IoT4Industry

Project Deliverable

ICT competencies for existing (ready to use) or potential developments of IoT Smart Manufacturing solutions

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Project Acronym	IoT4Industry
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Contributing partners	mTSW, SCS, MBI, Inno
Reviewer(s)	MTC - Junuz Jakupovic

Abstract

This report will focus on the IoT competencies that already exist in Europe. It will analyse the IoT technology offer across Europe and identify possible matches with needs and applications analysed in WP1.1 and described in D1.1.

Keywords

Industry 4.0; smart manufacturing; IoT; Big Data; Smart Data; Smart Sensing; security; robotics; simulation; modelling; sensor systems; VR; AR; Artificial intelligence; communication

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Revisions

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v0.1	22/06/2018	First structure and general keywords	Björn Van de Vondel
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v0.4	29/06/2018	Peer review	Junuz Jakupovic
v0.5	29/06/2018	Version shared with partners	Björn Van de Vondel
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Acronyms and definitions

Acronym	Meaning
IoT	Internet of Things
WP	Work Package
CPS	Cyber Physical Systems
IIoT	Industrial IoT
ICT	Information and Communication Technology
SME	Small or Medium Sized Enterprise
RF	Radio Frequent
VR	Virtual Reality
AR	Augmented Reality
EMS	Electronic Manufacturing Services
MMI	Man-Machine Interface
UWB	Ultra Wide Band

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The IoT4Industry project

The proportion of the manufacturing industry is currently decreasing in developed European countries' GDP. Industry 4.0 – also called smart manufacturing, digital industry or industry of the future – provides several technological responses to the challenging competitive market. The Industry 4.0 focuses on the development of processes based on technologies and devices autonomously communicating with each other along a value chain. Indeed, the integration of the Internet of Things (IoT) and related components – Cyber-Physical Systems (CPS), Digital Security, Cloud Computing and Big Data – in manufacturing SMEs will improve efficiency and flexibility in production and consumption.

IoT4Industry is an EC-funded project aiming at fostering this integration by connecting ICT clusters having capacities in IoT with Advanced Manufacturing clusters having access to process manufacturers and manufacturing SMEs. Based on a cross-border and cross-sectorial approach, a hundred of SMEs will be selected to receive funding and support to develop their access to smarter means of production and to modernize their processes and security. In fine, the project and this integration aims at creating new or improved value chains and new business opportunities.

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1. Executive Summary

The interviews of representatives of the IoT related clusters give interesting insights on how the technology providers see the evolution towards Industry 4.0. It can lead to a number of conclusions:

- The European IoT companies have a wide variety on IoT competences. Every subdomain is, to some extent, present across Europe
- The European IoT technology companies are used to implement their technology in other application domains. A significant portion of those companies has already some preliminary links with the manufacturing domain
- The IoT companies see great possibilities for IoT technology in a manufacturing or industrial setting. The majority of applications are targeted to increasing efficiency in some way.
- The two main challenges from a technological point of view are (1) the need for better security and (2) the lack of standardization
- The main hurdles to overcome however are not technical! The successful use of IoT technology requires a change in mindset: the manufacturing industry has to be introduced in the possibilities of IoT and the possibility of using or creating new business models think about the possible new business models. A second hurdle or problem is a lack of resources (money, time, skilled staff)
- The IoT related companies think that most of the work will be in projects involving the intelligent analysis of the data stream coming from a manufacturing plant.
- IoT companies are very eager to start working on projects addressing:
    - Data processing
    - Sensor nodes and platforms
    - Data communication
    - Energy management systems

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2. Description of Actions

Task 2 of work package 1 focuses on the inventory of IoT technologies and competences across Europe. The result of this task will be an inventory of possible IoT solutions that can be used to elevate manufacturing companies closer to the Industry 4.0. Since this task handles on IoT, the three IoT clusters are involved (DSP V, SCS and mTSW) together with the MTC. The support for the methodology has been done by Inno. The main coordination of the work package was the responsibility of MBI.

Next to the inventory of technologies and competences, the analysis will also be made to map this inventory on the potential needs and applications addressed in work package 1, task 1. These are described in Deliverable D1.1

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3. Objective

The objective of this deliverable 1.2 "ICT competencies for existing (ready to use) or potential developments of IoT Smart Manufacturing solutions" is double:

- First is an overview of the technological offering and competences in the field of IoT of a number of representative clusters
- Second is a preliminary mapping of the competences on the needs specified in WP1.1

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4. Target audience

The target audience of this document are, next to the IoT4Industry consortium partners, the clusters that were interviewed as representatives of the European IoT sector. In total the consortium has interviewed 15 clusters. Finally it is targeted at everyone that has an interest in the IoT competences and technologies present across Europe.

Table 1: Interviewed cluster representatives

Cluster	Country	Representative
Cluj-IT	Romania	Andrei Kelemen
DSP Valley	Belgium	Peter Simkens
Fondazione Distretto Green & High Tech Monza Brianza	Italy	Paolo Piccinelli
Fondazione Torino Wireless	Italy	Chiara Ferroni
GAIA	Spain	Jokin Garatea
HighTech NL	Netherlands	Ben van der Zon
IK4-Tekniker	Spain	Idoia Echave
Innoskart ICT Cluster	Hungary	Orsolya Szaplonczay
IVAM Microtechnology Network	Germany	Thomas Dietrich
Manufuture Baden-Würtenberg	Germany	Gunther Rieger
microTEC SüdWest	Germany	Maziar Afshar
Minalogic	France	Isabelle Guillaume
Secured Communicating Solutions Cluster	France	Olivier Chavrier
Silicon Saxony	Germany	Franck Bösenberg
TICE.PT	Portugal	Pedro Roseiro

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5. process and implementation

The process used to complete this task and to produce the deliverable D1.2 consists of the following elements:

- A study of relevant documents and information
- Interviews with 15 cluster representatives of IoT related clusters across Europe to inventorize the existing technologies and competences in the domain of IIoT
- A preliminary mapping of the represented technologies and competences on the needs by the European manufacturing companies described in D1.1

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6. Analysis

6.1. Introduction

The work package 1 has a clear focus on providing an overview of the needs by the manufacturing companies across Europe and the technology offers by the IoT related industry in Europe. Combined with the study of the regional strategies in these two domains, it will allow the project consortium to better define the target group for the next tasks and work packages.

When the needs of the demand side are clearly mapped and related to the offers of the technology side, the project consortium will be able to:

- Create and support a good match between different SMEs
- Get an insight on existing regional and cluster strategies regarding IoT for industrial applications and find a common balance to leverage on the existing support mechanisms
- Define the most interesting topics for general awareness creation and information dissemination

6.1.1. Description of the work

The second task of WP1. will elaborate on the IoT technology offering available by the many SMEs across Europe. To create this inventory the clusters DSP V, SCS, mTSW and MBI will be involved, with a methodological support by Inno.

The analysis itself will focus on the different competences and technology offers that are available. In other words, there will be a focus on specific IoT competences with a possible application in the manufacturing domain. The inventory will eventually try to provide a mapping of the offers to the demands raised in task 1 of this work package.

6.2. Methodology

The main source for the analysis in this document is a number of interviews conducted by the different contributors. First a number of relevant cluster organisations were selected to make sure to have a wide spread over the European territory. In the next phase the contributors contacted the respective cluster contacts with the question if they were interested in having a conversation (interview) on the topic of IoT technologies for industry. With this question, two documents were provided:

A project note: a document to present the IoT4Industry project and the objectives of the interview. This note also described the possible advantages for the cluster members and how to participate.

An interview guideline: this document listed a number of questions that will be used during the interview itself. The reason for this is to allow the interviewee to prepare for the interview to be able to provide information that is useful for the project.

Before the actual interviews were scheduled, the two documents, listed above, were seen and commented on by the other contributors.

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To follow-up on this task (and on the entire work package), a weekly telco was organized by MBI. These calls were on:

- 03/05/2018
- 17/05/2018
- 24/05/2018
- 31/05/2018
- 07/06/2018
- 14/06/2018
- 21/06/2018
- 28/06/2018

6.3. Interviews, figures and outcome

The project consortium decided to have a significant number of interviews, preferably with cluster representatives from all across Europe. The 15 selected clusters are all dealing with IoT Technology and this for a number of different applications.

Figure 1: overview of interviewed clusters

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To generalize, the analysis of the IoT competences has been done by involving 15 clusters from 10 different countries representing more than 2500 member companies.

6.3.1. IoT competences

One of the main questions that was asked to the cluster representatives was in which subdomains of IoT their member companies were active in. This was merely done to get an overview of the different IoT competences that there are present across Europe and to what extend they are present. To address several challenges or needs from the manufacturing industry, there will be a need for various competences.

The representatives were given a table of different sub domains which are commonly used to categorize activities and/or competences in the IoT domain. They were asked to highlight which of these competences were available in their cluster and approximately how many companies had knowledge of these specific technology domains.

Table 2: IoT competences

Sensors / Data Acquisition	*Sensor technology, systems for data acquisition, Digital Signal processing*
Communication technology	*communication protocols, baseband technology, RF Technology*
Security	*Encryption, data security, network security*
VR and AR	*VR techniques for visualization, simulation,...*
Artificial Intelligence	*Deep learning, Machine learning, Neural networks*
Data Analytics	*Big data, data mining, data processing*
Prototyping and EMS	*Electronic Manufacturing Services, engineering, manufacturing*
Tooling and simulation	*Design and simulation tools, visualization*
ICT Networking	*General ICT networking services like routers, modems, servers, ...*
Other	*Other competences not mentioned above*

Looking at the results of the questionnaire, there is a wide variety of competences present in the European clusters. The biggest group of companies has specific competences in sensor systems and communication technologies. This is to be expected since IoT nodes are very often (if not always) networked, that means using some form of communication, sensor nodes to gather data regarding some physical parameter. The presence of all the other competences, in a fairly even spreading, means that the needed competences to address the technological needs of the manufacturing companies will probably be found in one way or another.

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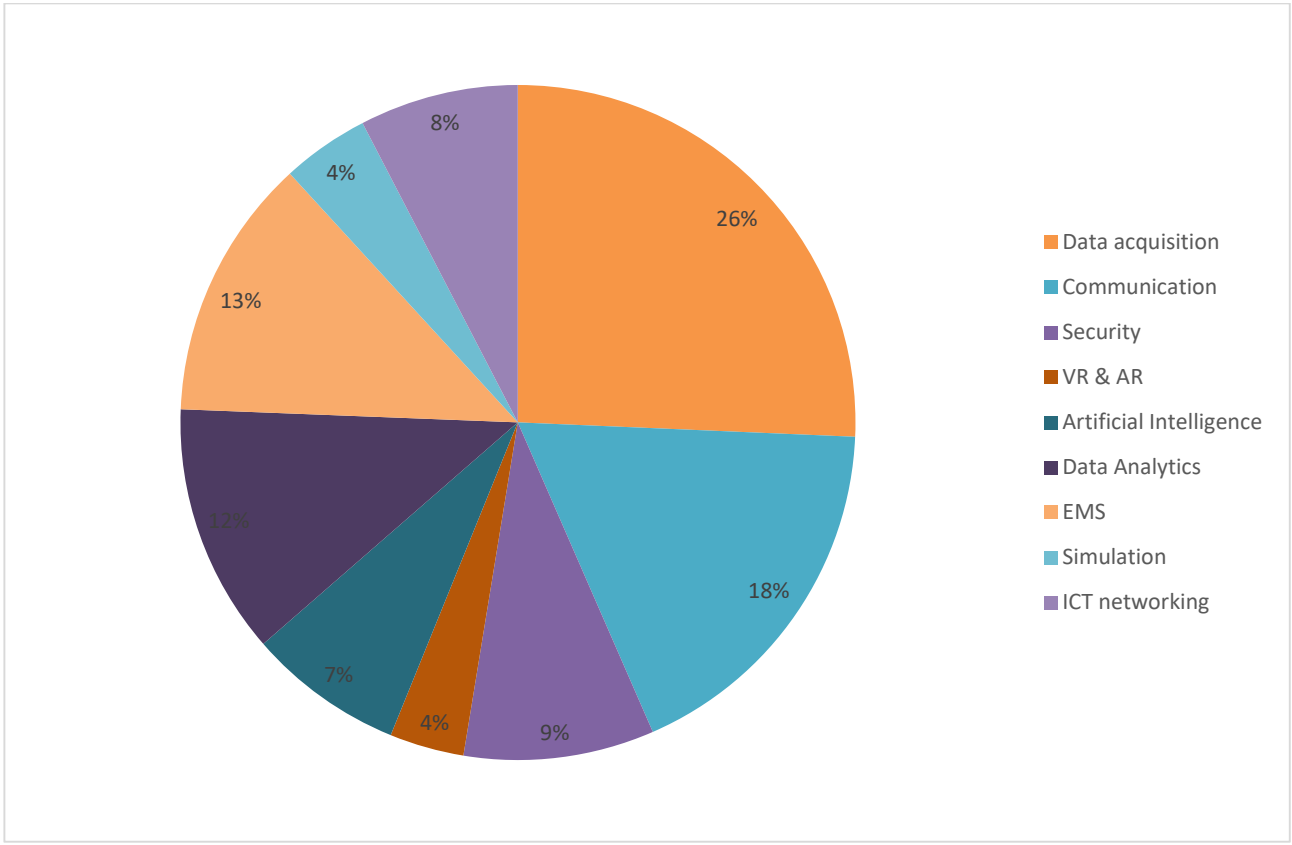
Figure 2: IoT Competences



6.3.2. Existing links with application domains

The specificity of IoT technology blocks or systems is that they hardly ever exist on their own. By definition they are almost always built in some application, serving a certain purpose. That is why the interviewed clusters all indicated that the competences listed above were all used in some or more application domain. It is very interesting to elaborate a bit on that to see in which application domains most of the member companies are active in. This will probably also tell something about the feasibility or the possibility to use these competences in a manufacturing environment.

The list of application domains was not limited. A number of domain were specified, but the interviewees had the possibility to add domains as they saw fit.

A number of the respondents described some application domains as being a “Smart” domain. By that they wanted to highlight that the IoT system or building block that was incorporated in the respective application was made “intelligent” by using the IoT system. The usage of IoT technology allowed the application to interact with the environment, the user, other “smart” applications, … .

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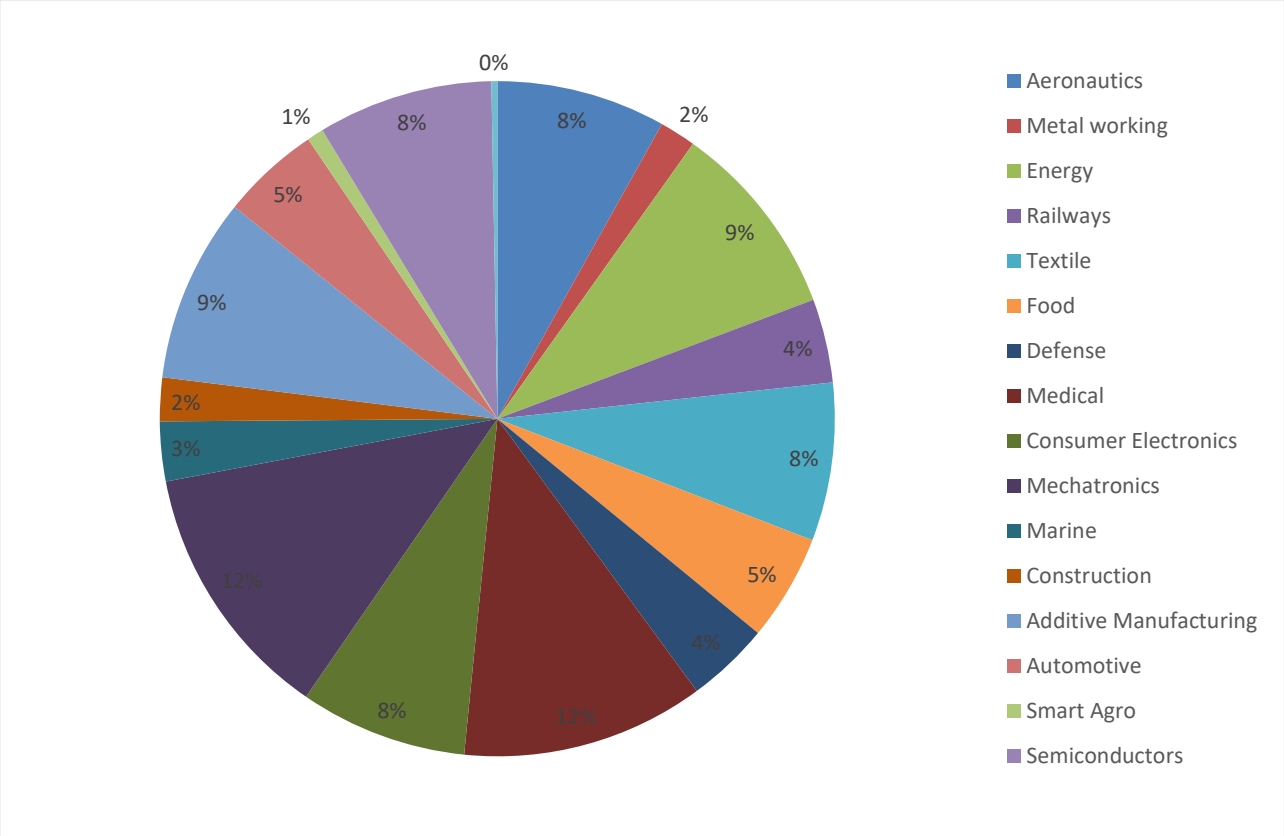
Figure 3: Application domains of IoT clusters



When looking at figure 3, it is interesting to notice that, next to the medical domain, the application domains Mechatronics (12%), Energy (9%) and Additive manufacturing (9%) are relatively highly ranked. This might lead to the conclusion that at present, a significant portion of the IoT companies are already familiar with the industrial or manufacturing domain.

6.3.3. Trends, Challenges, Hurdles

Trends

The questionnaire also asked for a look into the future. The cluster representatives were asked to give their opinion on what possible technological trends were to be expected in relation to Industry 4.0 or Smart Industry (Smart Manufacturing). Nearly all of them answered that the IoT technology would enable the manufacturing companies to increase their efficiency by means of several applications. In general these applications consist of some innovative sensor system gathering one or more physical parameters and generating useful data. This data is then processed by intelligent algorithms, using advanced techniques like Artificial Intelligence or neural networks and properly visualized, to support the management of the manufacturing plant to take the correct decision.

When asked for upcoming applications, predictive maintenance is omnipresent. Apparently, more efficiency is often interpreted as less downtime, precise maintenance and higher throughput. Other applications that were mentioned are monitoring of logistics and supply chain, tracking and tracing of assets and monitoring and control applications (like e.g. Digital Twins).

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Table 3: Top 5 of expected applications

1	Predictive Maintenance
2	Logistics & supply chain
3	Tracking and tracing
4	Monitoring applications
5	Process analysis

Challenges

The interviewees were also asked about possible technological challenges they foresee for their companies if they become active in the value chain of Smart Industry. Here, the different answer were less explicitly different. However there is one answer that really stands out: the need for secure and safe applications.

Table 4: Top 5 of possible challenges for the IoT sector

1	Safety & Security
2	Lack of standards
3	Open innovation
4	MMI
5	Integration in existing applications

The need for (cyber)security is certainly prominently present within the IoT clusters. Since IoT means that everything gets connected, this also means that everything is reachable or addressable. If technology doesn't allow manufacturers to secure their system or their data, this could pose a huge problem. Just imagine what a malicious person could do if he could alter or influence some safety critical data in a chemical or nuclear plant and what the consequences might be ? Or what if valuable and vital information is leaked towards the competitor ? All these negative scenarios ask for a better security of the IoT system and the processed data. But there is more. The possible lack of security or the vulnerability of the IoT system is often seen (by the IoT providers) as the hindering factor in the adoption of IoT technology by companies from the manufacturing domain. The certainty of having a secure and resilient system (i.e. a system that can withstand possible tampering) could (will) increase the adoption of IoT technology.

A second challenge for the IoT providers, but far less stressed than the security issue, is the lack of standards. For the moment there is no uniform standard on the communication protocol for instance or on the read-out procedure of a certain sensor. The IoT technology companies see the need for an open development of platforms and standards, to enable other companies or providers to add their building block or application onto the existing platform. An open platform, developed in a context of Open Innovation could certainly thrive the technology forward.

The other challenges, like the need for support when integrating IoT technology into an existing application, come from companies for whom the manufacturing sector will become a new activity domain. They probably don't have the experience to interact with industrial players and underestimate the needs of an industrial application.

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Hurdles

Finally the cluster representatives were asked to give their opinion on other possible hurdles for the usage of IoT Technology in Smart Manufacturing applications. There were the general feeling is that the challenges from the previous paragraph will be solved by technology sometime, the hurdles in this paragraph are more circumstantial. It is also interesting to notice that these hurdles are non-technical and seem to be harder to overcome.

Table 5: Possible hurdles for the deployment of IoT in industry

1	Lack of knowledge
2	Resources (skills, money, people)
3	Mindset - Business case
4	Reluctancy to engage
5	Social aspects - big brother

The main hurdle that IoT providers see is what could generally be called “Lack of Knowledge”. By this the technology companies mean that manufacturing companies and companies from the industry domain lack the technical knowledge to understand IoT. Therefore it is difficult to present or suggest technological improvements by using IoT. Since the target group still requires additional knowledge the barrier to start using IoT is sometimes rather high.

Lack of knowledge can also be seen in the other direction: IoT companies lacking knowledge and experience to produce (sub)systems for an industrial context. Often technology companies underestimate the requirements that an industrial environment poses on (electronic) subsystems.

These answers are a very interesting input for WP2 of the project where different needs for training are investigated. In general, one could conclude that there certainly is a need for technological training in both domains.

Another significant hurdle is described as (a lack of) resources. Technological skills or knowledge is one important resource where there is not enough of, but this is already addressed in the previous paragraph. Apparently IoT companies think that manufacturing companies do not preserve enough money and time for the changing process involved in starting to use IoT technology. It is often seen as a fundamental evolution in the production process when one starts to embrace IoT technology for Industry 4.0 applications and as a consequence this needs time and financial resources to be successfully implemented. Industrial companies, and more in particular the SMEs, are only focussed on their own production or core activities. They lack the time and/or money to fundamentally look into their internal and external processes and where they could be improved.

A very important resource with an important shortage is skilled people. In the technology oriented companies as well as in the industrial companies, there will be an increasing need for technologically skilled people. Engineers that have knowledge of sensor systems, data interpretation and visualisation, implementation of ICT components, … . This shortage of skilled people could very well be the most important obstruction for a smooth implementation of IoT technologies in the industrial domain.

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A third hurdle that is observed by the IoT companies is the missing business case. When discussing possible IoT solutions with industrial customers, solution providers often see the willingness to start with Industry 4.0 and to have more data oriented processes in place, but when one asks for the reason why, often the answer never comes. A lot of industrial companies seem to have never thought about the possible implications or benefits from the usage of technology. This is probably due to the fact that there is still a significant knowledge barrier to be overcome. IoT companies are asking to also be involved in the discussion on how to improve business and production processes in manufacturing plants.

IoT companies see also a new opportunity for the industrial domain in setting up new business models. For example going from a purely production based business model to a servitization model.

6.3.4. Topics for IIoT

The representatives of the IoT clusters have also given a list of subjects or topics in which they most certainly expect proposals to be submitted. These topics are an interesting parameter to see where the technological companies are willing to work on. Or else it gives a good vision on what they see as being the most interesting topics for projects.

Table 6: Relevant topics for IIoT projects

1	Smart Data projects
2	Smart Sensing platforms
3	Connected systems
4	Energy management systems
5	Robotics/cobotics

The topic that is by far seen as the most important one is “Smart data projects”. The IoT companies see a need in projects where data is gathered (be it existing data or new data provided by sensors) and processed. The ultimate goal is here to reach a higher efficiency for the production site. This could be reached by reducing the use of raw materials, reducing downtime or faulty machinery, increasing throughput, enhancing quality.

If you say more relevant data, you automatically also say intelligent sensor platforms. There where the necessary data is not available yet, one has to apply a specific sensor node to start measuring or capturing the needed data. It is also repeatedly mentioned that the development of such a sensor platform should be open to some extend and, at a specific moment in time, standardized. This to allow third parties to “connect” their node, their application to the platform.

The third pillar of the IoT technology (next to data and sensors) is also in this list on number three: communication technology. In this case there is an even louder call for standardization. A large number of communication protocols and technologies is now being deployed (UWB, LoRa, Sigfox, narrow band IoT,…), all with their own specific advantages and disadvantages.

Because reaching a higher efficiency is one of the key goals to reach when using IoT technology, it should not come as a surprise that IoT companies want to invest and work on specific energy management systems. These systems are targeted at reducing energy consumption. This could be done by efficiently controlling

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production processes, but looking into new forms of energy harvesting could also be a possibility. One has to think on using vibration of machinery to power sensor nodes, reusing dissipated heat, … .

Finally, the IoT companies see a promising future for the use of robots and cobots in our production plants. They can take care of automated and repetitive tasks in order to let the skilled personnel focus on more important tasks. A specific challenge in this domain is personal safety: how can robots be applied in a production area where also people are present. How can both interact with each other without being exposed to a security or safety risk.

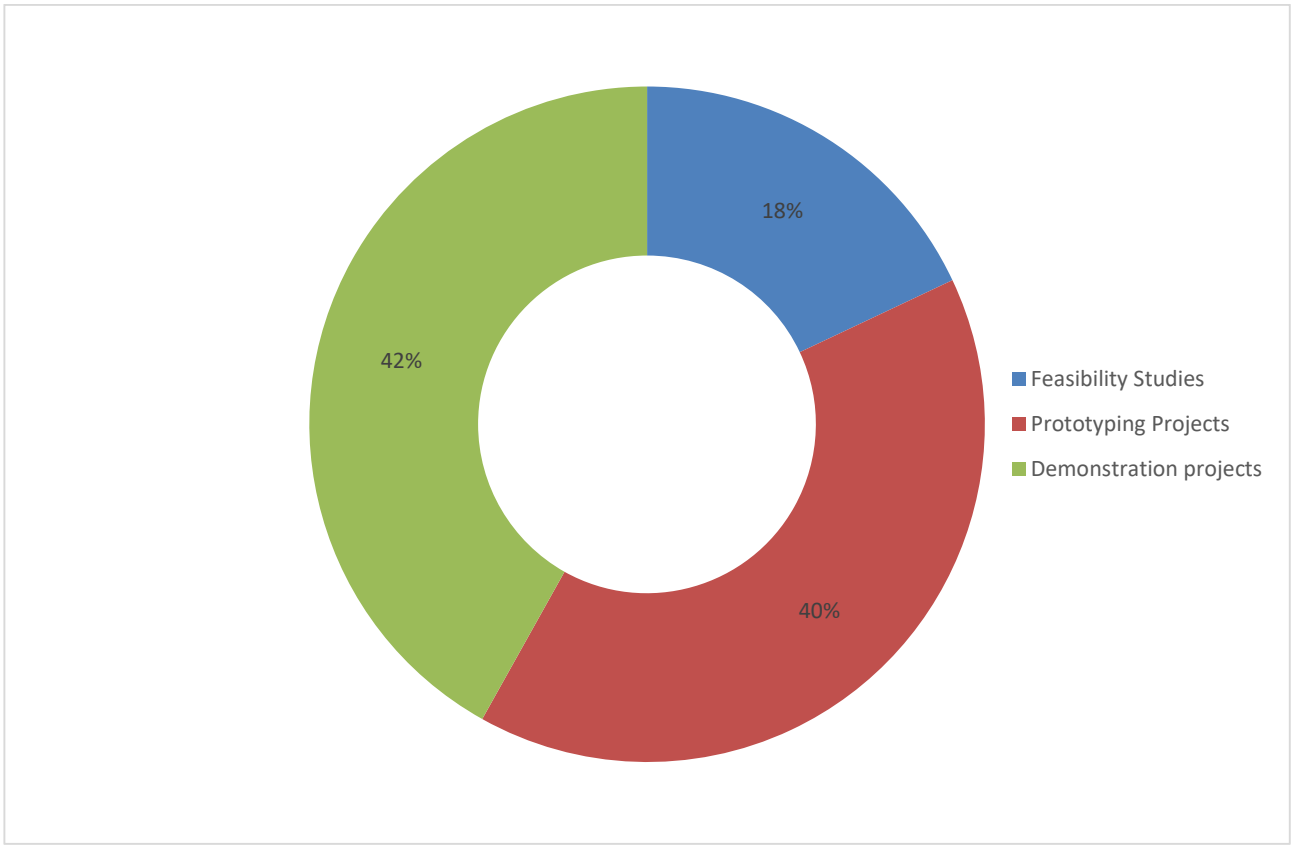
As a general comment, most of the representatives mentioned that the project ideas, the question and needs and as a consequence the topics for projects should come from the manufacturing companies. They believe that the technology is there and is ready. It is only a matter of finding the correct question for the answers.

6.3.5. Project types

The IoT4Industry project foresees financial support for consortia of companies working on IoT application in an industrial context. It is planned to provide financial incentives for three different project types: Feasibility studies, Prototyping projects and Demonstration projects. The representatives of the different IoT clusters gave their opinion to what extend these three mechanisms would be used.

It is also worth noticing that every interviewee confirmed their interest in the project and the cascade funding. There was only one important prerequisite: keep the project administration as lean as possible.

Figure 4: Different project types



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6.3.6. Conclusions

The interviews of representatives of the IoT related clusters give interesting insights on how the technology providers see the evolution towards Industry 4.0. It can lead to a number of conclusions:

- The European IoT companies have a wide variety on IoT competences. Every subdomain is, to some extent, present across Europe
- The European IoT technology companies are used to implement their technology in other application domains. A significant portion of those companies has already some preliminary links with the manufacturing domain
- The IoT companies see great possibilities for IoT technology in a manufacturing or industrial setting. The majority of applications are targeted to increasing efficiency in some way.
- The two main challenges from a technological point of view are (1) the need for better security and (2) the lack of standardization
- The main hurdles to overcome however are not technical! The successful use of IoT technology requires a change in mindset: the manufacturing industry has to be introduced in the possibilities of IoT and the possibility of using or creating new business models think about the possible new business models. A second hurdle or problem is a lack of resources (money, time, skilled staff)
- The IoT related companies think that most of the work will be in projects involving the intelligent analysis of the data stream coming from a manufacturing plant.
- IoT companies are very eager to start working on projects addressing:
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7. Offers and needs: mapping and matching

7.1. Needs of the manufacturing companies

Paragraph 6.5 of deliverable D1.1 “European mapping of concerned SMEs and selected/suggested focus topics and sectors” describes the outcome of task 1 of work package 1. There is a good description of the needs and expectations of the manufacturing companies with regards to the use of IoT technology.

Figure 11, on page 30 of the D1.1 gives an overview of the (technological) interests of the manufacturing technologies. There we see a high score for topics related to robotics and automation, projects involving simulation and modelling and projects with sensors and sensor nodes.

In general, one of the conclusions of the D1.1 is that manufacturing companies are interested in projects addressing:

- Automation and monitoring
- Simulation and modelling
- Big Data
- (Cyber)security

7.2. (mis)Matches and conclusions

The first important similarity between D1.1 and D1.2 is that both reports state that the most important hurdles or needs to come to a successful implementation of IoT in the manufacturing domain are not technical ! Aspects like business models, reluctance to adopt the technology, ignorance about some technological aspects seem to be a large portion of the hurdles.

The IoT4Industry project will have to address this in the provided trainings and awareness raising sessions!

Concerning the technical or technological needs and offers there are some similarities and some mismatches.

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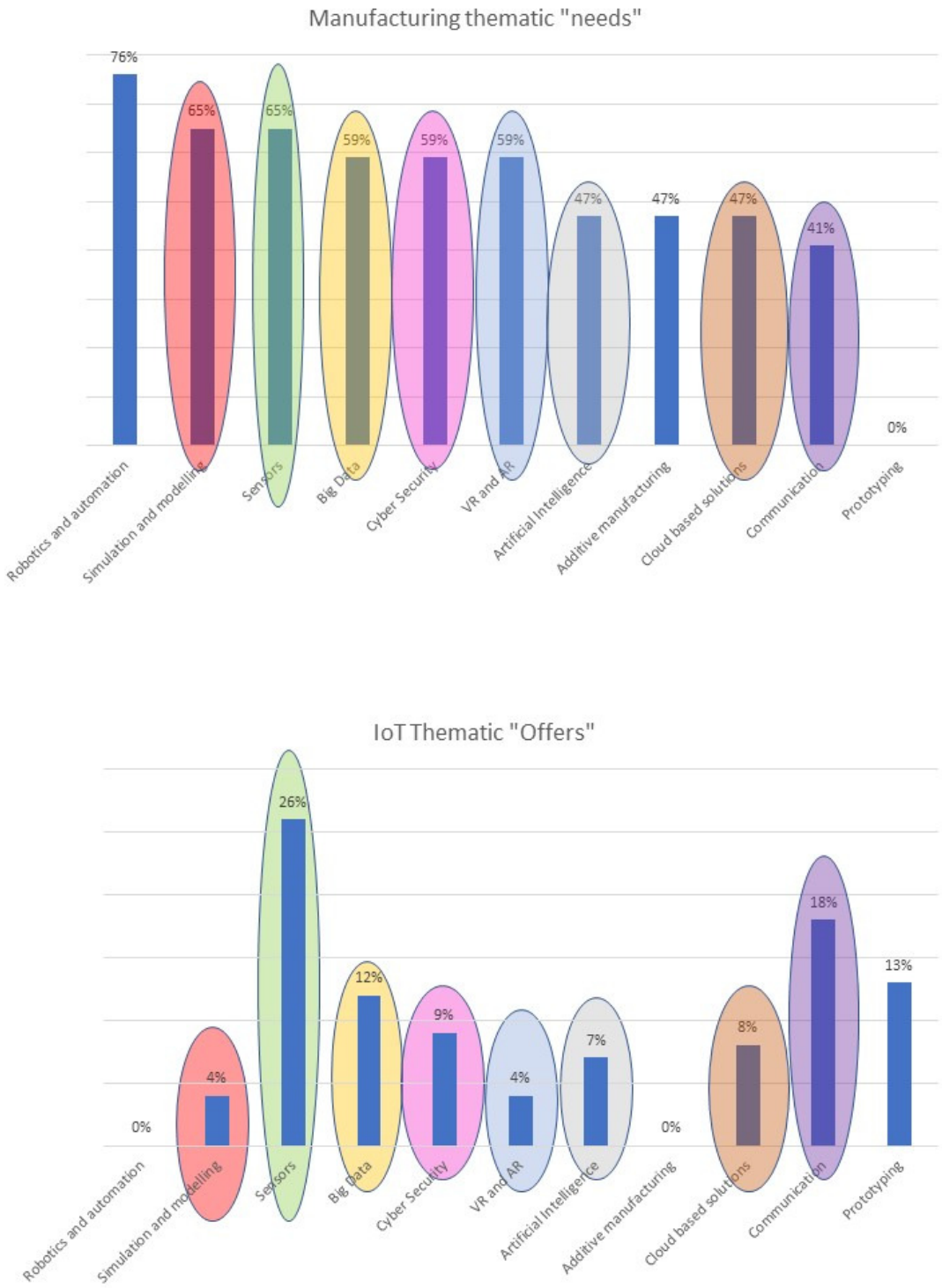
Figure 5: Matching between needs and offers



It is clear that on the majority of the thematic interests there is a correspondence between what is needed by the manufacturing companies and what is seen as interesting by the technology companies.

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It has to be noted that the importance however of certain topics is different for the manufacturing than the IoT side. This might be caused by a lack of knowledge on the specific topics or an inexperience in the industrial domain.

This leads to the conclusion that for **the majority of the existing needs in the manufacturing domain, an answer can be found in the IoT domain across Europe**. The crux however will be in translating the needs and offers that they can be understood by all parties involved.

However two topics show a clear "mismatch". For the manufacturing the topic "robotics and automation is clearly very important, but it is non-existing in the table of the offers. The probable explanation would be that robotics is not seen as a clear IoT topic. It certainly consists of a number of subtopics like data gathering and processing, analytical data handling,… . A second one is additive manufacturing. Again this is not generally seen as an IoT topic.

A final and important thing to notice is this. In the deliverable report D1.1 one of the conclusions for the manufacturing companies states: "Manufacturing SMEs can identify at macro level technical topics but they are not able to identify precisely what they need. Therefore the offering side (IoT) has to really push their solutions and prospect manufacturers because technologies they offer represent an emerging market". One of the conclusions of the interviews with the IoT companies is: "most of the representatives mentioned that the project ideas, the question and needs and as a consequence the topics for projects should come from the manufacturing companies. They believe that the technology is there and is ready. It is only a matter of finding the correct question for the answers".

This "mismatch" is a clear indicator for the relevance of projects like IoT4Industry. Every possibility to bring both domains closer together and to remove possible hurdles will be a next step towards a successful implementation of Industry 4.0

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8. Annexes

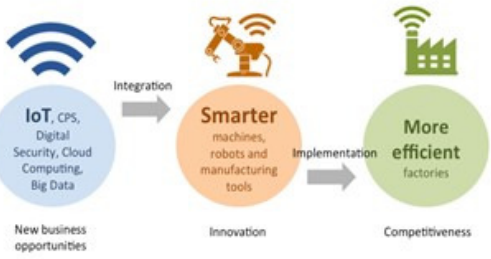
8.1. Project concept note

IoT4Industry

Context

The IoT4Industry project seeks to support EU growth and competitiveness through the development of a new cross-sectoral industrial value chain based on the **integration and use of IoT and related components (Digital Security, Cloud Computing, Big Data, Artificial Intelligence…) into manufacturing tools, machines and robots**, through the cross-border collaboration between SMEs and other RDI actors of the ICT and advanced manufacturing sectors.

New cross-sectorial value chain



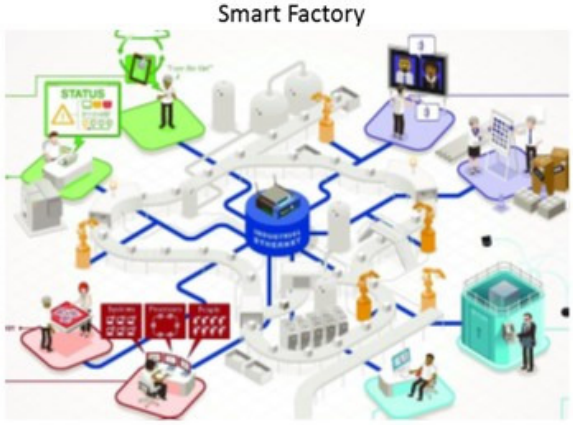
for European SMEs

Objective

The goal is to connect and encourage collaboration between relevant innovation actors from the IoT and industrial sectors to:

- Enable the access to industrial market to IoT SMEs
- Modernize the production capabilities in European industry, and in particular in SMEs

Smart Factory



Your benefits ?

- Involve your members into cooperation with industrial companies in Europe
- Your members may be qualified to receive voucher from 25 to 60K € to deploy IoT technologies into industrial use cases. (Feasibility study, prototyping, demonstration / pilot)*
- You and your expertise will be recognized to speed up and assist industrial companies in their transformation for the future.

We would like to have a discussion with you to gather your vision and analyses on the Internet of Things technologies in your environnement.

Contact

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Phone: +33 6 64 50 88 05
Email: guillaume.roux@pole-scs.org

SECURED COMMUNICATING SOLUTIONS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 777455

IoT4Industry

Appendix

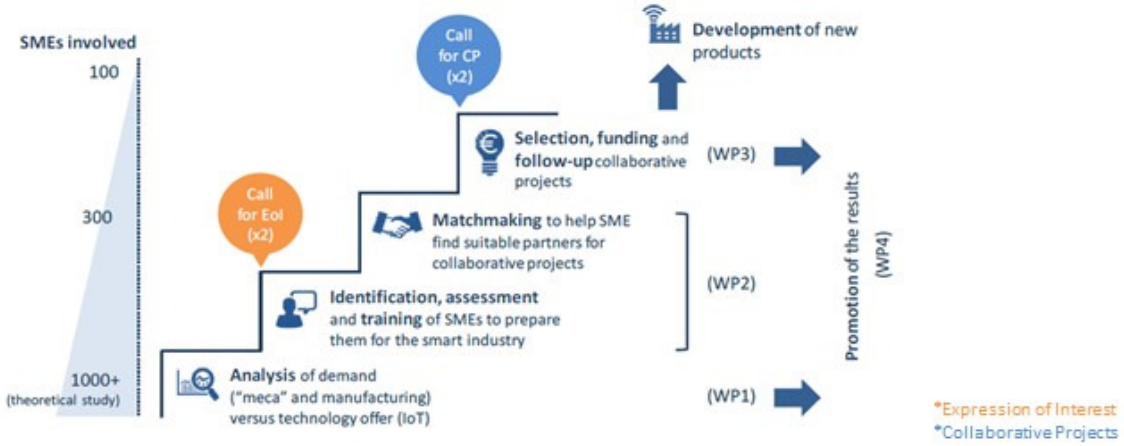
*Types and characteristics of vouchers

	Feasibility study	Prototyping	Demonstration / pilot
Eligible expenses	Technical feasibility, intellectual property, design study…	Development, prototyping, miniaturisation…	Large scale-demonstration, testing, validation…
TRL of envisaged project	5-6	7-8	8+
Maximum amount granted per beneficiary (SME)	25 000 €	45 000 €	60 000 €
Funding rate		Lump sums	
Time frame	Up to 6 months	Up to 12 months	Up to 12 months

Methodology of the project IoT4Industry

It is organized on 4 steps (Work Package):

- Provide large information support to SMEs throughout Europe having shown their interest in the matter of smart manufacturing
- Provide them training
- Provide them matchmaking action (collaborative projects between manufacturers and ICT companies)
- Provide them a support to develop products, processes….



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8.2. Interview guide

INTERVIEW GUIDE

1. Interviewed cluster

CONTACT		
Name of contact		
Function		
Phone number		
Email		
CLUSTER ORGANISATION		
Name		
Address		
Public/Private		
Country		
Number of members	Total number of members	
	Small enterprise (<250 empl.)	%
	Medium sized enterprise (250…1000 empl.)	%
	Large Enterprises (> 1000 empl.)	%
	Labs – research facilities	%
	Groups – clusters	%
	Associations	%
	other	%
Coverage area	National □	Regional □
	European □	Worldwide □
Focus	Application oriented □	Technology oriented □

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Application domains	

2. IoT competences

Theme	% covered in cluster	Mainly used for application domain
Sensors / Data Acquisition *Sensor technology, systems for data acquisition, Digital Signal processing*		
Communication technology *communication protocols, baseband technology, RF Technology*		
Security *Encryption, data security, network security*		
VR and AR		
Artificial Intelligence *Deep learning, Machine learning, Neural networks*		
Data Analytics *Big data, data mining, data processing*		
Prototyping and EMS *Electronic Manufacturing Services, engineering, manufacturing*		
Tooling and simulation *Design and simulation tools, vizualization*		
ICT Networking		

What do you see as the main unique expertise or competences represented in your cluster ?

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3. Links to Smart Industry

Is there a link, or do your member companies have links to “Smart Industry” or manufacturing ?

If yes, which sectors:

□ Aeronautics	□ Medical
□ Metalworking	□ Consumer Electronics
□ Energies	□ Mechanic/Mechatronics
□ Railways	□ Marine
□ Textile	□ Construction
□ Food & Beverage	□ Additive manufacturing
□ Defense	□ Other:

What are, in your opinion, the primary trends regarding Industry 4.0 ?

What are the challenges for your members regarding Industry 4.0?

Are there other hurdles than technological for Industry 4.0?

4. Calls for the IoT4Industry projects

In the calls for IoT4Industry projects we will try to match competences from IoT companies to challenges or needs from manufacturing companies.
Which main technologies could your cluster supply ?

According to you and your previous answers, which 5 IoT technology’s topics should be eligible? for which purpose and why?

Key words	Themes	Needs

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Would your members be interested in these calls ?

Do you already have ideas on topics for the projects ?

Can you suggest some SME's to contact in the framework of these calls ?

Regarding the IoT4Industry support and to your opinion, which project type would be the most interesting ?

- Feasibility studies (%)
- Prototyping projects (%)
- Demonstration projects (%)

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