sell/buy products/services or networking with other companies?

Sometimes I use internet platforms to improve my business network, but it's a hard work to do! It takes a lot of time and many platforms have only a social approach, while I'd like to promote my company's production to enhance our turnover.



2 Do you have business partner abroad? Can a federated collaboration network as Nimble have a positive impact on your business internationalisation?

As provider in textile machinery supply chain, dealing with industrial automation systems for dyeing, our company was born and grew up in the Biellese Textile Discrict, but in the last few years we developed some partnerships with textile machinery companies based in the EU and Far East, and we started to buy mechanical and hardware components abroad. As an international reality we're still beginners and a tool as Nimble it's potentially a big opportunity for us.

3 As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?

The categories encompass most of the business sector, but they're generalist, a reserved category for textile machinery suppliers would be welcome! Moreover, as provider of industrial automation systems a more friendly tool to upload on the platform virtual catalogues where the potential customer can display our products could be a big plus for us.

4 How did you found the users' registration?

A little complex and the subscription confirmation by e-mail doesn't come in a rush.

5 How did you found the selling/buying research experience?

I tried to publish a product, the stages of description are exhaustive but the upload of the screens is slow. As highlighted in one of the previous answers, I found the sell/buy categories incomplete, and sometimes it's difficult to understand in which category a product can be inserted or searched.

6 In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

Potentially good but there is room for improvements. The chance to publish products, services and company profiles is useful to identify the interests and the needs of the platform members. As provider of industrial automation systems, the keystone to understand our potential costumer's need is an integrated system for the access to real time data at machine and product level, allowing to share information among the main actors of the supply chain, track problems and find solutions in a well-structured network.



INTERVIEW 5

User Personal Data - We kindly ask to provide some personal data, and to describe your habits towards the use of technology and the online shopping. We remind you that we collect these data just for statistical purpose.

NAME	Massimo
SURNAME	Perona
COMPANY NAME	Comeca
IN COMPANY ROLE	Owner
BIRTH DATE	04/01/60
EDUCATION LEVEL	Secondary school – Expert in Textile

2. Use of technological devices

Internet – frequency of use:	More times a day Once a day Once a week X Seldom
Device used to access Internet	Pc X Tablet Smartphone

3. Role in the manufacturing supply chain

Role	Manufacturing supply network stakeholders X Digital platform and infrastructure providers Technology and Service Providers
Have you ever used a B2B platform for managing your business?	Yes No X
If yes – which type of services are you interested in	Product catalogue consulting Finding new business partners Offering your own service To share data
If yes – frequency of use	More times a day Once a day Once a week Seldom
If not – why you don't	I think B2B platform do not respond to my business needs

1 Do you usually use internet platforms to sell/buy products/services or networking with other companies?

No, I admit my scepticism regarding the networking and marketing opportunities offered by Internet, but I see that nowadays is essential to align my company with these new business approaches.



2 Do you have business partner abroad? Can a federated collaboration network as Nimble have a positive impact on your business internationalisation?

We're provider of electric and electronic products skilled in electrical wiring harness, and we especially work at regional level as supplier of long-standing customers, therefore we do not have developed any international partnership. A tool like Nimble could be an unexpected chance to improve our networking and establish new business agreements.

3 As a Nimble subscriber of your business sector, do you find the sell/buy and networking categories exhaustive?

As for selling categories, I find them exhaustive, I appreciate the different fields for the description of the item/service.

4 How did you found the users' registration?

I had no particular problem with my registration, but the navigation and the upload of the pages is slow.

5 How did you found the selling/buying research experience?

The research method isn't so user-friendly, sometimes I can't understand what I have to do to reach the next step.

6 In a networking business based on a reciprocity viewpoint, how do you evaluate the capability to identify the interests and the needs of the other stakeholders offered by Nimble?

It still has to come into focus. Co.de.ca. activities are integrated in a wider workflow connected with the textile machinery production or directly with manufacturers' plants, therefore from my business point of view the main need is to be well-linked with my customers' internal activities in order to fully satisfy their requirements. On the other hand, my customers want flexibility, timeliness and accuracy. The perfect tool shall find a meeting point where all the different needs can be identified. For example, if we're producing components for a textile machinery, a system able to share real-time data related to the workflow and the order status of the machinery, could help us to align our production to the delivery times.