D8.11 – Project Business Plan

Year 1

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1 Executive Summary

The present document reports the outcomes of all WP8 activities (in particular Task 8.7) aimed at developing a sustainable business plan for the NIMBLE platform. It is a live document that will be continuously updated and refined throughout the project, where the final version (due at M36) will contain the actual NIMBLE business plan.

As stated in the project DOW, the **main target user group of NIMBLE** are indeed **European**, **manufacturing SMEs** who already run sustainable businesses, but are in danger of "missing the boat" in this time of technological change. However, in view of developing a viable and profitable business plan, we have performed a more comprehensive analysis of all involved stakeholders, in order to assess all the possible opportunities. Specifically:

- *Manufacturing supply network stakeholders* (suppliers, manufacturers, logistic operators, distributors, retailers).
- *Manufacturing B2B service providers and intermediaries* (private B2B service providers, industry trade associations and corporations, National, Regional and Local innovation and business development agencies, Technology-specific (SMEs) communities and cluster).
- *Platform and infrastructure providers* (system integrators, cloud platform providers, network/telco operators).
- *Technology and service providers* (Web entrepreneurs, start-ups and freelance developers, Established software SMEs, Technology research centres and universities).

For each of the identified target user group, we analyzed the main needs/expectations (with respect to the current behaviors) and evaluated their priority as NIMBLE target user group.

NIMBLE will develop and validate a novel cloud-based real-time and easy-access platform that will facilitate the establishing of dynamic supply networks for the identified stakeholders in future collaborative manufacturing.

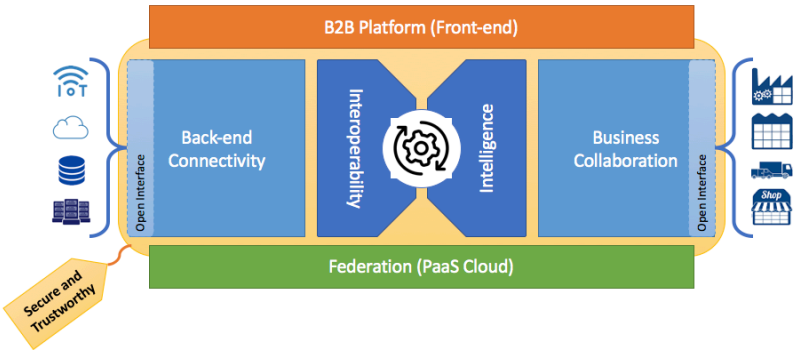

Figure 1 – NIMBLE B2B Platform: overview of main elements.

Specifically, the resulting platform will be a *manufacturing B2B service delivery framework*, which at the same time will be *interoperable*, *smart* (proactive), *open* (extensible/adaptable), *trustworthy and secure*. Moreover, the NIMBLE deployment will open up possibilities to exploit cloud infrastructure using the PaaS paradigm for platform providers to form a *federation* of NIMBLE platforms and give different sectors or regions a platform for B2C, B2B and manufacturing collaboration that can be customised for them. The devised platform has been analyzed in terms of core services, additional cloud service/tools and main assets, in order to highlight the distinct values, map the benefits for identified target user groups and report perceived barriers (from a literature review).

In addition to those two main contributions (i.e. stakeholder analysis and NIMBLE platform specification), we also started a preliminary assessment of the market and the competitors landscape and formulated a first hypothesis of the NIMBLE business model(s).

The **market assessment** has followed an incremental approach, starting from the analysis of the most relevant technology trends (demonstrating the potential interest of target stakeholders) and then focusing on segments, dimensions, challenges and main players of the actual NIMBLE target market: B2B Digital Platforms. Specifically, we report about:

- Manufacturing Cloud Computing trends
- Industry 4.0 trends
- Manufacturing Supply Chain Management solutions
- B2B Digital Platforms

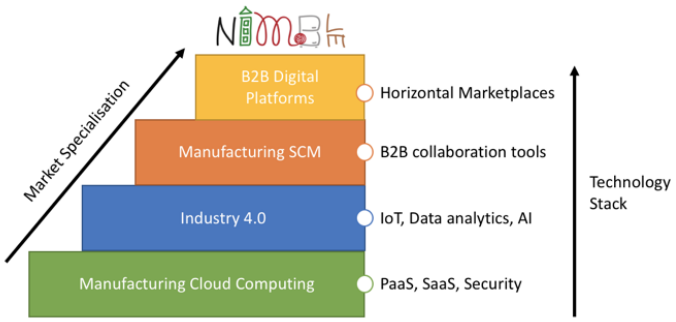

Figure 2 – NIMBLE target market(s)

The analyses revealed a potentially huge market, currently driven by the Industry 4.0 revolution, from one side, and the digital platform revolution, from the other side. However, so far, in the manufacturing B2B digital platform space (horizontal marketplaces) there are few examples of successful, innovative platform-based businesses, since big IT service providers (SAP, Siemens, Oracle, etc.) have mainly focused on vertical B2B platforms, while web-based platform players (i.e. horizontal B2B marketplaces such as Amazon, Alibaba, ThomasNet) do not offer really advanced solutions yet. However, this is only a matter of time. First movers in blending Industry 4.0 and Digital Platform revolutions will seek a great advantage.

The **formulated business models** include some possible alternatives concerning the roles of NIMBLE partners (interested in the exploitation of the NIMBLE solution as a whole) and the type of services that can be offered. The resulting 3 hypotheses are not mutually exclusive and they could be even operated in parellel by a NIMBLE Legal Entity, although they should be progressively activated (i.e. starting from one of the three). The value creation of NIMBLE for the identified target user groups is depicted in the simplified value chain reported below.

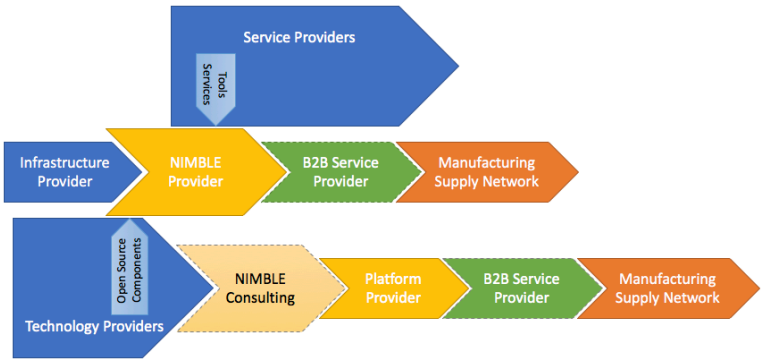

Figure 3 – NIMBLE Business Value Chain

In order to start structuring the business plan elements (that will be further developed in the next versions of the deliverable) and summarizing the main insights collected so far (including the work performed for deliverable D1.2), we also expanded on the original business canvas model for NIMBLE. The business plan will also include and analyse some possible **business cases**, based on the adoption of the NIMBLE solution. At this stage, we introduced the 4 project use cases, since they will be our first benchmark. However, as we progress with the AMBASSADOR and SEED activities, we plan to identify and report new possible business cases linking to additional (external) early adopters. For each of the identified business cases, the NIMBLE platform will offer a specific solution, based on the core services and, in some cases, some additional services and tools.

In terms of **future work**, the goal will be to create a process and a structure to progress in the business plan development by focusing on a problem and a customer segment at a time and to get rid of the riskiest assumptions as fast as possible. To this end, we will:

1. Develop a questionnaire that can validate our assumptions and hypotheses, as well as provide additional insights about the target market, existing barriers, and relevant business impacts;
2. Engage with (possibly) all the identified target user groups;
3. Schedule 5 to 10 conversations with each segment for which we want to validate our assumptions and hypotheses.

In order to engage with the target user group, we will exploit the following main channels that have already been established:

- Use case partners: WP4 activities will involve stakeholders from the project use cases to identify/develop the key platform services and UX and some workshops will be arranged.
- AMBASSADOR and SEED Programme: as part of the WP8 activities we will participate and arrange workshops to create awareness and collect feedback from target stakeholders. The AMBASSADOR programme will target potential end-users (manufacturing supply network stakeholders) and intermediaries (manufacturing B2B service providers, associations, etc.), while the SEED programme will target Platform Providers.

The collected information will be used to create a second, more focused version of the business plan, where we will start to clearly identify:

- The actual NIMBLE value proposition and existing barriers;
- The reference market and competitive landscape;
- An effective, viable business model;
- A go to market strategy.

2 Introduction

The present document reports the outcomes of all WP8 activities (in particular Task 8.7) aimed to develop a sustainable business plan for the NIMBLE platform.

It is a live document that will be continuously updated and refined throughout the project, where the final version (due at M36) will contain the actual NIMBLE business plan.

In this first phase (corresponding to Y1 activities), we focused on the stakeholder analysis and overall product definition, and we also provided a preliminary market analysis and some hypothesis about the possible business models.

All of this will be further elaborated, validated and extended in view of:

- Engaging with potential users/customers for:
  - the validation of the business hypothesis and assumptions.
  - fully understanding their barriers and values related to the platform.
- Extending the number of possible business cases (early adopters) based on the NIMBLE platform.
- Carrying on the activities of market analysis and business planning.

3 Target User Groups

As stated in the project's DOW:

"NIMBLE vision is to provide a federated interoperable eco-system of medium-sized platforms that provide B2B connectivity for the 99% of European businesses that are SMEs and would profit from Internet platforms, but are faced with "Hobson's choice": either to be dependent on a monopolistic Internet platform or go out of business, as consumers move away from traditional ways of shopping."

Therefore, the **main target user group of NIMBLE** are indeed **European**, **manufacturing SMEs** who already run sustainable businesses, but are in danger of "missing the boat" in this time of technological change.

However, in view of developing a viable and profitable business plan, we have performed a more comprehensive analysis of all involved stakeholders, in order to assess all the possible opportunities. It could be the case that, for example, the actual direct customers of NIMBLE are not the SMEs, but different stakeholders, such as platform providers or B2B intermediaries/service providers that "buy" the NIMBLE solution for their SME customers.

In the following sub-sections, we firstly introduce the envisioned platform ecosystem, with its main roles and interactions and then, we describe the identified target groups (stakeholders) that can play such roles.

3.1 Platform roles

NIMBLE will be a multi-sided - i.e. bringing together vendor and buyer communities -, federated – i.e. linking local and/or sectorial verticals -, open – i.e. open source - digital platform and thus the following main roles and interactions can be taken into consideration:

Platform orchestrator(s): the manager of the platform driving the strategic and operational framework, stakeholder interactions and the architecture of the platform and the resulting ecosystem. In view of a *federated approach*, we may expect multiple platform orchestrators, each focusing on a dedicated industrial region, cluster or branch.

Therefore, we can also expect the role of **Platform operator**: the actual NIMBLE service provider, hosting the platform and enabling multiple orchestrators to run their businesses independently and, if relevant, linking among them (multi-tenancy, PaaS approach).

Platform infrastructure supplier(s): the technical infrastructure providers (communication, IT, software, systems integration, and developers) who build, manage, monitor and deploy the underlying technology of the platform. They can or cannot correspond to the platform operator and generally there could be many of them, each focusing on different technical aspects.

Moreover, in view of an *open platform*, we can also expect the role of **Platform tool and service developers**: technical organisations that are interested in the creation of added-value tools and applications to be added to the platform (e.g. starting from the platform core services/APIs).

Platform end-users: i.e. manufacturing companies – in particular SMEs, but also OEM (Original Equipment Manufacturers), large manufacturers, service providers - connecting to the platform to seek (consumers) or offer (producers) services or products.

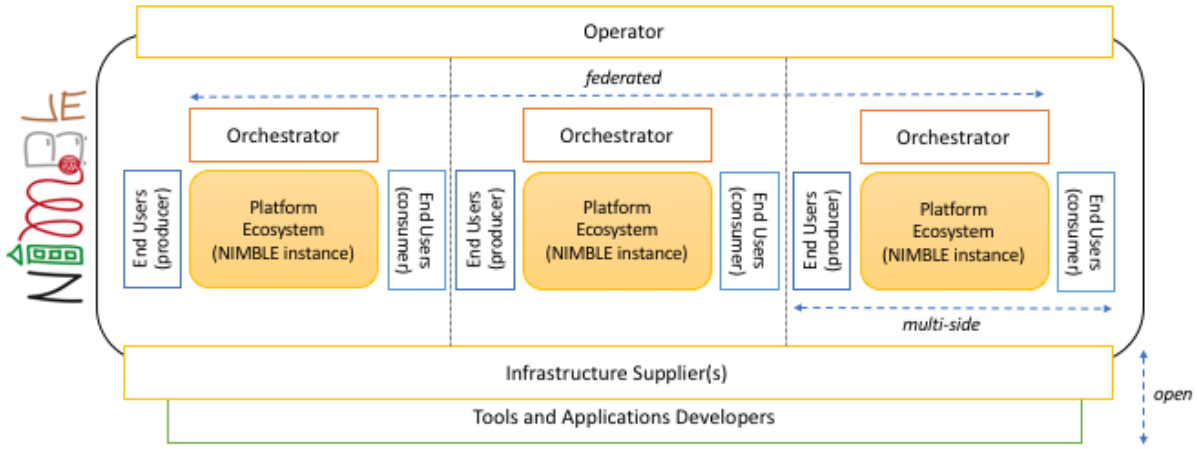

Figure 4 - Platform ecosystem(s) roles and interactions

The platform enables NIMBLE stakeholders to take very different roles across the ecosystem and any one actor can play multiple roles within a platform ecosystem – or even different roles across multiple ecosystems simultaneously.

Business model development activities will study the different possible strategies for the NIMBLE exploitation, by assigning different platform role(s) to the NIMBLE consortium partners. This will also include the definition of who will be:

- The platform customers: for example, we expect that platform end-users will pay a fee to either the platform orchestrator or the platform operator; but, also the platform orchestrator can pay a fee to the platform operator.
- The platform owner: most likely the platform orchestrator and/or operator will be the platform owner. However, alternative approaches should not be excluded at this stage. For example, in case of an industry association that acts as platform orchestrator for its members (manufactures companies), the latter could be both the platform owners and users.

3.2 Manufacturing supply network stakeholders

The first, relevant target group for NIMBLE includes all stakeholders of a manufacturing supply network, including:

- *Suppliers*: they are the first step in the supply chain as they provide manufacturers the raw materials needed to manufacture goods.
- *Manufacturers* - They transform the raw materials into manufactured products which will be further sold to the end users.
- *Logistic Operators* - They are links in the supply chain which move the manufactured products whether via road, air or sea.
- *Distributors* - They distribute the manufactured goods from the warehouse to the retailers.
- *Retailers* - They are the final step of the supply chain.

All of them can benefit in the same way of the NIMBLE solutions as producers and consumer end users. **All of them are looking for affordable B2B services enabling them to**:

Table 1 –Manufacturing supply network stakeholder expectations (general needs/expectations)

Needs/Expectations	Current Behaviour
Enter new markets with larger and more lucrative customers.	Expanding the business to new, international markets is difficult and requires fast adoption of new knowledge where the development of an international ecosystem facilitates the potential of successfully exporting products to new markets where the business and products are adjusted to wants, needs and requirements in the specific market. Many companies currently operating on international markets or aiming at new markets have limited networks and resources to identify and maintain effectively collaboration partners.
Increase their business wealth, knowledge and strength within the existing market.	There are currently no solid mechanisms that can deal with the issue of bringing together all relevant information for further analyses and correction in the existing business value chains. For example, knowledge collected from after-sale activities are not efficiently fed back to product development and manufacturing so that they can take countermeasures when an issue and/or lack of end-user satisfaction is detected.
Create and develop effective partnerships and business collaborations.	Currently, the collaboration between the external and internal actors is fragmented, with loosely coupled islands of information attached to the specific products. - There are currently no solid feedback mechanisms that can deal with the issue of bringing together all relevant information for further analyses and correction in the value chain.

In this context, however, we should consider that platforms like Amazon, Apple, Uber, etc. have fundamentally changed the customer experience: by offering the right products and services in the ways that modern buyers prefer, they have completely reset customer expectations. This means that the bar for securing customer loyalty is not just higher for those companies, but for all companies, regardless of business model (B2C or B2B). The shift started with B2C firms, but today even B2B customers do not stay loyal to a brand when expectations are not completely met.

Therefore, the achievement of the three needs/expectations listed in the table above requires an adequate digital transformation of the involved stakeholders. Specifically, what needs to be hugely improved is the range of ready-made and easy-to-use B2B services that can be utilised by manufacturing supply network stakeholders, when interacting with each other, and with customers. In the future, the majority of consumer products will be "smart" and "connected". For many manufacturing enterprises, this poses a dual threat:

- *Will my products be accepted in the market if they do not provide connectedness?*
- *Will my firm be visible in the market if it is not wholly connected via its processes?*

In both cases, smartness and connectedness are provided by ICT and will most likely be hosted in the cloud. But the manufacturers' current expertise lies mostly in the physical properties of the product, and in the human-managed processes of the company.

Ideally, NIMBLE end-users should be **manufacturing supply network companies with multiple data sources** (including legacy systems and/or IoT streams) **that aim to exploit them to enhance their customer experience and stand out from the crowd**. In this view, the following table **reports additional needs and expectations** of this target users group.

Table 2 –Manufacturing supply network stakeholder expectations as end-users (additional NIMBLE end-user expectations, source: NIMBLE use case analysis, see Section 7)

Needs/Expectations	Current Behaviour
Proactive engagement	Historically, manufacturing supply chains have been largely paper-based and highly regulated. But today, digital supply chains can enable businesses to become more proactive rather than purely reactive, and offer a more customer-centric experience.
Transparency and traceability across the value chain	Relevant information is usually kept in silos of individual entities. This limits the possibility of creating added-value service and customer trust. In addition, companies do not have tools for keeping track of the right information in the right place and to provide it at the right time to reduce redundancies in the product and information.
Overcoming heterogeneous data	Currently there are many data sources and data in different formats. Data handling is currently dominantly operated manually, involving many parts of the value chain and many different tasks. Market expansion calls for new information management in the supply chain and a need for transforming the current manual work into a digitally automated flow.
One face to the end customer	Today, most manufacturing companies (in particular large enterprises) are organized around product lines or business functions that run in silos. Each silo operates as its own business, owns a data storage tool and in many cases, data is not shared across the organization. This results in operational inefficiencies that alienate customers and hinder their interaction with the organization. This type of structure has historically reduced cost of the manufacturing process, but doesn't necessarily improve the perception of a brand – and can thus result in poor user experiences.
Simple and Cheap	Manufacturing companies (in particular SMEs) find business processes software too complex to manage and in many cases also too expensive.

In more detail, and to prioritize the marketing and commercialization activities of the project, we currently segment the manufacturing supply network user group according to company size:

Table 3 –Manufacturing supply network stakeholder segmentation

Segment	Description	NIMBLE priority
SMEs	SMEs have many limitations in resources such as human, capital and manufacturing equipment. This prevents SMEs from investing in information systems and other infrastructures in order to enhance product quality and efficient management. Scarce resources and lack of expertise in some technology areas are also the reason that SMEs can rarely accomplish research and development activities by themselves. This also results in a lack of ability to directly compete against large enterprises, making SMEs more vulnerable to environmental changes of the market and offering them fewer opportunities to expand, compared to larger enterprises.	The **most important segment** to build a strong relationship with, in terms of: (i) Numbers and possible impacts - the 20 million SMEs in the EU represent 99% of businesses, and are a key driver for economic growth, innovation, employment and social integration. (ii) Expected benefits – with cloud-based solutions, IT operations, maintenance and support can be shifted to experts whilst costs are moved from CapEx to OpEx, and the Total Cost of Ownership (TCO) decreases drastically. Most NIMBLE users are expected to be from this segment.
Large Enterprises	Differently to SMEs, LEs have sufficient resources to develop their own, ad-hoc ICT solutions. In their supply network, they are usually linked with multiple SMEs, which need to be compliant with their systems/solutions. They act as a central hub in a supply network. They can be attracted by the recent digital platform revolution to extend their presence and visibility and possibly attract new SMEs.	**Good segment**, **important as well from a strategic point of view**. They can drive the platform adoption since, if they join, linked SMEs will join too (network effect). In addition, the NIMBLE solution can represent for them an affordable and less disruptive way to integrate/complement their own, ad-hoc solutions, facilitating the connection with new linked companies. Some NIMBLE users are expected to be from this segment.

3.3 Manufacturing B2B service providers and intermediaries

In addition to the core stakeholders of a manufacturing supply network (discussed above), we should consider a second relevant target users group, including all organizations (profit and non-profit) that facilitate companies (particularly SMEs) in growing their business. They offer middleman/brokering services at different levels, for example including:

- Promotion and internationalization activities for their customers/members.
- Fostering communication and matchmaking among different business organizations.
- Support their customers/members in developing new supply networks (e.g. sourcing, supplier, logistic management).
- Support the digitalization (and generally the skills development) of business organizations.

This target users group can be interested in NIMBLE solutions as Orchestrators (in case of big organization, they could also be Operator). In fact, they already manage a network of contacts (i.e. an ecosystem) and they are looking for effective, scalable means enabling them to:

Table 4 - Manufacturing B2B service providers and intermediaries expectations

Needs/Expectations	Current Behaviour
Scout and engage valuable business organizations and support them properly.	Advertise and market the provided services; Visit fairs and exhibition; Participate in workshops; Access to networking websites for professionals.
Increase the number of members that join their network/ecosystem, including customers/members located in geographically distant areas (i.e. not only local firms).	Create their network/ecosystem website; Participate in sectorial fairs and exhibitions, workshops; Advertise and market the network/ecosystem activities through newsletters, campaigns, etc. Access to networking websites for professionals.
Facilitate the exchange of information among customers/members.	Use emails, chats, audio and video call applications and teleconference applications; Use communication platforms; Arrange dedicated physical events.
Perform matchmaking among customers/members to create new business opportunities for them.	Seek and read customers/members' profiles and brochures in order to find possible connections; Use emails, chats, audio and video call applications and teleconference applications to enable the meeting among selected organizations; Organize ad-hoc workshops and events.
Statistical analysis of activities/sectors at a micro (local) and macro (global) levels of the network/ecosystem.	Consult the online databases of the statistics offices and use their online statistical tools; Download data from the online databases of the statistics offices and analyse them; Interviews for customers/members for collecting local data.
Disseminate material, suggestions, strategic guidelines, training and best practices.	Publish on specialised journals, newspapers, magazines, websites; Promote and organize workshops.

It is worth highlighting that B2B service providers and intermediators are quite heterogeneous organizations: they can act locally (specific nation, region, geographical area) or globally (e.g. EU or US market); they can focus on specific industry verticals (e.g. wood manufacturing) or being general purpose. In addition, they can be private initiatives (really focused on marketing and business development, consulting activities) but in many cases are public-funded or institutional associations (e.g. industry associations/corporations).

Therefore, in order to prioritize the marketing and commercialization activities of the project, we identified the following segments:

Table 5 - Manufacturing B2B service providers and intermediaries segmentation

Segment	Description	NIMBLE priority
Private B2B service and platform providers, such as: http://holz.fordaq.com/ http://www.mercateo.it/ https://www.3dhubs.com/ https://www.tradegecko.com/	Their aim is to support their customers in expanding their business, by linking them to possible partner and/or develop a supply chain for them. They can be vertical (sector-specific) or horizontal. Some of them already developed a web platform for browsing organizations or, in some advanced cases, matchmaking requests with offers and added-value services.	As private entities, they can have resources to invest in order to make more advanced and appealing their offerings with NIMBLE solutions. Therefore, this can be a **key segment** for the project. According to their dimension, they could be interested to be an orchestrator or the operator.

	They are funded by their customers.	
Industry trade associations and corporations	Their aim is to offer promotion, internationalization and business opportunities to their members. They are vertical on a specific industry sector. Usually, they are national association, but they have regional/local units that are quite autonomous. They also have EU level representatives. They are quite traditional in terms of business service offering (i.e. not using advanced ICT solutions), although the innovation level could change from region to region (e.g. North Europe countries could be more advanced on their offering). They are funded by their members.	Similarly to the previous segment, they can have budget to invest in innovative solutions, but it should be demonstrated a clear benefit for their members. In some cases, the investments should be approved by the respective management boards. In any case, we can user them as a mean to promote NIMBLE to their members. Therefore, we can consider this as a **very relevant segment**, although the actual engagement with them could be quite slow and elaborated.
National, Regional and Local innovation and business development agencies	They are the public funded agencies that aim to create awareness, facilitate the development and in some cases implement the EU and National policies about business development. Usually they are horizontal on many sectors (although there could be some sector-specific units).	One key element of recent policies is the digitalization of SMEs, therefore they can be very interested to enhance their offering with some of the NIMBLE services. In any case, they can act as NIMBLE promoter. Therefore, we can consider this as a **relevant segment**, although, given that they are public funded, the actual budget availability can be different from region to region (depending on the National funding directives and investments).
Technology-specific (SMEs) communities and cluster	In this segment, we can consider all initiatives/networks that link different companies (in particular SMEs) that share a common industry sector or an area (e.g. technology parks). Differently to industry associations and corporations, they are less structured and usually don't have large budget to manage. Their main objective is simply to link and share information among members. In some cases, they are funded by their members (usually the fee is quite low).	Given their budget limitations, they can mainly act as promoter of the NIMBLE solutions. Therefore, we can consider them as a **good segment**.

3.4 Digital platform and infrastructure providers

Digital platform providers are companies and organizations that offer open or private digital solutions for many classes of applications (marketplaces, supply chain management, IoT, etc.), business models (B2C, B2B and B2B2C) and verticals (manufacturing, transportation/logistic, smart cities, etc.). The responsibility of the platform provider is to manage the system to which their customers can connect, on which service providers can build their services to serve service requesters and on which technology providers can position their components for use in delivering a service. This class of stakeholders is large and heterogeneous, but mainly includes software companies that:

- could already have a platform in the manufacturing sector and aim to extend/enhance their platform offering;
- don't have yet a platform in the manufacturing sector but could be interested to enter this market.

In addition, we can consider the infrastructure providers. These are companies that provide hardware resources, communication infrastructure and other virtualized resources required for hosting digital platform solution, and supporting (on demand) the dynamic adaptation of hardware resources up to the appropriate scale. This role is performed by any company providing hosting services (IaaS), e.g. companies with big data centres, cloud and grid computing providers etc. Therefore, they usually are suppliers of platform providers, but they could decide at some point to enter such a market.

Therefore, this target group can be interested in NIMBLE solutions as Platform Operator and/or Infrastructure Supplier. The table below reports needs/expectations of this target group to enter or extend their offering in the digital platform market and the respective motivation for adopting or supporting NIMBLE:

Table 6 - Platform and infrastructure providers expectations

Needs/Expectations	Motivations
Reduce the cost for complement/extend their current platform/cloud offering. Abstract underlying technology complexities (e.g. IoT, data heterogeneity, standardization, etc.).	Software companies are not willing to start new developments or technologies, without a clear opportunity/demand, such as a paying customer. However, this approach usually leads to private, ad-hoc solutions with limited opportunity to be re-used. Ready to use, advanced solutions, based on mainstream technologies, can attract software companies that are willing to enter a new market.
Revenue sharing in the marketplace.	Hosting a dynamic business ecosystem is not only a way of ensuring a higher demand of services and resources for a platform provider. The one-stop shop mechanism provided in marketplaces will attract service providers to develop and deploy applications in the platform. A revenue sharing mechanism could help platform providers to retain a part of the incomes generated by the different stakeholders in the value network. This additional revenue streams may represent an important source of revenues for the platform
Platform extensibility / adaptability. .	The available market of digital platforms is highly dynamic, and there will be always customers requiring different/additional features. This calls for the provisioning of easily adaptable and extensible technologies, as well as the possibility to involve third parties' technology/service providers.
Scalability on demand.	In the digital platform era, this is a pre-requisite. Platform providers aim to target the global market, but with a gradual, incremental approach. First phases will focus on early adopters to test the effectiveness and viability of the platform, then there will be a fast (as fast as possible) growth of the user base.
Control and monitoring of deployed solutions	Trustworthy platforms should guarantee precise levels of service operations, e.g. including availability, security and privacy, traceability. Therefore adequate control and monitoring mechanisms need to be available.

The following table summarizes a first segmentation of the platform and infrastructure providers target group.

Table 7 - Platform and infrastructure providers segmentation

Segment	Description	NIMBLE priority
System Integrator	They aim at developing vertical solutions; i.e. a customised solution for a customer or domain specific systems, such as ERP, Supply Chain Management, IoT and Industry 4.0 systems. Systems may range from limited data collection and analysis to comprehensive end-to-end application solutions. As a dimension, system integrators range from SMEs to Large Enterprises. Larger enterprises such as SAP, IBM, Oracle, etc. have been first movers in this space as they have the most to gain from automating existing complex manual processes. However, their solutions are currently mainly targeted at large companies, leveraging their prior vertical applications.	System Integrators can enforce their market position (or enter the market) by e.g. creating and then providing advanced B2B platforms, based on the innovative NIMBLE capabilities. Therefore, they are a **key segment** for NIMBLE. In particular, SME system integrators could largely benefit from ready-to-user NIMBLE solutions.
Cloud Platform Provider	They offer computing resources for enabling cloud solutions. They can be categorized as service providers (e.g. cloud manufacturing solutions) or infrastructure providers (e.g. AWS EC2).	Although it is not likely that IaaS and SaaS providers will transform their service stack into PaaS services, many of the current cloud providers are starting to complement their offering with PaaS capabilities. NIMBLE can be an opportunity for them to make this change. Therefore, they are a **very relevant segment.**
Network Operator	The network operators offer the capacity of a communication network to transfer data within a company and between linked companies in the supply chain. They can also act as system integrators and cloud platform providers. But this platform must be clearly open to third parties, in order to provide alternative solutions using the specific telecommunications infrastructure.	Similarly to large system integrators and cloud platform providers, the engagement of network operator could be difficult. Therefore, we should consider this as **a good segment**, since the opportunity to involve a network operator will be limited.

3.5 Technology and Service Providers

The technology and service providers are another relevant target user group of the NIMBLE platform, since that they can develop additional modules and services that can be deployed on the platform and, thus, contribute to its continuous development. For instance, companies can develop software services and modules, based on the core services of the platform (e.g. accessible via APIs), to implement a new tool for platform customers. Moreover, technology providers can make use of the open source approach of NIMBLE to develop platform extensions (e.g. extensions of core services) and plug-ins (e.g. enabling the interconnection with specific legacy systems).

Therefore, this target group can be interested in NIMBLE solutions as Platform Tools and Applications Developer. The table below reports needs/expectations of this target group to enter or extend their offering in the digital platform market and the respective motivation for adopting or supporting NIMBLE:

Table 8 – Technology and service providers expectations

Needs/Expectations	Motivations
Promotion Sale channels	Digital platforms are an opportunity for many service and technology providers (in particular SMEs) to gain access to more customers and showcase their solutions (e.g. to other companies).
Open platforms	Existing platform providers tend to impose a closed set of technologies. With an open, cloud platform (open source and/or open APIs), service providers are allowed to use a predefined set of well-known technologies in the cloud as building blocks, while technology providers will be willing to adapt other mainstream technologies and provide them in the platform ecosystem. This way platform providers can host more offerings and service providers avoid lock in.
Faster developments Fewer bugs Richer applications	Service and technology providers rely on specialized staff to work on the deployment and management of their solutions and applications and concentrate on their real business: the development of software should be fast and agile, rapidly leading to robust and added-value applications. SDK and API interfaces of cloud platforms are the baseline elements, but more comprehensive IDEs are the perfect tools for innovation-driven companies.
Horizontal scalability	Service providers look for scaling environments, elastically based on specific business demand. In this way, they can progressively grow in terms of customers and have direct control of costs.
Budget friendly services monetization	Service providers usually look at the cloud as a way of reducing costs, transforming CAPEX into OPEX or reduce risk. The cloud is also an opportunity to leverage a set of different business models that will help them to monetize their applications and services: pay per use in the applications and services, revenue sharing between different collaborating providers, subscriptions, advertisements, etc. Beyond the support of different business models, the marketplace may represent a single point for trading applications, integrating all the functionality required, from the specification of the offering to the billing and payment of the services.

Similarly to the platform and infrastructure providers, several organizations can play this role. Actually, the identified segment of system integrator can also be a segment for this target user group. However, the following seem to be the most relevant segments:

Table 9 – Technology and service providers segmentation

Segment	Description	NIMBLE priority
Web entrepreneurs, start-ups and freelance developers	Entrepreneurship, start-ups are a key trend in Europe now. Entities (people and micro-companies) in this segment usually develop applications and technologies within tight budgets, by making as much as possible use of existing resources and service (APIs) to create innovative solutions.	NIMBLE platform can be an ideal solution for fostering innovation. Therefore, this is a **very relevant segment** for NIMBLE. Enterpreneurs, freelance developers and start-ups can be invited to develop value added services on top of the platform.
Established software SMEs	Many established software SME companies offer manufacturing, SCM and more recently Industry 4.0 solutions. They usually have their specific solutions and strongly rely on mainstream technologies.	Similarly to the previous segment, also established SMEs can see NIMBLE as a starting point for innovate. In addition, they can develop platform plug-ins to link their specific solutions (e.g. an IoT solution for factories) to a B2B platform

		and thus have an additional sales channel. Therefore, this is also a **very relevant segment** for NIMBLE, also considering that they can invite their customer to join the platfrom (or vice-versa: manufacturing companies can ask their software providers to join the platform).
Technology research centres and universities	Industry 4.0 and all its enabling technologies (IoT, cloud, AI, data analysis, etc.) are some of the main research interests of many research organisations across Europe. They study and develop innovative prototypes that could enhance and/or specialise the NIMBLE capabilities.	In a medium/long-term view, this may represent a **good segment** for NIMBLE. In order to survive, NIMBLE has to grow and evolve in terms of capabilities. The cooperation with leading research centres could be a strategy for achieving this.

4 NIMBLE Platform

Novel industrial digital platforms will shift the supply chain management from controlling costs and driving efficiencies (existing SCM systems) to addressing customer demands for mass customization, adapting to dynamic markets, and embedding innovation wherever possible. Platforms have unlocked the power of data, converting it from distributed islands of data locked in local systems and equipment to a powerful currency creating new products, markets, and economics. They are changing the very nature of how things are made and how business works.

In this context, NIMBLE aims to develop and validate a novel cloud-based real-time and easy access middleware that will facilitate identified stakeholders in the future manufacturing supply network (see Section 3) to consume end-to-end manufacturing services encompassing domains of collaborative manufacturing.

The picture below provides an overview of the main elements of the NIMBLE platform.

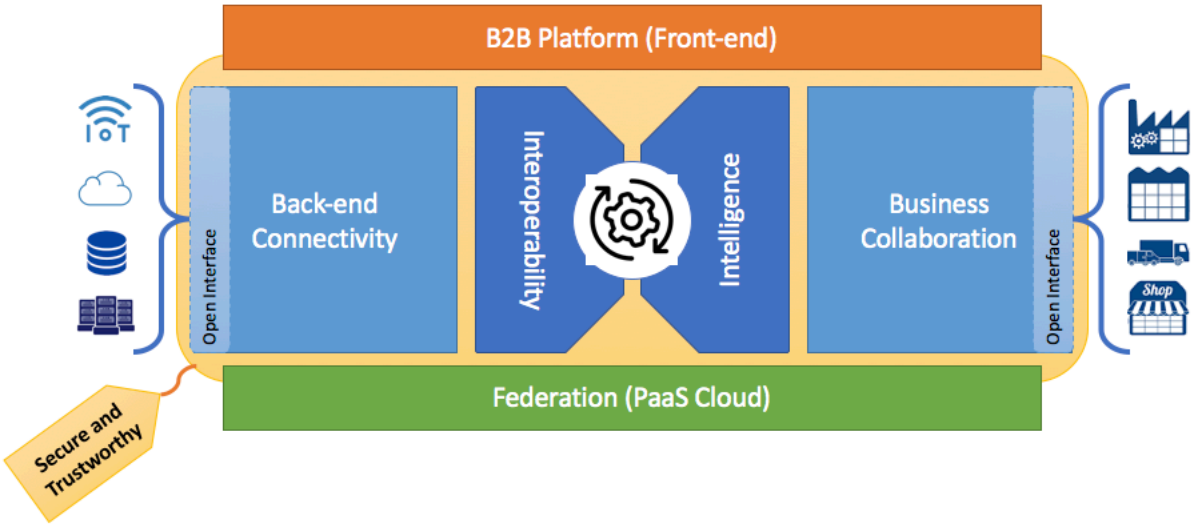

Figure 5 – NIMBLE B2B Platform: overview of main elements.

The platform will be a manufacturing **B2B service delivery framework**, which at the same time will be interoperable, smart (proactive), open (extensible/adaptable), trustworthy and secure**.**

Business Collaboration services will enable companies to

- register & publish manufacturing services;
- search for suitable partners;
- negotiate contracts & supply logistics;
- define private information channels for data exchange.

Back-end Connectivity services will abstract from company-specific data sources - in particular IoT solutions, but other data sources can be connected too - and support the exchange of data between supply chain partners, regardless of their heterogeneous nature.

Both collaboration and connectivity modules will be **open for third parties** to either develop new ways to connect data sources to the platform or create added value collaboration services to be offered to supply chain partners.

At the core, **Interoperability and Intelligence** services will make use of semantic modelling and description of involved resources (data), interactions and business processes to offer an ideal information-sharing platform for performing planning, traceability, and execution in supply networks, as well as to assist in making business decisions, supply optimization and monitoring.

All of these services will operate in a **Secure and Trustworthy** cloud environment, which has the ability to:

- model trust and privacy/security requirements in a multi stakeholder supply network, joining data and services of multiple enterprises;
- enforce security rules expressed in terms of roles and permissions on shared data and services;
- tracking and verifying trust-related variables and, for example, filter services according to the respective company reputation.

These elements are designed to encourage more collaboration and trusted data sharing within manufacturing supply network.

Finally, the NIMBLE deployment will open up possibilities to exploit the cloud infrastructure using the PaaS paradigm for platform providers to form a **Federation** of NIMBLE platforms and give different sectors or regions a platform for B2C, B2B and manufacturing collaboration that can be customised for them. Specialisations and localisations need to be enabled, to support national laws, regional practices and different languages. However, semantic interoperability services will ensure global collaboration with other platforms or NIMBLE federated instances.

As a result, the cloud approach will also facilitate dynamic service instantiation and consumption through a pay-per-use model whereby manufacturing service providers as well as consumers could come together and find new business opportunities for servicing operations in the value chain.

4.1 Core Services

The NIMBLE platform is a customization of an openly available PaaS infrastructure (Cloud Foundry), making it more suitable as a platform to serve the B2B/supply chain domains, con-

sidering especially the security requirements and potential scalability, extension and federation needs towards vertical sectors / countries.

Most of the platform components operate within such a cloud environment and they are developed by following a **microservices architecture**. Such an approach eases the task of long term maintenance and evolution of a large system, when compared to a monolithic system, and thus contributes to address adaptability and extensibility of the platform. In addition, the microservices architecture is distributed in nature and therefore supports scalability.

Specifically, NIMBLE will offer the following core (micro)services, grouped by the main components depicted in Figure 5 (see also D2.2).

Table 10 – NIMBLE Core Services

<table>
<tr><th colspan="3">B2B Platform Front-End</th></tr>
<tr><td colspan="3">Graphical user interface services
Requests dispatching to underlying services</td></tr>
<tr><th>Back-end Connectivity</th><th>Interoperability & Intelligence</th><th>Business Collaboration</th></tr>
<tr><td>Data Sharing Service
IoT Data Processing Service
IoT Data Analytics Service</td><td>Identity Service
Catalogue Service
Matchmaking Service
Communication Service
Business Process Service
Product Lifecycle Service</td><td>Register on platform (Person | Company)
Publish (Catalogue | Product | Service | Configurator)
Search for (Product | Service | Company | Person-in-role | Configuration)
Negotiate for (Product | Service | Contractual Terms) → Contract
Specify B2B data sharing rules as part of Contractual Terms → Platform data channels
Execute (Business-Process) according-to (Contract)
Monitor (Business-Process) according-to (Platform data channels)</td></tr>
<tr><th colspan="3">Federation</th></tr>
<tr><td colspan="3">In addition, the following platform management services will be available as part of the cloud PaaS approach:
Audit (Transactions) of-Company (Buyer, Supplier, 3rd Party)
Show platform dashboard (# of Companies, # of Transactions, Trading Volume, …)
Show platform security dashboard (# of Incidents, Risk Volume, Threat Vectors, …)
Manage user feedback (all user-facing functions should provide usability statistics and a back-channel to the development team)</td></tr>
</table>

4.2 Additional Cloud Services and Custom Tools

Developers may interact with the platform by using a **comprehensive API set**, giving them the possibility to extend the core services of the platform with value-added services and new tools for platform customers.

The API set will mainly include access to back-end capabilities, but also business collaboration and federation interaction will be made possible via APIs as well.

Specifically, new value-added services can be published in the platform as part of a **cloud service marketplace,** in order to be traded on the platform and generate revenues for the developers (3rd party service providers); this may include additional services for:

- benchmarking and estimation on lifecycle costs;
- ecological footprint analysis;
- IoT-enabled service definition and publishing;
- supply chain analytics.

Moreover, platform owners can decide to enrich one NIMBLE instantiation for a specific vertical/region/cluster with **custom tools;** i.e. addressing some customer-specific requirements. For example, as part of the project piloting, the following additional tools are planned to be integrated:

- Product End-of-Life Tool (MICUNA use case): A company is interested in managing the product End-Of-Life (EOL) and this can be done with two approaches. On the one hand, the manufacturer may offer a renovation of a used product (e.g. replace the cot by a child's bed), at a discount in the new product and support in the furnishing of the room, while on the other hand, some products can be donated to NGOs and charitable organizations to give them a second life.
- Product Configurator (Lindbäcks use case): The customer of bathrooms is able to make changes on the features and properties of a bathroom that will be part of the flat in a future eco house. This will be realized by a bathroom configurator linked to the NIMBLE platform.
- Product Avatar (Whirlpool use case): Offering a product Avatar for easy access to data, information and analyses from a single point, i.e. the NIMBLE platform, assuring for smooth exchange of information and knowledge sharing. The avatar should cover all critical product quality related information from one single user interface: the user will access the system inserting the serial number of the product and will retrieve in real time all the information associated to it.

4.3 Platform Assets

At the end of the NIMBLE project, the following assets will form the basis of the NIMBLE unique, innovative offering. Specifically, the first three assets are the actual product package that will be the main objective of the present business planning activity. The remaining assets are the main innovative components of the NIMBLE platform that could be also exploited separately by the project partners (this will be the objective of exploitation plan reporting).

Table 11 – NIMBLE main assets

Asset	Description	Innovative aspects
Platform Package		
The NIMBLE Platform	Complete, ready-to-use cloud platform including built-in core and some exemplary advanced services	It is all about integration, combined with intelligence aiming at frictionless transactions. It is a platform provided as a Service (details are reported in Section 4.4 below)
Platform launch kit	Open APIs, Platform instance launch guides, tutorials, NIMBLE-specific configuration of cloud infrastructure and middleware	
Developers (3rd parties) facilities	A cloud based environment for managing whole lifecycle (design, development, deployment) of cloud services (DevOps Center), Reusable constructs for development of cloud service specialized to industry	

Asset	Description	Innovative aspects
	Cloud Services Marketplace	
Core Services		
Collaboration	Product / service catalogue publishing, discovery, Business process design and execution, Product lifecycle management, Data sharing and negotiation	NIMBLE is the first of its kind platform connecting two distinct worlds: digital platforms (e.g. eCommerce) and B2B/SCM communication platforms.
Back-end Connectivity	IoT integration module Legacy/Collaboration Data Microservice architecture with distributed data stores	NIMBLE will enrich B2B/business collaboration tools with real-time and batch data sources from integrated companies Scalability
Interoperability and Intelligent (smart) services	Federation-aware APIs	Core services for discovery and collaboration capabilities are federation aware. Even though platform instances are specialized on various aspects, users of these instances can interact with other instances as far as the core services allow.
Enabling Technologies		
AI / Semantic Technologies	Apache Marmotta RDF triple store for ontologies, semantically annotated product catalogues and as a Linked Data Server	E2E Communication on the basis of linked data principles
IoT	MQTT, NodeRed, other IoT protocols	M2M communication on the basis of open IoT protocols and platforms, in contrast to proprietary M2M management.
Semantic data models and mapping	Standards-based B2B interoperability guidelines, Semantic representations for objects / products / processes, Semantically aligned sector-specific data models	Standards available in the form of machine-readable ontologies / taxonomies
Security Framework	Trust and reputation mechanisms on multi-sided platforms Best practices and recommendations for on security measures of federated cloud platforms; Incorporating GDPR regulatory lens; Trust and reputation mechanisms for multi-sided platforms;	Game theory-based methods for security optimization and reputation
Use case-specific tools/services		
Product Configurator	Tool for fast product configuration, according to multiple variables.	We anticipate a move from static catalogues to dynamic product configurations on-line, with close connectivity to ERP and production.
Product Avatar	Third party support for product lifecycle management	“Digital Twin” for products and processes
Product EOL Tool	Specific products can be donated to NGOs and charitable organizations to give them a second life	A new innovative service to take care of the furniture product EOL. MICUNA as manufacturer searches for NGOs and charitable organisations located in specific countries and geographic areas depending on the product distribution plan. After this, the company negotiates the condi-

Asset	Description	Innovative aspects
		tions with the NGOs similar how to negotiate with providers.
Product Manufacturing Specifications according to National Legislation & Regulation Service	Service to find documents about normative, legislation, patents and sectorial reports based on relevant parameters in order to support SMEs to enter new markets or new products according to national specific requirements	There exists specific information from Standards Bodies but not directly linked to a furniture product in any B2B platform.
Complementary Assets		
Collaborative supply chain service, models and practices	Feasibility / impact assessment toolkit, New collaboration patterns, new practices on supply chain optimization, new business models proven in four use cases	Adapting business models by setting parameters on the platform
Collaborative and integrated supply chain practices	Modular business process templates provided as cloud services Best practices on integrating manufacturing and logistics processes	Access to modern SCM technologies even to small enterprises, thus enhancing their economic impact

4.4 Distinct Values

From the table above, the following distinct values of the NIMBLE solution emerge:

It is all about integration…

Modern business is based on information. This information is traditionally located in separate data silos – different business applications, built for different purposes at different times, owned by different organizations or departments, and developed with different technologies. The overall business process of a supply chain requires utilizing and updating data across these different systems, and typically this requires an extensive amount of manual, error-prone work.

It is indeed our hypothesis for NIMBLE that the platform reduces the manual work and associated errors to a minimum. It can connect different systems, regardless where they are located or what technologies they have built on, and make the information exchange between the systems automated between enterprises, so that they can just focus on building and developing their business processes further.

NIMBLE capabilities make it possible to combine traditional batch-based transfers with modern event-based protocols including large-volume IoT scenarios: supply chains can combine legacy with modern interfaces available, as well as easily connect across protocols with systems, applications, technologies, partners, and more.

NIMBLE will demonstrate the connectivity with some legacy and IoT systems from use cases partners, but its modular interoperability services with flexible plug and play functionalities will open to future integrations for new Legacy or IoT system's data. In other words, NIMBLE provides adapters and makes it easy for 3rd party developers to create connections to both on-premise and public cloud software applications.

…combined with intelligence…

Connectedness will provide unprecedented information visibility and the real-time ability to touch/influence, resulting in an intelligent supply network and evolved operating models. Moreover, once the supply network is connected, analytics and smart services can provide the right information for decision making at the right time.

In this case, our hypothesis is that strong semantic models improve the chances of good matches between buyers and suppliers and that an equally strong, but easy to use query tool will give the participants the flexibility to express their needs in efficient and effective ways.

Semantic mapping services will automatically bridge data between formats and sources, and drive the process of searching for goods and services, negotiating delivery conditions and price, and closing a deal via the platform.

… aiming at frictionless transactions.

One of the defining features of successful platforms is that their design pulls the producers and consumers to the platform. To pull the participants to the platform it must provide tools to facilitate valuable interactions, which of course, reduces friction and transaction costs among the participants.

To achieve this, on top of the core intelligent services, the platform will provide tools to facilitate valuable interactions, and support different types of communications and collaboration activities and, thus, quickly integrate and accelerate business processes whether simple or complex. These tools involve modelling of the collaborative supply network workflows, sharing visibility of real time/batch data, execution of these workflows, monitoring of these workflows and events tracking, adaptation of the workflows when required.

It is a Platform

All businesses are different. Each organization builds its own business processes and modifies them as needed – changes in the operations, competition, and overall business environment cause changes in the way business processes are executed. Similarly, all the solution built with NIMBLE platform are always configured to fit specific companies' requirements.

Firstly, NIMBLE is a multi-tenant platform. This makes it possible for companies to manage and operate different parts of a business process in different tenants – for instance, your different companies in a supply network can create and operate their individual integration requirements independently.

Then, building upon the first three advantages (integration, intelligence, frictionless), companies can now create and operate their supply networks at speed, enabling information exchange between different parties based on their specific needs. The resulting supply network is able to scale. Beyond plugging in different partners and suppliers as needed, companies can scale down their operations to target niche markets/segments/customers, and/or target newer markets.

Moreover, NIMBLE is trustworthy by offering opportune security and privacy mechanisms for data sharing - selecting which level of privacy has to be applied - reputation, data provenance and an holistic approach for trust-driven product/service selection.

Finally, all key components of NIMBLE are open source with Apache 2.0 licence and based on existing, well known technology frameworks and standards, which is the best approach for enabling project partners and third parties organisations to quickly build commercial solutions based on NIMBLE.

Provided as a Service

NIMBLE's PaaS frees companies from the burden of owning and operating the required software and hardware that is needed to exchange information efficiently between different applications. The cloud-based solution is optimized to give the companies the best possible performance in all their specific business process scenarios, regardless of volumes or geographical location.

Deployed platform instances may be customized directly by customers' development team/organizations, but whenever necessary, project partners' architects and consultants can be engaged in assisting in creating the solutions.

4.5 Benefits for Target Users Groups

NIMBLE suits many kinds of needs of the identified target users groups:

Table 12 – Manufacturing supply network stakeholders

Benefit	Segment
Simple and cheap: a low cost, easy-to-access solution for supply chain network	SME
Lower costs: reduce the complexity and costs of manufacturing supply; lower administrative overheads.	SME
Rapid return on investment: immediate cost savings give a return on investment in under 12 months	SME
An effective showcase for business branding	SME
Business agility: immediate information on products and their availability will help you to select suppliers offering the best value for money and quickly respond to changes in customer orders.	SME
Efficiency improvement: providing a new cloud space for allowing the access to all the participants in the value chain to support their decisions and processes enhancement	SME
Faster deliveries: find the right supplier and send your order.	SME
Participate in a wider market: source from a larger network of suppliers, find new customers in new locations in Europe and beyond	SME
Save employee time: no more ringing around or waiting to send out manual email enquiries	SME
A secure environment to store relevant information (e.g. from legacy systems and IoT devices), enabling data sharing and data analytics in a safe way.	SME, LE
Interoperability: better connectivity between smaller enterprises and larger players, as well as between the manufacturing and aftermarket supply chains	SME, LE
Greater customer satisfaction: fewer errors, lower operational costs and faster response times lead to more business opportunities.	SME, LE
Data means knowledge: access to information from your business partners helps you to innovate and maintain competitive advantage	SME, LE
Improving efficiency in information flows in the supply chain and the traceability of the communications	SME, LE
Increasing visibility and sharing information from legacy and IoT systems between supply chain stakeholders	SME, LE
Internal systems can connect with the ICT platforms of all their business partners, irrespective of the platforms and software they use. New suppliers, even micro-businesses, can easily connect to the digital supply chain and meet the minimum e-business criteria of the larger businesses	LE
A reputation for innovation and business improvement	LE

Table 13 – Manufacturing B2B service providers and intermediaries

Benefit	Segment
Offer better services to their clients/members such as: - instantaneous connectivity to a much larger pool of potential partners, greater scope for offering a global service and scope for multiple digital business services; - a tool for faster reaction to market changes through supply network collaborative processes tools;	Private B2B service providers Industry trade associations and corporations
Real selling points in attracting new clients/members: when companies invest sums on software, compatibility with standards, flexibility and no 'lock ins' are all highly attractive.	Private B2B service providers Industry trade associations

	and corporations
Facilitate open manufacturing ecosystems, ensuring that any new entity which wants/needs to collaborate with others is able to exchange information through interoperability between the supply networks services and resources and third parties involved in the whole process;	Industry trade associations and corporations National, Regional and Local innovation and business development agencies Technology-specific (SMEs) communities and cluster
A reputation for innovation and business improvement.	Private B2B service providers Industry trade associations and corporations Technology-specific (SMEs) communities and cluster
Improving use and adoption of standards in different sectors, countries etc.	Industry trade associations and corporations
Improving development of close customer relationships and exchange through such relationships	Industry trade associations and corporations Technology-specific (SMEs) communities and cluster
Stimulate local entrepreneurship and thus improve the economic situation of a region/area	National, Regional and Local innovation and business development agencies

Table 14 – Platform and Infrastructure Providers

Benefit	Segment
Reduced Time to market: a ready to use cloud-enabled toolset which supports the optimization of manufacturing assets of SMEs and their supply networks.	System Integrator Cloud Platform Provider Network Operator
Increased average selling price and profitability margins	
Improved competitive advantage/market share	

Table 15 – Technology and Service Providers

Benefit	Segment
Reduced time to innovation and market	Web entrepreneurs, start-ups and freelance developers Established software SMEs Technology research centres and universities
Reduced service/application development costs	Web entrepreneurs, start-ups and freelance developers Established software SMEs Technology research centres and universities
Increased average selling price and profitability margins	Web entrepreneurs, start-ups and freelance developers Established software SMEs
Improved competitive advantage/market share	Web entrepreneurs, start-ups and freelance develop-

	ers Established software SMEs
Improved customer satisfaction	Web entrepreneurs, start-ups and freelance developers Established software SMEs
An effective showcase for business branding	Web entrepreneurs, start-ups and freelance developers Established software SMEs Technology research centres and universities

4.6 Barriers for Target User Groups

Generally, the following principles are perceived by digital B2B platform stakeholders as critical to building a **trustworthy platform ecosystem** [1]:

- Security and Privacy is essential as platforms operate on shared network infrastructures and handle increasingly valuable B2B transactions. This ranges from data security and safeguarding systems to threat analysis and cybersecurity techniques preventing hacker attacks. And it is a primary concern since, the annual cost of damage caused by hackers, malware and data breaches is roughly $3 trillion [2].
- Accountability which embodies three key components:
    - a platform must be reliable and functional as promised, which includes for example:
        - Risk of failure in integration / interoperability of existing databases/technologies and additional responsibilities in the interconnection (input/output) of existing industrial data.
        - Reliability and availability of services and applications to be available when they are needed; internet dependency so if the Internet connection temporarily fails companies will not be able to connect to the cloud services.
        - The communication does not arrive or arrives late or corrupted
    - its participants must comply with accepted standards, which can be challenging when operating at scale across a marketplace;
    - its operators must be held responsible if the platform fails to fulfil its promises. In this way, accountability lowers shared risks and encourages actors to further trust the platform.
- Transparency by providing stakeholders with meaningful ways to understand relationships, intent and outcomes. To achieve this, individuals need information on how relationships are structured and how data is being used to derive market insights and facilitate transactions. Additionally, transparency requires the capacity and oversight to audit algorithms across (and within) a platform ecosystem to confirm that delivered outcomes are accurate and that biases (intentional or unintentional) are not systemic.
- Auditability by verifying and monitoring transactions and data flows across an array of stakeholders and jurisdictions. It builds trust between parties by facilitating transactions and enabling efficient dispute resolution. The ability to definitively answer questions such as, “Who has what data and what right to use it in which ways?” and “How,

where and what transactions occur?" ensures that platforms are trustworthy, legal and reliable.

- Fairness is based on equitable value allocation and unbiased intended outcomes. Regulators and consumer protection agencies are focused on ensuring fairness and are increasingly vigilant about price discrimination, collusion and anti-competitive tactics. The very nature of ecosystems that depend on massive scale for efficiency in collaboration and innovation raises concern for policymakers about the boundaries between collaboration and collusion.
- Ethics is key to guiding stakeholders through potentially ambiguous and uncertain decisions. Unethical (or even illegal) activities can permanently damage trust in a platform and the brands associated with it.

In addition to trust, we should also consider possible user concerns related to:

- The **governance and sustainability** (technology improvements, commercial viability for long term operations, etc.) of the B2B digital platform (see also Section 5 – Market analysis).
- Actual **friction-less entry** (e.g. import of catalogues, link to legacy systems, etc.,) and **attractiveness to stay** (e.g. visibility, ROI, etc.) on the platform.
- **Localisation issues**, such as multi-linguality and national regulations.
- **Reluctance** of industrial companies to
  - **share real information** about the status of production and stocks
  - to **assume the risk of implementing innovative technology solutions** that have not been sufficiently tested and accepted in the market.

The following pictures illustrate relevant aspects in the choice of the right B2B marketplace, as it emerged from a survey with 240 retailers and manufacturers from 47 countries [3].

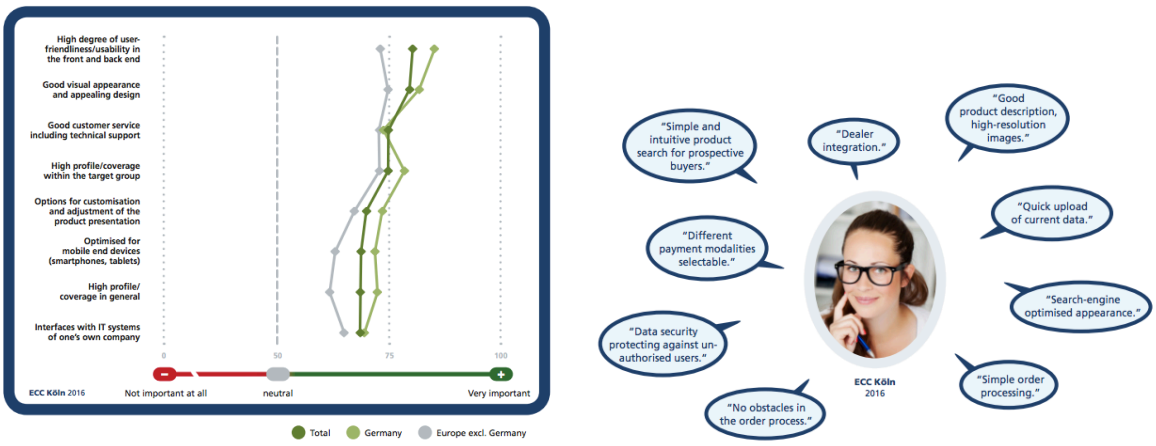

Figure 6 – Evaluation of central aspects of online B2B marketplaces

From the same survey [3], the picture below reports the perceived obstacles.

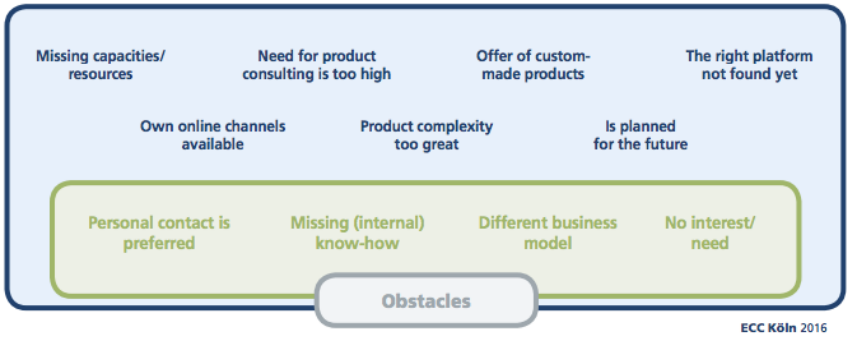

Figure 7 – Obstacles to the use of online B2B marketplaces

As part of the next steps, we will validate and refine this list of potential barriers, and we will highlight how NIMBLE will address them.

5 Market Analysis and Competitors Landscape

This section offers a preliminary assessment of the market in order to position NIMBLE's expected results that will be further extended in the next versions of the business plan. It is important to highlight the character of "preliminary" from two different points of view:

- all project partners will have an initial vision of the main market characteristics and will contribute to further refine the NIMBLE vision and positioning in the market;
- this is a reference point to guide exploitation and business planning activities which will take place within the WP8.

The assessment will follow an incremental approach, starting from the analysis of the most relevant technology trends (demonstrating the potential interest of target stakeholders) and then focusing on segments, dimensions, challenges and main players of the actual NIMBLE target market: B2B Digital Platforms. Specifically, we report about:

- Manufacturing Cloud Computing trends
- Industry 4.0 trends
- Manufacturing Supply Chain Management solutions
- B2B Digital Platforms

The following picture highlights (i) how each of the identified markets builds on top of the others (in terms of market specialisation and technology elements) and (ii) the positioning of NIMBLE platform at the top of the stack.

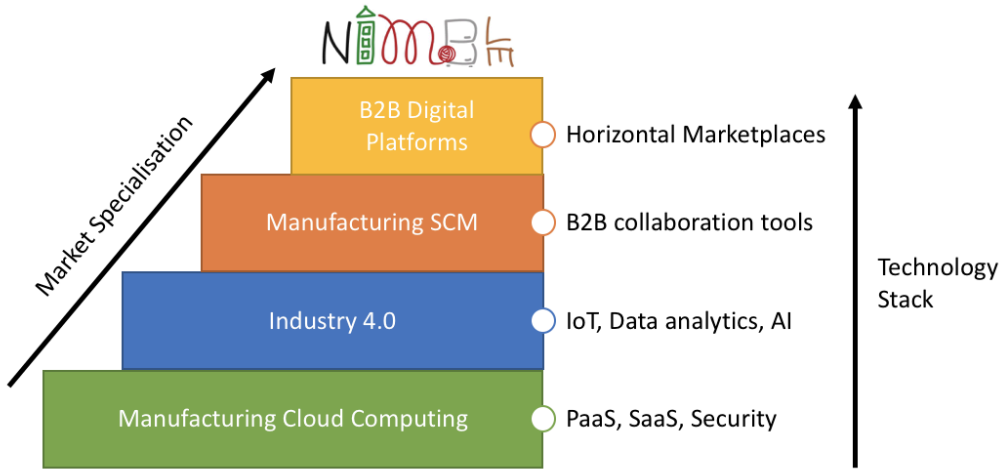

Figure 8 – NIMBLE target market(s)

Finally, in the last section of this chapter, we give an overview of the competitor landscape.

5.1 Manufacturing Cloud Computing

Cloud computing is in the process of transforming virtually every facet of modern manufacturing. Whether it's how manufacturing enterprises operate, how they integrate into supply chains, or how products are designed, fabricated, and used by customers, cloud computing is helping manufacturers innovate, reduce costs, and increase their competitiveness. Critically, cloud computing allows manufacturers to use many forms of new production systems, from 3D printing and high-performance computing (HPC) to the Internet of Things (IoT) and industrial robots. Moreover, cloud computing democratizes access to and use of these technologies by small manufacturers.

As a trend, cloud computing is already a reality for manufacturing business, and it will grow further in the next few years driven by
- *the combination with other trending technologies (e.g. IoT, big data, etc.)*
- *the growing interest of SMEs*.

Over 90 percent of global enterprises report using cloud computing in some part of their business [4]. Moreover, already in 2015, a study by market research firm IDC surveyed nearly 600 manufacturing enterprises from 17 countries and found that 66 percent of respondents reported using a public-cloud implementation for two or more applications while 68 percent were using a private cloud [5]. The study further found that these manufacturers expected to increase the cloud-services share of their annual IT budgets by 27 percent from 2015 to 2017 [6].

Most recent analyses show that cloud-hosted services are expected to account for nearly half of all organization level software usage among manufacturers by 2023 [7]. Market research firm Gartner estimates that what it calls the "cloud shift"—the transition from spending on traditional IT offerings to cloud services—will be worth $111 billion in 2016 and will grow to more than $216 billion in 2020 [8].

Moreover, **within the manufacturing sector itself**, a study by the Economist Intelligence Unit (EIU) found that 60 percent of survey respondents believe cloud computing will be "very important" in supporting production processes, while 54 percent respond it will be "very important" for better supply chain management, 52 percent believe so for enabling design and prototyping, and 48 percent for inventory, orders, and distribution [9].

According to Infoholic Research [10], the increase in IoT technology and big data in manufacturing industries will have an impact on the growth of cloud based manufacturing market. Specifically, manufacturers are continuing to adopt the smart devices in their business (internal and external) and raising the spending on cloud technology, IoT technology, big data, etc. The market is expected to grow at a CAGR of 22.9% during the period 2016–2022 to touch an aggregate of $131.15 billion by 2022**.**

Moreover, from the same Infoholic report [10], it appears that **SMEs are also realizing the benefits of the cloud technology adoption** in their operations. The SMEs are moving towards cloud adoption, which will help them to expand their business, improve their customer base, and increase productivity. The lack of skilled resources, infrastructure issues and investment are some of the challenges in the SME sector. But in the next few years, SMEs are expected to take the lead in the cloud based manufacturing market.

From a geographical perspective, American countries (with US, Canada, Mexico and Brazil at the top) will be the leading region for cloud based manufacturing followed by Europe and Asia Pacific.

5.2 Industry 4.0

The most relevant technology and policy trend in the manufacturing space, is called "Industry 4.0" in Europe (and "Smart Manufacturing" in the United States) [11] and it actually corresponds to the fourth industrial revolution: a set of disruptive digital technologies that will transform the manufacturing sector by 2025 [12].

The disruptive technologies of Industry 4.0, such as IT-enabled manufacturing and increased computing capacity, hold the promise of smart factories that are highly efficient and increasingly data integrated. **Data will be the core driver**: leaders across industries are leveraging data and analytics to achieve a step change in value creation. A big data/ advanced analytics approach can result in a 20 to 25 percent increase in production volume and up to a 45 percent reduction in downtime.

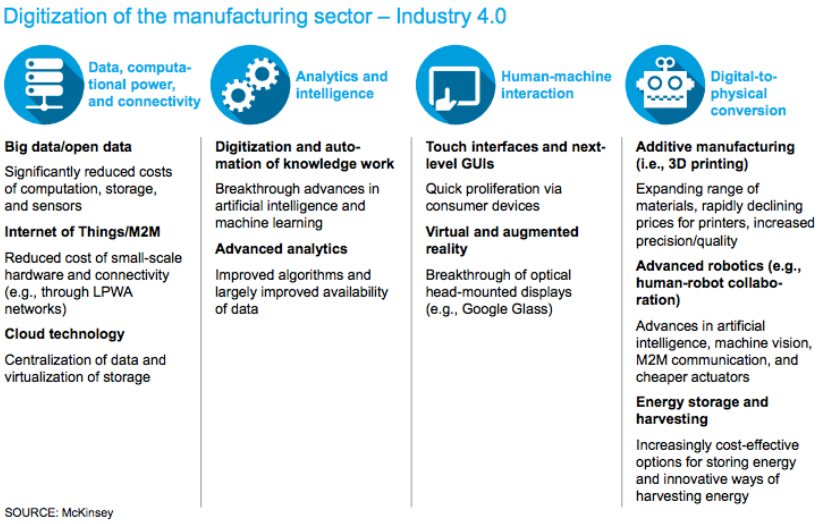

Figure 9 – A number of disruptive technologies will enable digitization of the manufacturing sector [12]

Among the disruptive technologies listed in Figure above the followings are the **most relevant for NIMBLE**:

- **Data, computational power, and connectivity**. This cluster, which comprises big data, the Internet of Things (IoT), and cloud technology (see Section 5.1), is mainly driven by a significant reduction in costs that makes the ubiquitous use of sensors and actuators possible and allows for affordable yet powerful storage, transmission, and processing. **Today, all prerequisites for IoT applications are finally falling into place** [12]: interoperability is made possible by new communication protocols designed especially for seamless machine-to-machine (M2M) interaction. Connectivity is enabled by effective wireless infrastructure to connect thousands of IoT nodes. And finally, affordability is being achieved with the forecasted IoT hardware prices of just USD 1 per IoT node in the near future (see picture below).

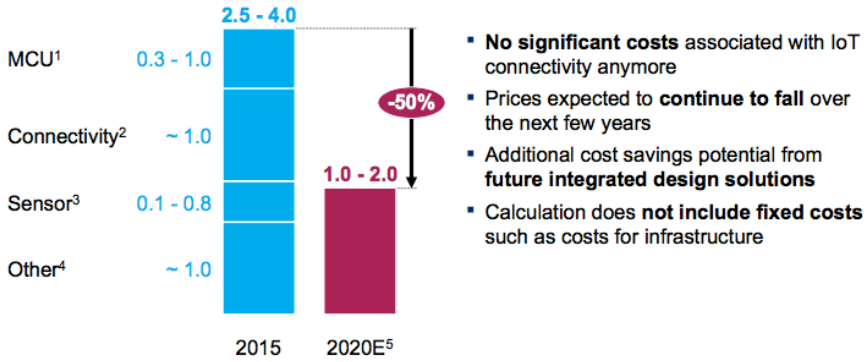

Figure 10 – The cost of IoT nodes has come down drastically and is expected to fall further [12]

- **Analytics and intelligence**. Significant knowledge advances have taken place in this area over the last few years. Specifically, advances in artificial intelligence and machine learning as well as the exponential increase in available data and improved statistical techniques enable digitization and automation of knowledge work and advanced analytics.

Therefore, the digital transition is expected to significantly transform the companies backed by considerable investments.

Industry experts estimate that the investments share in industry 4.0 solutions is expected to account for more than 50% of planned capital investments for the next five years [12]. In Europe, for instance Germany's industry is expected to invest about $47 billion each year by 2020 in industry 4.0. As a result, Industry 4.0 market is expected to grow at a CAGR of 14.72% between 2017 and 2022. The overall Industry 4.0 market was valued at USD 66.67 billion in 2016 and is expected to reach USD 152.31 billion by 2022

Moreover, from the 2016 PwC Global Industry 4.0 Survey (2000+ respondents from 26 countries), it **clearly emerges that Industry 4.0 is no longer a 'future trend'** – for many companies it is now at the heart of their strategic and research agenda. In the following, we report some findings from such a survey, starting from **stakeholder interests and expectations**.

To generate additional revenues, **companies will introduce new industrial products with digital features and augment their existing portfolio by 2020**. The picture below highlights how respondents expect to more than double their level of digitisation by 2020.

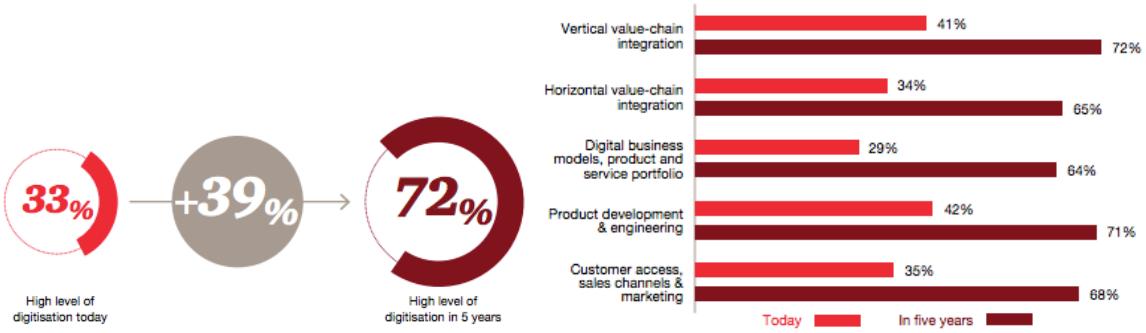

Figure 11 – Respondents expect to more than double their level of digitisation by 2020 [13]

Digital services based on data analytics, or even complete digital solutions serving a customer ecosystem, will drive breakthrough revenue growth. In addition, real-time data availability will enable companies to manufacture personalised products and customise solutions. These customised products usually generate significantly higher margins than mass-manufactured offerings. Improved customer insight from smart data analytics also allows companies to better focus on additional high-margin business.

At least a third of companies in every sector expect to secure efficiency gains and cost savings of more than 20% and many anticipate that these will be accompanied by additional revenues of the same magnitude. The following picture depicts the identified digitisation area that will bring more revenues in the next 5 years.

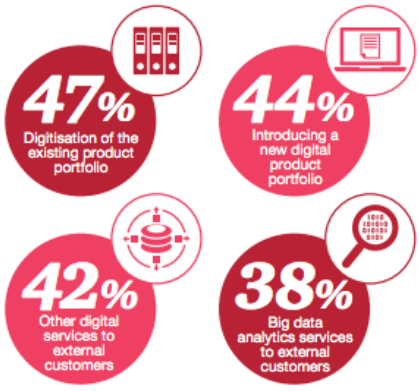

Figure 12 – Revenues from digitizing the product and service portfolio will grow significantly in future [13]

Integrated solutions or value added services are characterised by significantly higher customer benefits and will revolutionise existing product portfolios and performance relationships. **Foremost among these is a platform approach**.

The platform approach is perceived as a nexus of exchange and interoperable technology, which allows a wide range of vendors and customers to interact seamlessly.
Therefore, the most successful first movers of the software and internet industries all cemented their positions with powerful and distinctive platforms.

Regional Segmentation

Big gains are anticipated by companies in **all regions**.

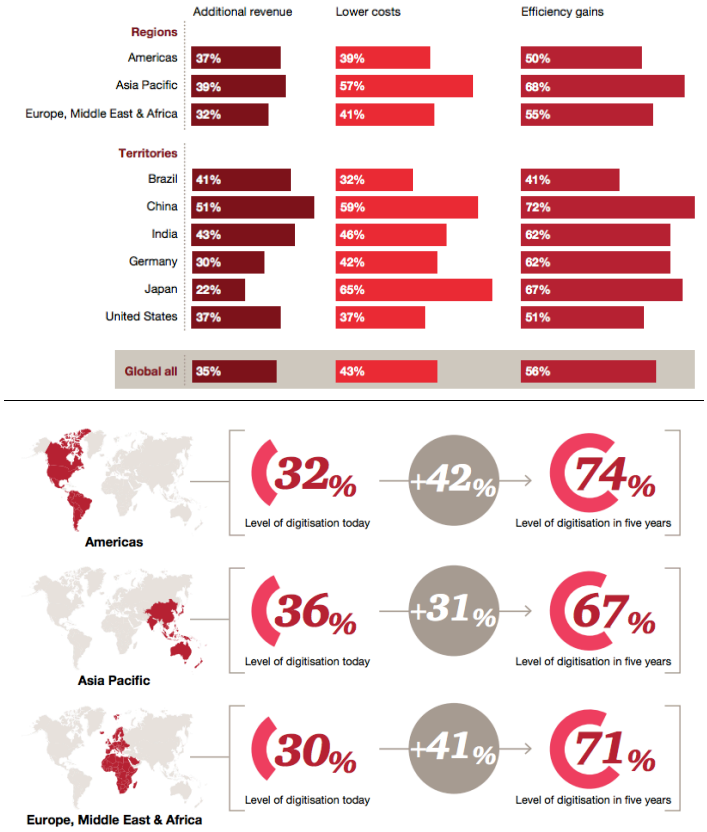

Figure 13 – Expected regional revenues, cost savings and efficiency gains (left) and regional level of digitization [13].

Industry players in all regions are pressing hard on the Industry 4.0 accelerator and expect to secure significant benefits. From the survey it emerges that companies in Japan and Germany are far ahead in digitising internal operations and partnering across the horizontal value chain. With high investments in technology and employee training, they view their digital transformation primarily in terms of gains in operational efficiency, cost reduction and quality assurance. In US companies are planning more investments in developing disruptive business models, as companies move more quickly to digitise their product and service portfolio. Their focus is more on digital revenue growth, rather than efficiency gains. China's industrial companies stand out in all aspects of digitisation: they are expecting both above-average cost reductions as well as increased digital revenues by 2020. China is one of the countries that stands to gain the most from automating and digitising labour-intensive manufacturing processes and needs to find a solution to rising employee compensation. In addition, Chinese

companies are highly flexible and open to digital change, and the Chinese workforce is embracing digital technologies.

Moreover, companies all over the world are expecting to dramatically increase digitisation over the next five years.

Industry Segmentation

Companies in every industry sector are planning substantial investments.

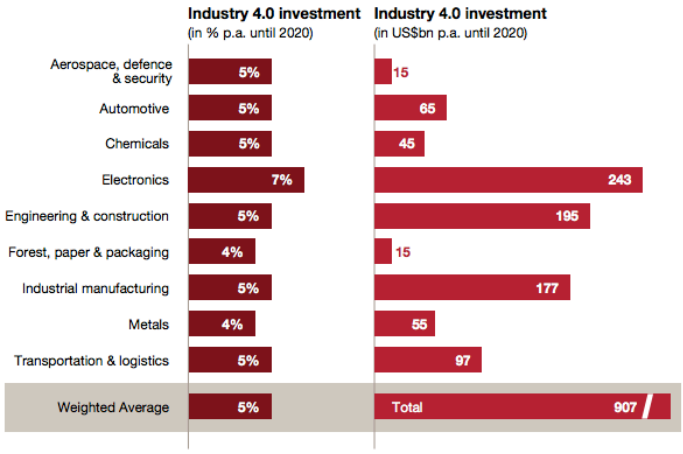

Figure 14 – Expected industry sectors' investments [13].

Survey [13] respondents anticipate that those investments will lead to US$493 billion in additional revenues annually, in addition to strong gains in efficiency and reductions in cost. Investment levels will be highest in the electronics sector. A major focus of this investment will be on digital technologies like sensors or connectivity devices, as well as on software and applications like manufacturing execution systems. Companies are also investing significantly in training their employees, hiring new specialists and driving organisational change.

Most companies believe they will see a return on investment (ROI) within two years or less for their Industry 4.0 projects. Just over a third of companies anticipate a longer timescale of three to five years, but very few think that it will take any longer than five years for Industry 4.0 investments to pay for themselves.

5.3 Manufacturing Supply Chain Integration

Supply chains are extremely complex organisms, and **no company has yet succeeded in building one that's truly digital**. Indeed, many of the applications required are not yet widely used. But this will change radically over the next five to 10 years, with different industries implementing digital supply chain at varying speeds.

Companies that get there first will gain a difficult-to-challenge advantage in the race to Industry 4.0, and will be able to set, or at least influence, technical standards for their particular industry. The advantage will by no means be limited to the greater efficiencies. The real goal will be the many new business models and revenue streams the digital supply chain will open up.

Cloud computing (see Section 5.1) will play a pivotal role in facilitating enterprises' integration into broader industrial supply chains. As Accenture observes, *"Cloud computing is increasingly the engine that makes supply chains talk to each other." [14]*

For manufacturers, cloud-based supply-chain management solutions can deliver a number of specific benefits, such as: permitting the integration of multiple IT platforms, providing an environment for collaboration, supporting integrated advanced analytics, and increasing scale and reducing costs [15].

The digitisation of the supply chain enables companies to address the new requirements of customers, the challenges on the supply side, and the remaining expectations in efficiency improvement. Supply chain will become faster, more flexible, more granular, more accurate and more efficient. Moreover, eliminating today's digital waste and adopting new technologies together form a major lever to increase the operational effectiveness of supply chains.

As a result, the potential impact in the next two to three years is huge. It is expected that supply-chain management solutions delivered via software as a service will constitute a $4.4 billion market by 2018, representing more than three-fold growth since 2012 [14]. Expectations include up to 30 percent lower operational costs, 75 percent fewer lost sales, and a decrease in inventories of up to 75 percent. At the same time, the agility of the supply chains should increase significantly [12].

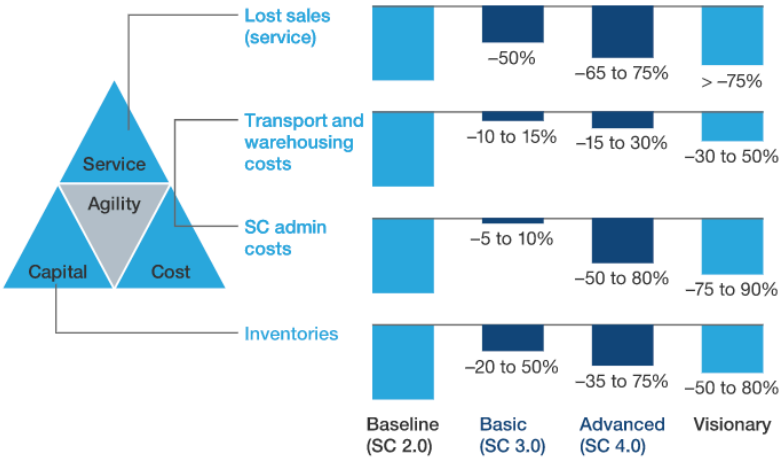

Figure 15 – Supply Chain 4.0 unlocks potential in all supply chain categories [12]

5.4 B2B Digital Platforms

B2B digital platforms enable partnerships across vast ecosystems that are redefining industries and creating new business models. These platforms promise more inclusive and diverse outcomes, while expanding market access and raising innovation levels for participants.

Digital platforms work differently from traditional businesses in three important ways:

1. *Value shifts*. Historically, value has been created "upstream" and systematically pushed down the value chain to the consumer. Platform business models create value in an iterative and continuous fashion across entire ecosystems.
2. *Non-linear growth*. Network effects can accelerate the velocity of change for how value is created (and destroyed).
3. *Trust*. This is a foundational element between market participants, who must understand and apply a core set of principles to govern platform-powered ecosystems.

Platforms classification

As depicted in Figure 16 below, we distinguish different types of platform [16]:

- *Commercial digital platforms* generate income by allowing different stakeholder groups to interact via the internet and exchange or trade ideas, data, or services (e.g. Facebook, Amazon). They are the backbone of digital business-to-consumer (B2C) markets, and are starting to emerge in business-to-business (B2B) markets as well. So far, Europe has largely failed to create successful B2C platforms. However, **European companies are still well positioned to drive the creation of B2B platforms in those domains where they can leverage their market and domain know-how, e.g. manufacturing, automotive**.
- Compared to commercial platforms, *non-commercial digital platforms* have the same objectives, but operate on a not-for-profit basis, e.g. Wikipedia or Linux. Successful non-commercial platforms usually result from grassroots movements and were created without significant government support. **Non-commercial B2B platforms are particularly hard to conceive**.
- *Stakeholder platforms* unite groups of stakeholders to collaborate in a pre-competitive context on different aspects of the digitisation of Europe (e.g. AIOTI, EFFRA, Industrie 4.0), including aspects such as standardisation or the alignment on an industry research roadmap. In the public debate, stakeholder platforms are often referred to as "digital platforms" because of the nature of the topics discussed within the platform. However, **stakeholder platforms are clearly non-digital in their ways of working**. They can be very beneficial, but if there are too many of them, they become a nuisance.

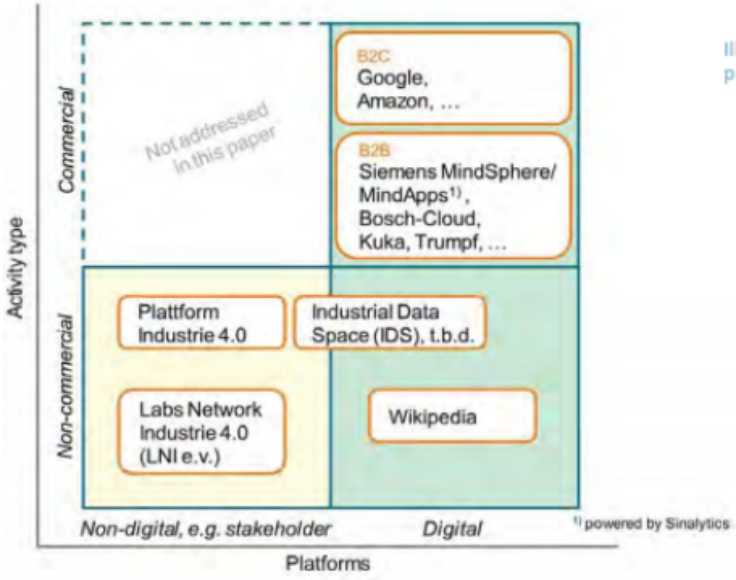

Figure 16 – Different types of platforms [16]

In addition, for what concern the commercial digital platforms, two main archetypes are crystallizing among the many different subtypes that exist:

- an *interaction platform* provides a "marketplace," i.e., **the technological conditions to connect multiple parties and coordinate their interactions**. The provider adds value to the system by ensuring a certain quality level and ideal distribution of the goods and services offered. The trend is moving platforms that can act as a marketplace linking supply (producers/suppliers) and demand (purchaser). The vision is to develop an integrated production network where companies, machines, humans are

connected via the Internet and customer orders are produced with optimal capacity utilisation. **A look at past experience also shows that websites, online shops and marketplaces have developed very dynamically in the B2B segment**, especially in recent years.

- a *technology platform or ecosystem* where companies (usually large companies) facilitate the further development of advanced products and applications based on their own original technologies and products. The ecosystem is made up of all companies (partners, customers, re-sellers, service providers, etc.) that make use of the own original technology and product and the platform is the mean for the development of their own applications and products, while at the same time promoting the platform owner product and brand.

Given the reported classification, NIMBLE exploitation activities will mainly target:
- *Commercial platform;*
- *Interaction platform.*

Market Value

B2B digital platform services constitute a highly specialized market, more so in terms of cloud-based, Industry 4.0, Supply Chain integration managed services, with the laggards (in terms of innovation) slowly fading away and losing market share.

The World Economic Forum's Digital Transformation Initiative (DTI) research [1] suggests that B2B digital platforms could unlock $10 trillion of value for business and wider society over the next 10 years. They can do this by enabling the "outcome economy", which will reshape how industries are defined, how ecosystem participants interact, how stakeholders' needs are met, and how value is created and shared. While business leaders take decisive action to position their organizations for success in this new environment, many others are less certain of their strategy and starting to lag.

After assessing 129 initiatives across 10 industries, the DTI research [1] estimates the cumulative socio-economic impact of digital transformation at $100 trillion between 2016 and 2025. It found that just over half of the initiatives relied on the enabling capabilities of B2B platforms, and that there is an estimated $10 trillion in value that the B2B platform economy could generate for business and society through 2025.

The following picture depicts the expected value for the most relevant industry sectors.

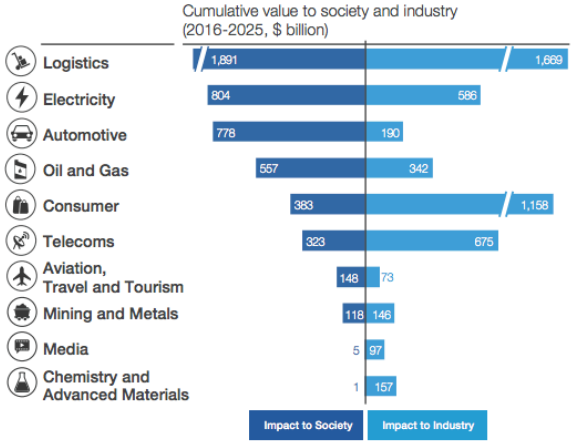

Figure 17 – B2B platform-enabled value at stake by industry through 2025 [1].

Market Challenges

The following aspects should be carefully considered and addressed, when launching a new venture in the B2B digital platforms market, in order to succeed:

- *Cross-border regulation*: platforms are more impactful in larger markets where transactions can flow easily without having to cross geographic boundaries. Accelerated scaling is easier in a single market; for platforms that seek cross-border growth, there is the challenge of balancing global-local tensions in regulations concerning, for example, data localisation, tax and labour. For example, data-localisation requirements generally reduce economic efficiency by forcing businesses to store data in particular countries. Forced data-localisation laws can increase computing costs for local companies by 30%- 60% [18].
- *Business Models*: Platforms make new business models possible. Particularly when powered by the internet of things (IoT) and mobile capabilities, platforms enable business models that can sense, adapt and respond in real time. Platforms allow enterprises to create ancillary services built around physical products and this can underpin transformational growth. New business models only accounted for a 1%-5% share of total revenues in 2015 but are expected to be responsible for 30% by 2020. Much of this opportunity will emerge from a few new classes of digital business model that are particularly relevant in the B2B environment [19]: Commission-based models; Subscription models; Data-monetisation models. To take advantage of these new business models, actors need to know how to access them: buy, build or ally. The accelerating rate at which incumbents are acquiring platforms (or key platform components) shows the importance they place on accessing these capabilities.
- *Effective platform governance* reduces friction across interactions while meeting the needs of actors within the complex ecosystem. The innovative nature of platforms requires more collaborative governance frameworks that can identify and manage shared risks. The most pressing governance concerns revolve around agreement on standards (to facilitate interoperability), data usage and privacy, and value apportionment. Emerging technologies (e.g. APIs or block chain) can provide new ways to embed governance principles into the automated interactions of ecosystem participants. Typically, governance is set and monitored by the platform owner, which needs to proactively engage regulators and other actors in the development and rollout of new governance frameworks.
- *Multisided network development*. It requires focus and investment in building both sides of an ecosystem – because ecosystems don't just organically grow and flourish around newly built platforms. To rapidly activate an ecosystem, the platform owner must know how to mobilize ecosystem members, technology and capabilities. That means connecting with critical players, rapidly developing proofs of concept and recruiting talent for sales and delivery.
- *Collaboration*: Enterprises with strong capabilities in traditional partner management need to be cautious. Conventional procurement approaches will not create the collaborative, win-win mindset that is needed to be successful in a platform model. Critical capabilities in ecosystem management include: clarifying objectives; getting partners on board rapidly; creating joint incentives; and apportioning value appropriately between partners. Most critical of all is a clear and shared understanding of partner priorities and opportunities. This allows actors across the ecosystem to boost the value of participation for all parties, creating a virtuous circle.
- *Adoption of a holistic set of outcome-based metrics*. These metrics should provide important insights into the success of specific entities within the ecosystem but do not

necessarily point to the key measures that the ecosystem as a whole should be monitoring. The power of new digital metrics is that they can measure the whole system, not just individual components.

Current Practices

Between November 2016 and January 2017 businesses were surveyed by the EC to assess their experience with online platforms [17]. In the survey, questions were asked about the usage of online platforms, the importance of used platforms for their business, experienced problems during the business relationship, whether terms, conditions and related practices are perceived as fair and, if not, reasons why. Businesses use online platforms for various business purposes depending on the type of platform (online e-commerce marketplaces, app stores embedded in mobile operating systems, social media, online advertising platforms.

The majority of the surveyed businesses use platforms for more than one purpose. The most commonly used platforms are social media platforms as indicated by 89% of business users (see Figure below). Online e-commerce marketplaces are reported almost as often as online advertising platforms.

Figure 18 – Share of businesses using online platforms by platform category [17]

On average, the respondents indicated to use 3 different online e-commerce marketplaces, and 3 different social media platforms. Businesses use on average slightly fewer application stores and online advertising platforms. The most commonly reported platforms are listed in Figure below. Amazon, Allegro, eBay, Booking.com, and Trivago are the commonly used online e-commerce marketplaces. Widely used app stores are Amazon Appstore, Apple App Store and Google Play. Businesses use Facebook and Twitter both, for social media and online advertising.

Figure 19 – Most commonly reported platforms [17]

5.5 Competitors Landscape

Players in the digital platform arena range from traditional IT service provider companies (SAP, Oracle, Siemens, Philips) to the web-based giants of the digital era (Alibaba, Amazon, Google) to a host of start-ups offering industry-specific platforms, data or technical capabilities. A representative collection of these companies across various sectors is shown below [1].

Figure 20 – Selected B2B platform companies across different sectors [1].

In the Manufacturing B2B space there are fewer examples of successful platform-based businesses. **However, this is only a matter of time**. So far, digital technologies have transformed markets where non-tangible goods are traded (finance, media, music, communication, etc.), and this is where many of the successful platform based businesses have emerged. Digital technologies are starting to merge with the real world. We therefore expect to see more and more platform-based business models focusing on enhancing real-world products and systems.

Moreover, as highlighted in [12], the competitive landscape in the manufacturing sector is already changing and **the number of players in the manufacturing value chain is likely to increase, driving up complexity and leading to more potential NIMBLE competitors**.

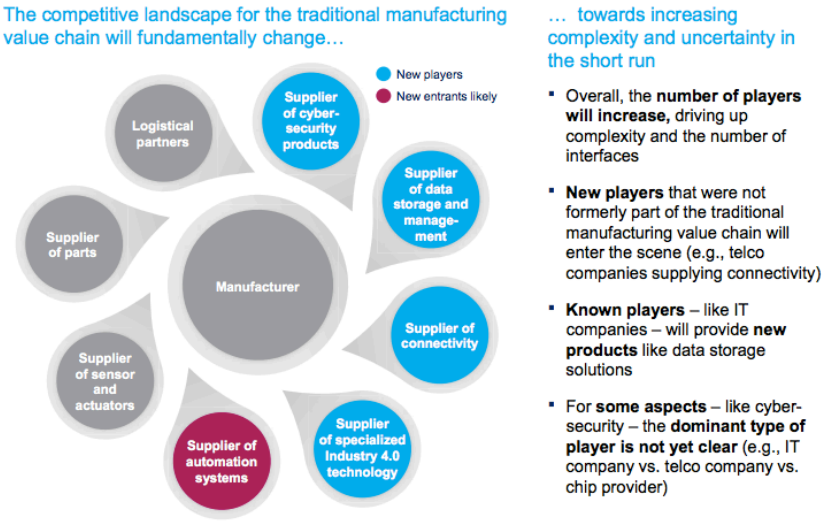

Figure 21 – Changes in the competitive landscape are likely and will probably increase complexity and uncertainty [12].

Specifically, traditional value chains are experiencing radical transformation. Instead of one company developing and producing an entire product, a higher degree of specialisation is likely to occur (disintegration of the value chain). New value chain players will include suppliers of technologies and services (connectivity, data analytics, system automation, security, etc.). And first movers on Industry 4.0 will seek a great advantage.

All of this can lead to the **flourish of many digital platforms that can facilitate and control the links between the different elements of the value chain**. An effective platform must, by definition, bring the customer close to operations. Industrial companies that share these platforms will also have access to customer data, which will be analysed to better forecast their needs, improve products and develop new ones. Whoever owns the platform thus owns the customer, owns access to the customer, and ends up aggregating the work of a lot of other enterprises. Ultimately this can lead to providing a full digital ecosystem.

IT service/platform provider companies are already rushing to solidify themselves as platform providers. Each has developed a cloud-based system for connecting machines and devices from a variety of companies, facilitating transactions, operations and logistics, and collecting and analysing data. Other industrial companies are also moving from simply augmenting their products with digital features to more comprehensive digital offerings. These can range from complete digital solutions to becoming a platform integrator. However, these companies are more focused on selling vertical B2B platforms (i.e. commercial, technology platform or ecosystem as defined in Section 5.3) aimed at offering cloud manufacturing and SCM solutions tailored to specific target customers (mainly large enterprises). Their solutions are usually expensive and not open, therefore not suitable for SMEs. Just to give a preliminary idea of the main players in this space, the following picture reports the 2015 market shares of the top 10 SCM software vendors [20].

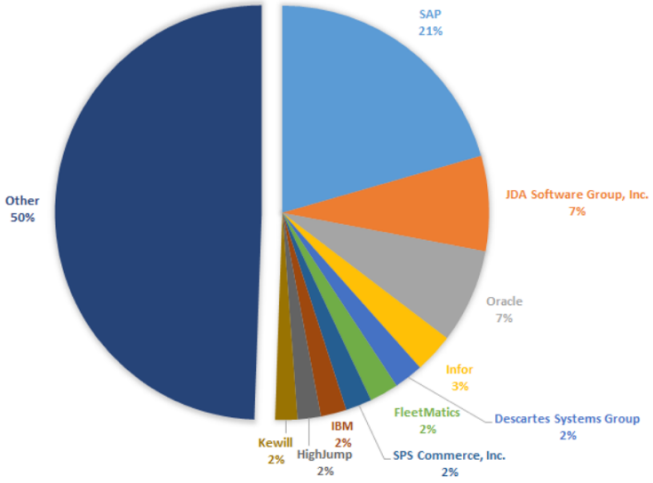

Figure 22 – Top 10 SCM Software Vendors & 2015 SCM Applications Market Shares [20].

Differently, following a different perspective, **web-based solution players** currently target B2B horizontal platforms (i.e. commercial, interactive platform as defined in Section 5.3) which mainly focuses on linking and facilitating the trading for many companies, with some limits in terms of advanced (e.g. IoT, AI, etc.) services. In no particular order, below we report a list of the top online **B2B marketplaces**:

- *Alibaba* – Launched in 1999, this Chinese-company serves millions of buyers and suppliers globally and only in the last fiscal year (2016) had a net income of approximately 6 billions of U.S dollars.
- *Amazon Business* – Specific B2B portal for Professional Sellers to reach business customers on Amazon which has generated more than $1 billion in sales from more than 400,000 business customers in 2016.
- *IndiaMart* – India's largest B2B marketplace with over 3.5 buyers and a selling model similar to Alibaba. It generates $1-billion of B2B sales annually for its members.
- *ThomasNet* – Leading online platform for B2B seller discovery and product sourcing with over 500,000 suppliers on its platform.

- *EC21* – Established in Korea and operates three different marketplaces for China, Korea, and globally. It has over 2 million members, 7 million products, and 3.5 million buyers.
- *FGM Vendors* – Online wholesale marketplaces that operates like an online tradeshow.
- *Wholesale Central* – Largest wholesale directory of active wholesalers and wholesale products since 1996.
- *Joor* – Largest wholesale marketplace for fashion with 155,000 retailers and 1,500 brands.
- *Field Engineer* – An example of a niche B2B marketplace that solely focuses on helping business find and hire Telecom engineers.
- *Wer Liefert Was* – a German-based B2B marketplace with more than 560,000 B2B suppliers and over 6 millions of products.
- *Mercateo* – a European B2B platform with over 23 million items from over 16,400 manufacturers, around 700 suppliers, over 1 million registered customers.
- *FORDAQ*.com – a newtwork of more than 200.000 wood professionals (log producers, sawmills, veneer mills, panel producers, importers and large industrial users) across the word.
- *3DHubs* - an online 3D printing service platform. It operates a network of 6,370 3D printing services in over 150 countries, providing over 1 billion people access to a 3D printer within 10 miles (16km) of their home.
- *TradeGecko* - a Singapore based software-as-a-service company that develops online inventory and order management software targeted at SMEs.

As a main differentiation, NIMBLE will develop a solution that can bridge the two visions and approaches introduced above, by aiming at an horizontal B2B marketplace that can also benefit of novel Industry 4.0 technologies.

In future versions of the Business Plan, we will provide a more focused analysis of core competitors.

6 Business Models (Hypothesis)

At this stage, on the basis of the target user group analysis and the preliminary outcomes of the NIMBLE platform developments, we developed some hypotheses about the possible NIMBLE business models.

These hypotheses include some possible alternatives about the roles of NIMBLE partners (interested to the exploitation of the NIMBLE solution as a whole) and the types of services that can be offered. Specifically:

H1. The first, lean, hypothesis foresees a *NIMBLE legal entity* - representing the partner(s) interested to commercially exploit the NIMBLE solution – that will play the role of NIMBLE operator, implementing a NIMBLE PaaS approach, where:
   a. An external *cloud platform provider* (IaaS) will offer hosting services as a service supplier.
   b. Main target customers are *Manufacturing B2B service providers and intermediaries* that orchestrate a (local/sectorial) ecosystem of *Manufacturing supply network stakeholders*, which are in fact the final end-users of the solution.
   c. The NIMBLE operator will also enable *Technology and Service providers* (i.e. third parties) to offer NIMBLE-compliant tools and services to either the ecosystem orchestrator (e.g. offering more specialised tools for a given sector) or

the single manufacturing supply network companies of an ecosystem (e.g. a tool for a specific class of companies). Tools and services will be showcased in the NIMBLE marketplace in exchange of a %fee commission on the generated revenues.

The following picture depicts the dynamic relationships between the main stakeholders, and tangible, intangible and economic flows (values) between them.

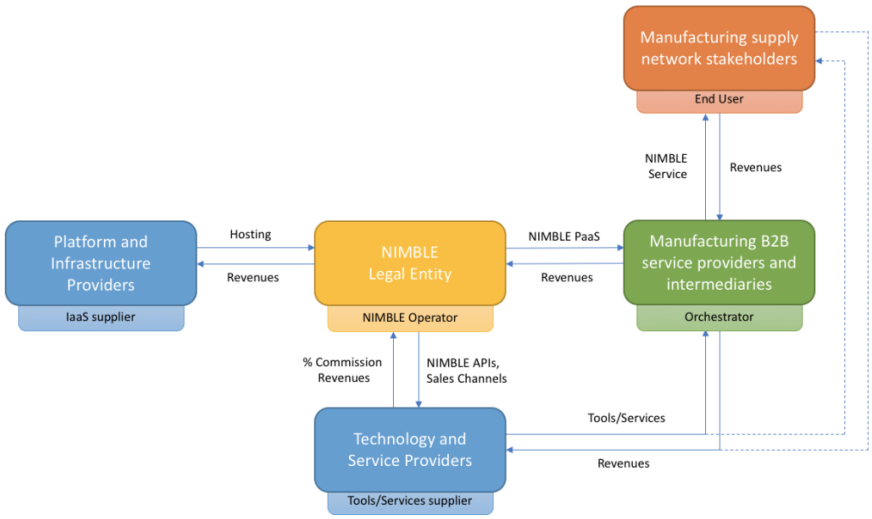

Figure 23 - NIMBLE Business Model: NIMBLE Legal Entity as Operator.

H2. The second hypothesis includes two simple evolutions of H1, where the NIMBLE Legal Entity can offer additional services to generate more revenues. Specifically, we may assume that the role of ecosystem orchestrator can be also played by:

a. *Platform and Infrastructure providers* that may plan to quickly enter the manufacturing platforms market and they may use the NIMBLE PaaS opportunity. In fact, this role is similar to the role of Manufacturing B2B service providers and intermediaries introduced in H1. But the type of company (e.g. in terms of domain expertise and background) could be quite different. Therefore, we may consider them as a distinct type of customers.

b. *The NIMBLE Legal Entity* can decide to become an ecosystem orchestrator too. In this case may use its own solution to either create some specific vertical platforms or create a kind of overarching platform to enable different NIMBLE platforms (orchestrated by distinct players) to interact each-other.

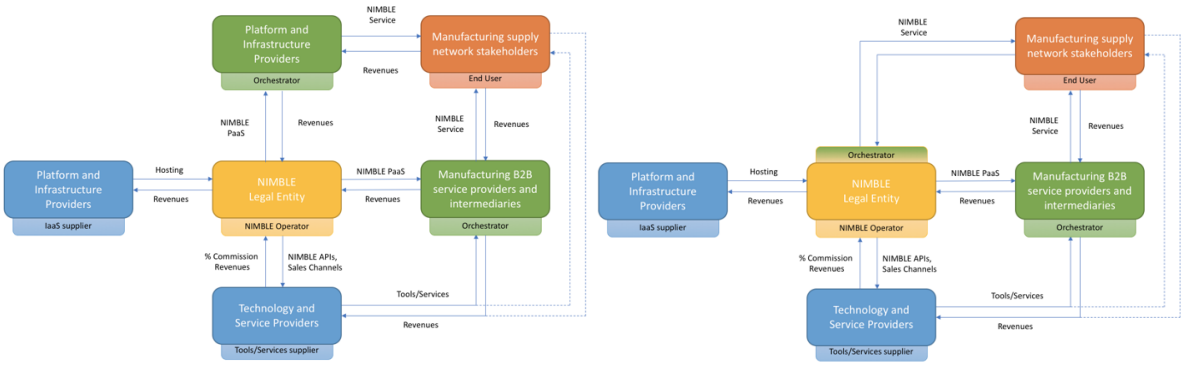

Figure 24 - NIMBLE Business Model: Platform and Infrastructure providers as PaaS customers (left) and NIMBLE Legal Entity as both operator and orchestrator (right).

H3. The third hypothesis foresees a completely different role for the *NIMBLE Legal Entity*: it will implement and maintain a reference NIMBLE Open Source platform, which will be licensed to *Platform and Infrastructure Providers* that can create their PaaS offering (like those reported in H2) on top of that (although other models can be implemented by the platform provider). The rationale of this strategy is that NIMBLE shall become a reference, standard-based platform for manufacturing digital platforms with a linked community of developers that can push technology developments and improvements. In this scenario, revenues for the NIMBLE legal entity may come from consulting (technology and business) services to system integrators interested to use the NIMBLE solutions.

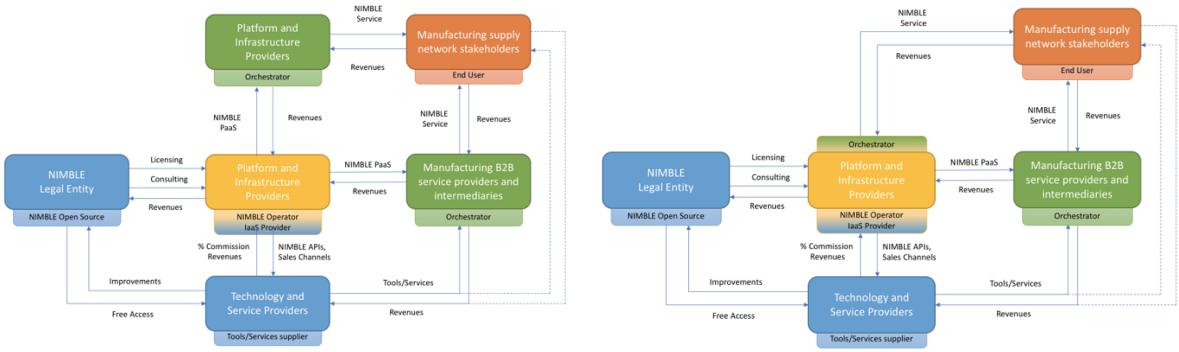

Figure 25 - NIMBLE Business Model: additional hypothesis.

It should be noted that the three reported hypotheses are not mutually exclusive. They could in fact be operated in parellel by the NIMBLE Legal Entity, although they should be progressively activated (i.e. starting from one of the three).

In this view, the value creation of NIMBLE for the identified target user groups is depicted in the simplified value chain reported below.

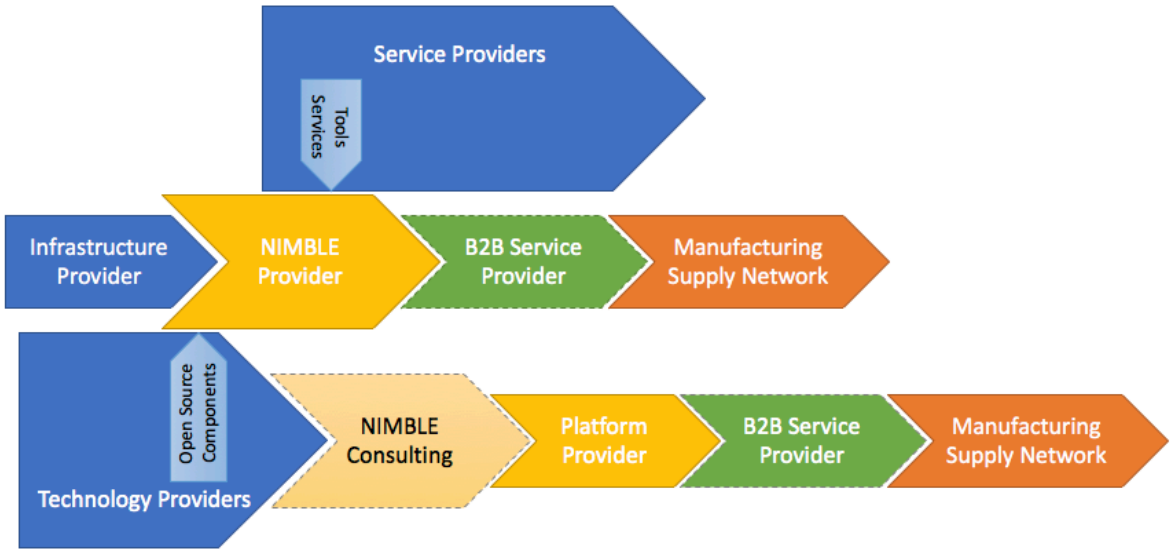

Figure 26 – NIMBLE Business Value Chain

Specifically:

- The infrastructure provider provides the cloud infrastructure (IaaS) on top of which NIMBLE runs.

- The NIMBLE provider offers the platform where Manufacturing Supply Network companies can operate their business, with (or without) the orchestration role of B2B service provider and intermediaries.
- The service providers have an important role in the value chain since they create the critical mass of NIMBLE-compliant services/tools required for commercial survival of NIMBLE as integrated solution. Their services/tools can be found and made available for B2B Service Providers and Manufacturing Supply Network stakeholders through NIMBLE platform marketplace. The number of service providers is critical also in the sense that they can provide essential revenues for NIMBLE providers in terms of platform marketplace commissions.
- A NIMBLE provider may need technology provider services to upgrade, improve and add new functionalities for the platform, and to keep the solution functional. This can be achieved thanks to open source releases of NIMBLE components provided by its supporting community. Technology providers will be the members of such a community and will offer new open source components according to their specific business objectives.
- Other Platform Providers (e.g. system integrators) can access the open source releases of NIMBLE solution to leverage/adapt the use of NIMBLE to their specific customers' needs and requirements, such as B2B service providers or directly Manufacturing Supply Network companies.
- Other Platform Providers may need support and guidance to properly make use and extend the NIMBLE solutions. This consultancy can be provided by NIMBLE partners.

6.1 Business Canvas Model

In order to start structuring the business plan elements (that will be further developed in the next versions of the present deliverable) and summarizing the main insights collected so far (including the work performed for deliverable D1.2), we report on the business canvas model for NIMBLE.

Customer Segments

As detailed in Section 3, we identified the following main target user groups:

- *Manufacturing Supply Network Stakeholders*
- *B2B Service Providers and Intermediaries*
- *Platform and Infrastructure Providers*
- *Service and Technology Providers*

Value Proposition

As detailed in Section 4 the platform must provide tools to facilitate valuable interactions, and support different types of communications and collaboration activities, i.e. make collaboration frictionless.

The benefit of the platform (detailed in Section 4.5) will be to act as a facilitator of interaction between actors that do not need to set up new channels (and formats) of communication, i.e. NIMBLE creates value for all parties. In summary:

For *Manufacturing Supply Network Stakeholders* we may distinguish value for

- Consumers: access to value created on the platform
- Producers or third party providers: access to a community or market

- Consumers and producers: access to tools and services that facilitate interaction
- Consumers and producers: access to curation mechanisms that enhance the quality of the interaction.

For *B2B Service Providers and Intermediaries, we may consider the opportunity for:*

- Offering better services to their clients/members
- selling points in attracting new clients/members
- Facilitating open manufacturing ecosystems
- A reputation for innovation and business improvement
- Improving use and adoption of standards in different sectors
- Stimulating local entrepreneurship and thus improving the economic situation of a region/area

For *Platform and Infrastructure Providers, we may consider the opportunity for:*

- Reduced Time to market
- Increased average selling price and profitability margins
- Improved competitive advantage/market share

For *Service and Technology Providers, we may consider the opportunity for:*

- Reduced time to innovation and market
- Reduced service/application development costs
- Increased average selling price and profitability margins
- Improved competitive advantage/market share
- Improved customer satisfaction
- An effective showcase for business branding

Customer Relationship

The NIMBLE offering can be a multi-sided PaaS, with added-value tools and technology and consulting services. Therefore, the following main relationships could be foreseen:

- *Self-service and automated services*, by using NIMBLE PaaS in one of its "standard" configurations.
- *Personal assistance and customization* for those customers demanding PaaS + complementary technological services due to specific requirements/configurations, according to, e.g. amount/type of data that can be uploaded; historical data to be kept; requesting access to real time data analytics versus batch processing; development of customized / added-value tools and/or analytical services, etc.
- *Personal assistance, business consulting and training* for those customers who plan to use the NIMBLE open source components in order to develop their own digital manufacturing platform.

Key Activities

- *PaaS and Marketplace Marketing and Commercial activities*
    - Design and develop the Marketing and Commercial strategy and Pricing List based on the service variability.
    - Design and develop Marketing and Commercial materials.
    - Design and develop Formation to commercial staff.
    - Deploy Marketing and Commercial activities with the selected customer segments through the selected channels;
    - Continuation of the AMBASSADOR and SEED programmes
    - Contracts management.

- *PaaS and Marketplace Commissioning Services' activities*
  - Design commissioning services to customize/adapt the get up and initial run of NIMBLE to specific customers' needs;
  - Adaptations and in-house training.
  - Train commissioning services technical staff.
  - Develop commissioning services.
- *PaaS and Marketplace Running Services' activities*
  - System administration.
  - Application technology management.
  - Monitoring activities for remote applications access.
  - Performance audit.
  - Detailed performance tuning.
  - Custom software optimization.
  - System optimization.
  - Technical capability and risk assessment.
  - Scalability testing.
- *Open source Support, Maintenance and Upgrading activities*:
  - Design and develop technological services materials.
  - Design and develop formation to technical services' staff.
  - Develop and integrate new functionalities/modules.
  - Generate latest information on upgrades and new versions installations.
  - Community governance/management.
  - Community awareness creation and technology providers' engagement.
- *Consulting services*
  - Design and develop the consulting services materials.
  - Train consulting services' staff.
  - Develop consulting services.

Key Resources

The Key Resources can be considered a translation in terms of tangible and intangible resources of the Key Activities introduced above:

- *Marketing and Commercial resources*
- *Commercial staff.*
- *Commissioning services' resources.*
- *IaaS platform to rent.*
- *PaaS modules and NIMBLE core services.*
- *IoT connectivity services/tools.*
- *Collaborative Models.*
- *Security and Trust monitoring and enforcement.*
- *PaaS Support, Maintenance and Upgrading activities.*
- *Marketplace API and developers' support tools.*
- *Open Source licenses.*
- *OS Technical services materials.*
- *OS Technical services' staff.*
- *Consulting services materials.*
- *Consulting services' staff.*

Key Partners

- *IaaS platform suppliers.*
- *RTD / Added Value Services developers and companies*

- *Manufacturing supply chain managers and their IT departments.*
- *B2B companies, sectorial associations and consultancy software firms* working in the industrial sector interested to operate NIMBLE platform for their customers as commissioners.
- *Business developers / consultancy companies.*

Channels

- *Direct contact with potential customers*:
  - AMBASSADOR Programme (Manufacturing Supply Network Stakeholders);
  - SEED Programme (B2B Service Providers and Intermediaries, Platform and Infrastructure Providers);
  - Use Cases (Whirlpool, Piacenza, Micuna, Lindbäcks)
- *Dissemination Channels*:
  - Press Releases
  - Industrial Events/Presentations/Exhibitions
  - Website, YouTube videos, and Social media allowing enterprises to request information and connect to NIMBLE platform
  - Open source distribution lists (GitHub)
- *Service provider companies and consultancy (software) firms* working in the industrial sector interested to operate NIMBLE platform for their customers as commissioners
  - e.g. from the consortium: DOMINA, HOLONIX, INNOVA, AIDIMME, FEVAMA, SRDC, BALANCE

Cost Structure

- *Marketing and Commercial costs*
  - Commercial staff salaries.
- *PaaS and Marketplace Commissioning services' costs*
  - Commissioning services' technical staff salaries.
- *PaaS and Marketplace Running services' costs*
  - IaaS platform to rent.
  - Development team salaries.
- *Open Source Support, Maintenance and Upgrading costs*
  - Technical services' staff salaries.
  - RTD developers' salaries.
- *Consulting services costs*
  - Consulting services' staff salaries.

Revenue Streams

There are currently many alternatives for revenue streams:

- *PaaS business model* in which customers subscribe to a full solution configuration and they pay-per-use the platform functionalities (i.e. core services + value added services/tools) according to the demanded time and workload, plus payments for specific complementary technological services through a list price. Different service level agreements (e.g. companies want to be presented and made "searchable" only with their description, no product catalogue) will be also possible, with different pricing models.
- *Flat rate with monthly/yearly subscription fee*, for customers that want to subscribe to a specific PaaS commercial offer, e.g. including some PaaS functionality and workload, plus its related support services.

- *Open-Source business model* with free and open-source code software licenses (i.e. Apache 2.0) in which customers (e.g. Platform Providers) pay for specific complementary technological, business development, training services through a list price.
- *Negotiated payment/commissions with services providers* that can use the platform (NIMBLE service marketplace) to develop and trade new added value services/tools. Service providers get revenues from selling their product/services and pay a commission to the platform owner.

In addition, as introduced in D1.2, for NIMBLE, there are some special issues to consider and the first is in fact, the modest profit expectation from running the platform itself. We are not expecting a single platform to conquer the world and to dominate its market. Instead, we design the platform to share the expected excess value fairly between its users and those responsible for running a federated instance of the platform.

At present, besides the possible monetisation models listed above, we also envisage for the first cohort of businesses to give them an incentive, e.g. to make them shareholders in the future platform and to waive access fees until their value of transactions reaches a level where there is a clear positive margin for the participants, even when paying the access fees.

7 Business Cases

This section will introduce and analyse some possible business cases, based on the adoption of the NIMBLE solution.

At this stage, we introduce the 4 project use cases, since they will be our first benchmark. However, as far as we progress with the AMBASSADOR and SEED activities, we plan to identify and report new possible business case linking to additional (external) early adopters.

For each of the identified business cases, the NIMBLE platform will offer a specific solution, based on the core services and, in some cases, some additional services and tools.

7.1 Child Furniture (MICUNA)

Problems to be addressed	Create new value chains in new markets, but limited: - Links to international networks - Knowledge of international markets - Knowledge about cultures and national-specific regulations Need for - identifying new partners for product development, production and logistics - including product catalogues for enabling identification of collaboration potentials - supporting negotiation opportunities - acquiring knowledge of national cultures, norms and legislation - simplifying acquisition of relevant and reliable information on norms and regulative requirement in specific geographical areas
Stakeholders	Platform customers: - Micuna as manufacturing company - Suppliers and logistics partners - Retailers Platform owner: - *To be defined*

	Other stakeholders: - Authorities and certification bodies - Non-Governmental Organizations (NGOs) - Standard setting organisations
Key NIMBLE Services/Tools	<u>Core Services</u>: Publication of product catalogues (as simple as possible) - The guided manner should support for example relevant taxonomies and ontologies, potentially presented as multiple facets through which a user can interactively narrow his search space Matchmaking between companies operating in global markets - Specifying requests - Linking to public catalogues Provider search - The manufacturer aims at finding providers of required materials and operations, which it cannot cover by its own resources or which it aims at improving along different dimensions Mechanisms to negotiate with known and new production partners - linking to ERP if possible - trust and security level assurance - exchange of data and documents - Firstly, financial and delivery terms are agreed. Then, technical aspects are reviewed to ensure the needs are properly fulfilled. The manufacturer includes the provider in the ERP system if missing <u>Additional Services/Tools:</u> Exchange of information and knowledge in the area of norms and regulations - exploit local partners that share info - link to ad-hoc datasets Product End-Of-Life: A company is interested in managing the product End-Of-Life (EOL) and this can be done with two approaches. On the one hand, the manufacturer aims at offering a renovation of a used product (e.g. replace the cot by a child's bed), at a discount in the new product and support in the furnishing of the room, while on the other hand, some products can be donated to NGOs and charitable organizations to give them a second life.
Value Proposition	NIMBLE will enable companies to navigate more smoothly in new markets: - Short-listing partners - Support negotiation - Enable adaptation of product specifications and manufacturing processes according to regulations and norms for each market - Bridging of knowledge and information, as a channel for collaboration and as a customer channel Knowledge about cultures and legal conditions for products offered and insights in potential design improvements enables the product development function to improve future exploitation of high qualitative products A decentralized information management adjusted to needs and wants in the specific country

Business Impacts	Expected savings: - more efficient processes in production, for instance in prototyping new products adjusted to particular markets and hence result in cost reductions - reducing the amount of resources needed for acquisition of resources (human capital and social capital) and for exploitation of offerings

7.2 White Goods (Whirpool)

Problems to be addressed	There are many data sources and data in different formats. The collaboration between the external and internal actors is fragmented, with loosely coupled islands of information attached to the specific products. There are no solid feedback mechanisms that can deal with the issue of bringing together all relevant information for further analyses and correction in the value chain. Knowledge gained by the field technicians is not efficiently fed back to product development and manufacturing so that they can take countermeasures when a recurrent defect is reported. Design knowledge about the product is not effectively transferred to customer service in order for field technicians to enhance their diagnostic and prognostic capabilities. Need for: - improving the flow of information from their customer service and field service back to the internal supply chain organizations - adopting of structured feed-back mechanisms to deal with quality problems identified by the field service, to improve product design - fast and reliable exchange of different types of critical data - collaboration between a company and the external third-party SMEs offering field services to end customers - transactions of data and information without face-to-face interactions (no collaboration)
Stakeholders	Platform Customers: - Marketing: transforming the needs of the consumer into product concepts - Global Product Organization: research, product development and procurement - Manufacturing: transforming raw materials and components into products - Supply Chain: distribution of the products to retailers and customers - Customer Service: managing post sales operations including field service and spare parts Platform owner: - *To be defined*
Key NIMBLE Services/Tools	Core Services: - a tool for enabling systematic adoption and analyses and sorting of information - structured mechanisms for exchange of information and knowledge

	assure that the service technicians are aware of the information they should communicate / exchange with the manufacturing company. Additional Services/Tools: - Offering quality assured analyses of errors in products and different parts in the supply chain in order to bring such information into companies' decision making. - Offering a product Avatar for easy access to data, information and analyses from a single point,
Value Proposition	Improve the flow of knowledge in both directions of the value chain Enabling the company to standardize the information flow and knowledge transfer between external and internal actors Decrease the time needed for information gathering from aftermarket for product development Enables the collaborative partners to establish a culture of knowledge sharing Development of a learning organization by limiting deficiencies in product and by enabling increased quality. The right information is conveyed to the right people at the right time in the most appropriate way
Business Impacts	Increased efficiency, higher quality, decreased costs and faster innovation Knowledge about the product is not effectively transferred to customer service causes higher warranty cost (e.g. substituting the whole machine instead of a single component). Knowledge about current errors in products offered and potential design improvements enables the product development function to improve the company's future exploitation of high qualitative products Decreasing the workload for the internal product development through automatic information collection and analyses Increasing efficiency in transactions of information between a large number of service technicians representing a large number of SMEs and the big company

7.3 Wood Buildings (Lindbäcks)

Problems to be addressed	Business expansion calls for new information management in the supply chain and a need for transforming manual work into a digitally automated flow Need for: - new information structures to keep track of the right information in the right place and to provide it at the right time to reduce redundancies in the product and information flow - establish new logistics chains, and improve monitoring of transport and on-site construction - seamless connection between the manufacturing company and their supply chain actors
Stakeholders	Platform Customers: - Lindbäcks departments: Sales, Project managers (responsible for building project), and Factory management - Companies involved in the Lindbäcks production value chain, e.g.

	suppliers like Podcomp Platform owner: - *To be defined* Other Stakeholders: - Third party stakeholders may need information/data from NIMBLE, e.g. insurance companies - IoT-solutions can be used for decreasing risks for insurance companies and hence offer lower insurance fees for customers of houses
Key NIMBLE Services/Tools	Core Services: - Enabling consolidation of information from different sources in order to make information more analyzable and traceable - Keeping track of changes in the supply chain occurring from suppliers, customers and the internal organization - Offer potential for reactive changes in the manufacturing process through relevant feedback - IoT-sensors for collecting information that can affect the product Additional Services/Tools: - Product configurator - Tracing components and adding QC (Quality Control):
Value Proposition	Simplification of data handling Sensor data (IoT) in modules that cover the processes / stages of production, construction and after sales Data enriched by an "Analysis Supplier" with expertise in eco houses to transform plain data for knowledge transfer Support tractability throughout the value chain related to PLM approaches Support a more private relationship and knowledge transfer between the company and their stakeholders
Business Impacts	Improved efficiency by better/rapidly exchanging information Improved quality by monitoring traceability

7.4 Textile (Piacenza)

Problems to be addressed	Aiming for more customized production of their exclusive fabrics Build close relationships between fabric designers and clothing stylists Design proposal quality, flexibility in production and delivery, and also service and quick responses to customers' needs are critical to build added-value and overcome cost pressure There are over 400 suppliers involved in the supply chain process. Many of these are SMEs with limited ICT-resources In the textile sector, the origin of the supplies and ethical issues are of importance Need for: - platform for a fast and reliable data exchange service, based on IoT, M2M and B2B data transfer - monitor and exchange data of several types - standardization, which would allow companies to interact with new customers/suppliers (mainly B2B) - integrative environment for many software products - accuracy of rich information and communication between actors, facilitate exchange of ideas in virtual designs, and decrease the

	workload associated with its use - a resource in the design development process by sharing documents such as CAD documents and catalogues
Stakeholders	Platform customers: - Piacenza (Textile manufacturer) - Fabric designers - Clothing stylists Platform owners: - *To be defined*
Key NIMBLE Services/Tools	Core Services: - Collaborative design and production o Data changes must be tracked and available for all eligible users - Virtual catalogues and services o Publication of catalogues must be managed very carefully, because usually the fabric catalogues are not available to everyone, for copyright reasons - The user shall be able to access real time data at machine and product level, exploiting IoT and M2M-data Additional Services/Tools: - a company can re-collect real time machine data at the end of the production run and produce automatically the preferential origin certificate declaration
Value Proposition	Standardisation Foster agility and value-creation, enabling environments for business collaboration Traceability of all production actions in the supply chain and to provide, easily and quickly, those data to the customers, with real time granular monitoring of production flow Provide real time, accurate forecasts of machinery and product availability Information redirection/filtering in order to convey information to the right person at the right time
Business Impacts	Virtual clothing design: NIMBLE can greatly increase the speed of both design and production processes

8 Next Steps

The main objective of this first year of activity for business planning (Task 8.7) was to start answering the following main questions:

- Who is the NIMBLE customer?
- What is the (business) problem?
- How can NIMBLE solutions address that problem?

As a result, we obtained a set of analyses, assumptions and hypotheses about the NIMBLE commercialisation opportunity.

In the coming months, the goal will be to create a process and a structure to progress in the business plan development by focusing on a problem and a customer segment at a time and to get rid of the riskiest assumptions as fast as possible.

To this end, we will:

1. Develop a questionnaire that can validate our assumptions and hypothesis, as well as provide additional insights about the target market, existing barriers, and relevant business impacts;
2. Engage with (possibly) all the identified target user groups;
3. Schedule 5 to 10 conversations with each segment we want to validate our assumptions and hypothesis.

The questionnaire will be based on the following template[1]:

Do you think NIMBLE is a good idea?
Questions: - Which other tools and process have you tried before settling on this one? - Are you actively looking for replacement? If so, what is the sticking point? If not, why not? - Where are you currently losing money with your current tools? - Is there a budget for better ones?
Would you buy a product which does X?
Questions: - How are you currently trying to solve X? How much does it cost you to do so? - How much time does it take? - What happened last time when X came up?
How much would you pay for X?
Questions: - How much does this problem cost you? - How much do you currently pay to resolve it? - How big is the budget you have allocated?
What would your dream product in this area do?
Questions - Why do you want these features? - Why do you bother? - What are the implications of that? Why do you bother doing it this way? How do you currently cope with this feature? - Why do you want that? - What would that let you do? - How urgently do you need it? - How would that fit into your day?
What else have you tried?
Questions: - What are you using now? - How much does it cost? - What do you like/ dislike about it? How much would these fixes be worth? How traumatic would it be to switch to a new solution?
Other Good Questions:
- Where does the money come from? - Who else should I talk to? - Is there anything else I should have asked?

[1] The mom test: http://www.startupwerkboek.nl/startupcenter/Momtest.pdf

In order to engage with the target user group, we will exploit the following main channels that have already been established:

- Use case partners: WP4 activities will involve stakeholders from the project use cases to identify/develop the key platform services and UX and some workshops will be arranged.
- AMBASSADOR and SEED Programme: as part of the WP8 activities we will participate and arrange workshop to create awareness and collect feedback from target stakeholders. The AMBASSADOR programme will target potential end-users (manufacturing supply network stakeholders) and intermediaries (manufacturing B2B service providers, associations, etc.), while the SEED programme will mainly target Platform Providers.

The collected information will be used to create a second, more focused version of the business plan, where we will start to clearly identify:

- The actual NIMBLE value proposition and existing barriers;
- The reference market and competitive landscape;
- An effective, viable business model;
- A go to market strategy.

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