



DELIVERABLE DT1.2.4

Integration of outputs from projects
towards comprehensive BSO support pack
for SMEs

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| Lead Contractor of the Deliverable: | PP 5 – Centro Servizi Industrie S.r.l. – Polo MESAP |
| Authors: | PP 1 – Eva Breuer, Stefanie Neumayer, Georg Alber |
| | PP 2 – Francesca Pozzar, Saverio D'Eredità |
| | PP 3 – Boris Golob, Mario Vukelić, Andrea Oštrić Petropoli, Nadija Surać, Suzana Knežević, Sanja Miškulin |
| | PP 4 – Antonia Liebl, Thomas Helfer |
| | PP 6 – Łukasz Górecki, Ewa Dudzic-Widera |
| | PP 7 – Marie Kubankova, Dagmar Doleželová |
| | PP 8 - Sophie Wiesinger, Michal Hudec, Margarethe Ueberwimmer |



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1. Introduction

The project “Boost4BSO” is cofinanced under the Central Europe Programme and addresses the 4th Call topic “Industry 4.0/Advanced Manufacturing” resp. Priority 1 / SO 1.1, aiming at improving knowledge build-up and sustainable knowledge transfer linkages among CE BSOs (BSO: Business Support Organisation). The main objective of Boost4BSO is to build up Industry 4.0-related (I4.0) capacities of CE BSOs enabling them, as key innovation system actors, to provide effective and efficient support services for local companies in I4.0 transformation. To reach this goal, Boost4BSO capitalizes on training contents/methodologies developed by the core projects InnoPeer AVM and Things+ (both Interreg CE) and the upscaling practice experience of IoT4Industry (H2020), with complementary inputs from further EU/national I4.0 related initiatives.

Boost4BSO creates a comprehensive capacity building programme for BSOs comprising a Competence Pack and Toolbox for I4.0-related SME support (technology + organisational change + business strategy + product/service innovation) and demonstrates how knowledge transfer among BSOs from different CE regions can be sustainably strengthened and qualitatively enhanced through the innovative Boost4BSO Snowball Mechanism and Awarding Procedure. By targeting CE BSOs and transnational BSO networks for strengthening their knowledge transfer linkages, Boost4BSO will sustainably impact the dynamics of I4.0 transformation of SMEs across CE and open new opportunities for economic growth and job creation in I4.0-related business fields.

Boost4BSO project results will raise the capacities of wide BSO networks across CE regarding all relevant I4.0 aspects to be considered by regional companies for successful I4.0 transformation/upscale and provide BSOs with a toolbox enabling them for demand-driven I4.0 support services for their local company networks. Boost4BSO snowball mechanism for downstreaming project results will spread I4.0-related knowledge and SME support tools among wide BSO networks from different CE regions and put them in the lead of driving digital transformation in local company networks. This will help CE SMEs to cope with different aspects of I4.0-related upscale and develop adequate business strategies. By interlinking a growing number of trained BSOs based on the Boost4BSO downstreaming approach, knowledge gaps on I4.0 implementation will be sustainably reduced in CE regions, consequently leading to a higher level of I4.0 maturity of CE economies. CE SMEs will become capable to enter I4.0-related business fields, develop innovative I4.0 products/services and start transnational collaboration. Political sustainability shall be secured by addressing the I4.0 focus in existing RIS strategies and forthcoming I4.0 strategy upgrades with 2030- and/or long-term perspective.

This report was prepared in the framework of Thematic Work Package 1 “Development of integrated BSO I4.0 competence pack and implementation toolbox”, Activity A.T1.1 “Integration of challenges and needs”.

Based on desk research and partners’ experience and collective knowledge this report includes an overview of the most relevant results and lessons learnt from the several EC and National/Regional projects: these data will be elaborated so to set up a comprehensive framework of activities for supporting the companies’ development in the industry 4.0/Adv Manufacturing field.



2. Background - Digital transformation, Industry 4.0

In its **SME Strategy for a sustainable and digital Europe**¹ the European Commission has chosen to focus on three pillars:

- capacity-building and support for the transition to sustainability and digitalisation,
- reducing regulatory burden and
- improving market access and improving access to financing.

The over 600 members of the **Enterprise Europe Network (EEN)** will continue delivering innovation support services and internationalisation support services - at the same time they will strengthen their role in supporting SMEs in becoming more sustainable in terms of introducing solutions for a circular economy and commercialisation of green technologies.

For what concerns the digital transformation processes in SMEs, the European Commission counts on the more than **240 Digital Innovation Hubs (DIH)** which should deliver user-friendly and targeted advice and training.

With the support of the Digital Europe Programme, the Commission will develop **Digital Crash Courses** for SME employees to become proficient in areas such as AI, cybersecurity or blockchain, building on the experiences of the Digital Skills and Jobs Coalition platform. DIHs will act as intermediaries between SMEs and universities/training providers at the local level.

On the other hand, the **New Industrial Strategy for Europe**² underlines the importance of cooperation between young technology SMEs and traditional industrial SMEs in providing industrial modernisation and strengthening innovation in innovative business eco-systems.

Digitalisation is deeply affecting all industry sectors as the driver of product/service/business innovation, but also as the threat for employment in traditional production. Many Central European production companies are urgently searching for guidance and support to master transformation towards Industry 4.0 (I4.0). Several I4.0 Initiatives and programmes have already been established or will be officially announced in Central European countries. Public support programmes provide financial support by way of vouchers and grants for advice and training services as well cofinancing of investment projects.

Business Support Organisations (BSOs) face new challenges to keep pace with the ongoing changes impacting their company networks. For CE BSOs it is crucial to advance their own capacities and develop adequate SME support offers to help local SMEs to transform their operations and develop I4.0 business strategies.

For many industrial SMEs the technologies, products and services related to the fourth industrial revolution, considering their current business models, are not feasible, either from a financial or an organisational point of view. Therefore the role of BSOs is to support industrial SMEs in redefining their business models in order to create an appropriate framework for introducing I4.0 solutions such as for instance: integrated cyber-physical systems based on sensors, SCADA (Supervisory Control and Data Acquisition), MES (Manufacturing Execution System), APS (Advanced Production System), ERP (Enterprise resource planning); big data analytics in process optimisation, preventive maintenance and customer services; automation, robotics and additive manufacturing for flexible customised production processes; artificial-intelligence based systems in predictive maintenance, quality management and customer services, as well as Internet of Things allowing to introduce servitization in the commercialisation strategy of innovative products. At the same time **regional networking** between local and regional self-

¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: „An SME Strategy for a sustainable and digital Europe”, COM(2020) 103 final, Brussels, 10.3.2020

² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: “A New Industrial Strategy for Europe”, COM(2020) 102 final, Brussels, 10.3.2020



governments, vocational schools, technical schools, universities and BSOs should be encouraged to develop training programmes for current and future employees with specific focus on new skills and competencies required in companies that have entered into the I4.0 change process.



3. Experiences from previous and ongoing projects

3.1. Background information

- **Information on the examined projects:** here below we report detailed information and links, on the examined projects, to provide to you a quick guide on the envisaged activities and the expected results.

| <u>PlatformaAVO+</u> | |
|--|--|
| Scheme | <i>National - OP Enterprise and Innovation for Competitiveness</i> |
| <p>The project PlatformAVO+ is a follow up project of Internationalisation of Platform AVO implemented in 2016-2019 and supported by the 1st call of OP Enterprise and Innovation for Competitiveness (www.cztee.eu/platforma) to support the cooperation and communication among business organisations, primarily SMEs and research organisations. It also aims to provide advisory services to both the public and private sectors focused on strategic management, business development, marketing and project management and transfer of technologies</p> <p>In the project Internationalisation of PlataformaAVO+ project AVO delivered the Technology Foresight of applied research, I4.0 was identified as a key priority.</p> | |

| <u>MITTELSTAND 4.0</u> | |
|---|-------------------------|
| Scheme | <i>National Measure</i> |
| <p>The Mittelstand 4.0-Kompetenzzentrum Augsburg offers assessments of the potential of medium-sized companies for the introduction of digitization and to enable transfer of the project results to industry.</p> <p>Priorities:</p> <ul style="list-style-type: none"> • Networked production • Artificial intelligence • Intralogistics • Work 4.0 • Digital business models • Finance 4.0 | |

| <u>THINGS+</u> | |
|--|---|
| Scheme | <i>European - Interreg Central Europe</i> |
| <p>THINGS+ project aims to enrich the portfolio of companies with additional services that can increase value delivered to customers and improve their position on the market, by strengthening entrepreneur’s skills in service innovation management.</p> <p>THINGS+ project is focused in transformation of traditional companies into regional innovation actors, without excessive investments. The Key output of those actions will be the transfer of a new approach to helping entrepreneurs to introduce service innovation into manufacturing companies and increase prosperity on changing markets.</p> | |



| <u>InnoPeer AVM</u> | |
|---|---|
| Scheme | <i>European - Interreg Central Europe</i> |
| <p>The InnoPeer AVM project develops and tests a first comprehensive, transnational AVM qualification programme, customized on the needs of central European companies. The multi-level programme uses a mix of well-proven and novel training formats and methods for basic, advanced and practical trainings. These include living lab webinars, practical test runs at a model factory and AVM strategy camps and the Participants attending the projects' teaching cases become InnoPeer-certified AVM managers. Pilot trainings involve target companies and innovation managers from all participating regions. The piloted programme is freely available to other interested regions and companies. The project also prepares regional action plans and a roadmap on AVM capacity building and establish the 'InnoPeer AVM Board' that will further promote project results.</p> | |

| <u>SYNERGY</u> | |
|---|---|
| Scheme | <i>European - Interreg Central Europe</i> |
| <p>SYNERGY aims at strengthening currently underdeveloped linkages, cooperation and synergies between companies, industry, research, intermediaries and policy makers in central Europe. The project will analyse funded and finalised innovation projects and cluster institutions involved in projects into three key areas covering the most promising modern industrial technologies. These areas include additive manufacturing and 3D printing, micro- and nanotechnology-related processes and materials, as well as the industry 4.0 sector. Institutions and clusters included in each area will form 'synergic networks' based on a novel projects assessment methodology and a 'synergic consortia matchmaking' IT online tool. Moreover, the project will define new crowd innovation services and test them in different types of pilot actions. As a result, project activities will boost the creation of innovative services and facilitate transnational cooperation in the industrial sector.</p> | |

| <u>ProsperAMnet</u> | |
|--|---|
| Scheme | <i>European - Interreg Central Europe</i> |
| <p>Many smart specialisation strategies of central European regions recognise the need of strengthening advanced manufacturers. In particularly small- and medium-sized companies face substantial competitive pressure. The ProsperAMnet project offers know-how and create a transnational network to collect experiences from the local level. The project jointly develops innovative tools and approaches to support advanced manufacturers and will build their capacities. Additionally, partners develop strategic action plans and recommendations for the future</p> | |



| <u>NUCLEI</u> | |
|--|---|
| Scheme | <i>European - Interreg Central Europe</i> |
| <p>NUCLEI aimed to establish a transnational innovation management model in Central European regions and created a transnational pool of knowledge that support advanced manufacturing innovation beyond regional borders.</p> <p>This work increased economic connections and interdependencies among seven regions and encouraged more effective transnational value chains in automotive, electrical industry, IT sector, robotic and mechanic automation.</p> <p>The main project achievements were:</p> <ul style="list-style-type: none"> • An analysis of the potential impact and integration with other regional projects or relevant policy initiatives. • A trans-regional analysis of the policy instrument adopted in Central Europe regions, outlining those measures that can be investigated in depth and to inspire new policy initiatives • result transfer to 53 managers, outlining the request companies involved in the project pilot actions • a careful analysis of the different regional contexts with a focus on regional R&D goals for advanced manufacturing, to be considered in the design of innovation services, made by the NUCLEI partners. | |

| <u>European Automotive Cluster Network (EACN) for Joint Industrial Modernisation Investments</u> | |
|--|-------------------------|
| Scheme | <i>European - COSME</i> |
| <p>European Automotive Cluster Network (EACN) for Joint Industrial Modernisation Investments is a European project formed by six automotive clusters.</p> <p>The aim of the initiative is to support the creation of collaborative research projects and of joint investments in industrial modernisation by way of bringing together SMEs in interregional thematic groups, define a common strategy and roadmap for action; strengthen Cluster-to-Cluster cooperation via a common collaboration strategy and joint cluster actions; and build an strategic interregional collaboration and strong industry cooperation around four pillars:</p> <ul style="list-style-type: none"> • Virtualisation for planning processes (simulation and modelling) • Robotics & Artificial Intelligence in production processes • Elasticity of production processes in SMEs • Skills and competences of employees | |

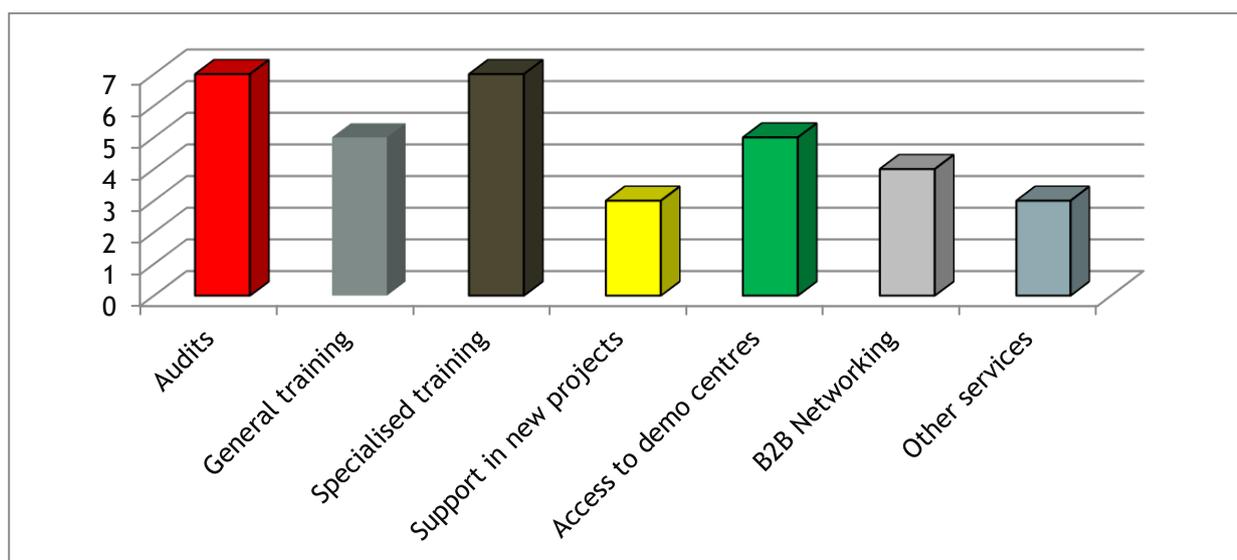


| <u>IoT4Industry</u> | |
|--|--------------------------------|
| Scheme | <i>European - Horizon 2020</i> |
| <p>The goal is to connect and encourage a cross-collaboration between relevant innovation actors from the industrial and IoT sectors from different EU regions to:</p> <ul style="list-style-type: none"> • Modernize the production capabilities in European industry, specifically in SMEs • Increase the competitiveness of companies through more efficient production • Answer to local needs with the help of vouchers and fully meet demands <p>It is organized on 4 steps:</p> <ul style="list-style-type: none"> • Provide large information support to SMEs throughout Europe having shown their interest in the matter of smart manufacturing • Provide them training about IoT opportunities and the call itself • Provide them matchmaking action (collaborative projects between manufacturers and ICT companies) • Provide them a support to develop products, processes and to capitalize this technological introduction | |



- **First glance overview of the services provided by each project:** here below, we report a summary of the services performed by each analysed project

| | Organisation | Project | Audits | Advisory | General training | Specialised training | Support in new projects | Access to demo centres | B2B Networking | Other services |
|-----------|---|-----------------------------|--------|----------|------------------|----------------------|-------------------------|------------------------|----------------|----------------|
| D.T.1.2.1 | Friuli Innovazione | Thing+ | YES | YES | N/A | YES | N/A | N/A | N/A | YES |
| D.T.1.2.1 | Business Upper Austria | InnoPeer AVM | YES | YES | YES | YES | N/A | YES | N/A | N/A |
| D.T.1.2.2 | MESAP | IoT4Industry | YES | YES | YES | YES | YES | N/A | YES | YES |
| D.T.1.2.3 | Association of research organizations | PlatformaAVO+ | YES | YES | YES | N/A | YES | YES | YES | YES |
| D.T.1.2.3 | Step RI | SYNERGY | N/A | N/A | N/A | N/A | N/A | YES | YES | N/A |
| D.T.1.2.3 | Silesia Automotive and Advanced Manufacturing | EACN | YES | YES | YES | YES | YES | YES | YES | N/A |
| D.T.1.2.3 | Cluster Mechatronics & Automation | Mittelstand 4.0 | YES | YES | YES | YES | N/A | YES | N/A | N/A |
| D.T.1.2.3 | FH OÖ Forschungs- und Entwicklungs GmbH | ProsperAM and Entertransfer | YES | N/A | N/A | YES | N/A | N/A | N/A | N/A |
| D.T.1.2.3 | Business Upper Austria | NUCLEI | N/A | N/A | N/A | YES | N/A | N/A | N/A | N/A |



We can notice that most of the projects carried out audit and specialised trainings, therefore high added value services. On the contrary, the support in the preparation of feasibility studies or projects, that could be helpful in the framework of a support activity, is a less present service.



3.2. Taxonomy

We provided a taxonomy to have a harmonised and standardised reference framework for next strategic Boost4BSO activities.

The taxonomy should mitigate and avoid, as much as possible, misunderstanding in classifying the services, providing us a framework and a beacon to set up a coherent guideline for the tool box setting up.

Audits to identify needs and challenges for implementing I4.0 solutions

Auditing is defined as the verification activity of a process or quality system, to ensure compliance to requirements or to identify internal needs/problems to be tackled and solved.

It could be carried out with the use of questionnaires, or on-site.

Key roles of auditing in Boost4BSO context are a) to understand existing capabilities and attitude towards I4.0 transformation in particular SME and b) to explore appropriate I4.0 options for implementation in particular SME

Advisory services and workshops to prepare I4.0 strategy, roadmap and action plan

The advisory services are services aimed to give focused advice to the customer (in our case, mainly SMEs) on a particular issue or topic.

The advisory services tackle the issues (economical, technical, management, human resources...) that are felt as problematic by the customer, and produce as outputs a number of recommendations useful for solving the specific needs.

Workshops are dedicated meetings, in which focused issues are tackled in order to progress beyond the current state of play.

Boost4BSO advisory scope is a) to address complex issues, circumstances, change and impact management during implementation of I4.0 solutions and b) to leverage I4.0 enabled results and newly created capabilities into increased competitiveness, cost reduction and revenues.

General training on the impact of I4.0 on SMEs

Training activities in order to raise awareness among the SMEs about the potential impact of Industry 4.0/Adv. Manufacturing technologies on their business.

Boost4BSO aims to enable SME leadership's understanding of impact and benefits that I4.0 solutions bring to SME performance and competitiveness. That understanding is of paramount importance from "getting tangible results" and "real life implementation" perspective.

Best practice & "black box" examples combined with (un)successful implementation case studies are useful addition or substitute to training activities.

Specialised training on selected issues:

Training activities on specific Industry 4.0/Adv. Manufacturing issues.

As already available trainings, webinars and knowledge resources would be used to enable basic understanding of key I4.0 technologies and topics. Fundamental for Boost4BSO knowledge exchange platform.

Support in the preparation of feasibility studies, projects

Support activities in preparing new projects or studies.

Best practices, successful and failed projects and relevant results from implementation and return on investment perspective as additional content for Boost4BSO knowledge exchange platform.



Providing Access to demonstration centres and testing facilities

Support for accessing demonstration centres and testing facilities in order to allow clients to experiment before going into production.

Best practice exchange toward BSOs with limited resources as mean to create organizational competences for establishing and growing partnerships with I4.0 solution providers, research centres and scientific institutions. Additional experiences of creating and supporting ecosystem of I4.0 solution providers, developers, users and public institutions.



4. Analysis

All the analysed projects reported a high number of activities that aimed at supporting SMEs, mostly on the I4.0 field. The type of assistance has been segmented in 8 main categories, for a better classification. We produced a taxonomy in order to define the operational framework: however, on purpose, we did not reshape the sourced deliverables (DT1.2.1, DT1.2.2 and DT1.2.3) according to the taxonomy, since our analysis will be horizontal through the various categories.

The main goal of the current deliverable is to identify the best practises experienced by the partners in the SMEs assistance process, learning from the eventual mistakes, and optimising and sharing the adopted methodologies.

We have to pick and elaborate the services that have the highest added value, and can be recognised worthwhile by our clients for their growth.

As preliminary remark, it is quite evident that the road to I4.0 needs a wide spectrum of support services: I4.0 does not deal only with technology innovation, but concerns also a high number of business functions that have to be improved/modified in order to have a correct and fruitful implementation.

The experience from the PPs past projects confirms the above statement: the support activities that have been performed tackled several topics, with a particular attention to HR, internal organisation, market forecast, business models and, obviously, technology innovation.

On top of this, we have to consider the degree of awareness and maturity of the companies, which inevitably reflects on the topics covered and on the degree of in-depth assistance required.

Therefore, the more homogeneous the audience is, the better the support services can be structured.

Another factor to be taken into account is the organisation of the services: a strategy that structures the activation of a set of services is surely able to create a more efficient pathway of support. And can generate a customer care effect with the supported clients.

Audit

Audit is one of the typical activities useful for a better understanding of the company needs: however, strong differences can be pointed out if it is performed through a personal interview with the company or through the use of questionnaires.

Generally speaking, the return rate of the questionnaires is not, on average, so performing: companies are instinctively reluctant in filling forms, and a strong accompanying activity should be twinned, in order to obtain awareness on the proposed service and appropriate feedback.

If an audit is performed interviewing the client, it is useful but implicitly “expensive” in terms of engagement (for both the auditor and the company).

However, it’s one of the most common and used tools that enable to enter in confidence with the client and understand the necessities to be tackled.

The audit, by its nature, investigates on issues that are strictly specific to the interviewed company, and, even if these are not always explicitly expressed (most of times the auditor should be able to assess the needs), is mainly useful for a one-to-one assistance service.

In some cases, the recourse of an external expert is needed.

Suggestions:

- The identification of the audit subject (e.g. technical topics, market perspective, organisational changes due to I4.0, ...) is important, in order to avoid dispersions and for a good organisation of the future support initiatives.



- Questionnaire alone should be used only if we want to investigate general trends or make holistic surveys: however, the Project Partners (PPs) should be capable to select “hot” topics, in order to raise appropriate interest.
- The questionnaire should be short, and very clear. And it should be anticipated with awareness actions, highlighting the benefits that could bring to the client.
- The language used could be the native one: however, if the audit concerns issues dealing with internationalisation, the language used should be English.
- The audit made by interviewing the clients obtains a higher success rate, and obtains customisation.
- The audit exercise needs to be necessarily twinned with a structured development/support plan. E.g., if the audit detects lack of knowledge or problems with HR, or lack of funding, the PP should be reactive responding to the identified needs.

Advisory services and workshops to prepare I4.0 strategy, roadmap and action plan

The Advisory services performed by partners covered a wide range of topics: as repeatedly said, the implementation of an I4.0 strategy and activity involve a high number of company business functions. Most of the Advisory services has been conceived having the workshops and the training activities as triggering starting point: therefore, the questionnaires and the audits seem not to be the main propulsive factor.

Suggestions:

- Workshops have been an important tool for collecting needs, and consequently activate advisory services.
- Organisation of strategy camps: moments in which participants share their concerns/challenges (that can be of any sector), and elaboration of possible solutions.
- Support during negotiation phases: applied during Matchmaking events, but it could be a standard service to be offered. This assistance would imply, however, a wide range of competences (contractual, market, technical, ...).
- The SMEs behaviour is a decisive factor to be taken into account by PPs when approach them proposing a service: apart from the specificity of the assistance topic, and this is why an audit exercise is important, PPs should know the SME attitude to the change, to the investments, to the cooperation with other companies (that could also be in competition). The awareness of the SMEs attitude is helpful for fine-tuning the advisory services, provided according to the expressed needs.

General and Specialised training on the impact of I4.0 on SMEs

Training has been one of the most performed activities by the PPs.

Even more than in other services, the plethora of subjects tackled has been wide: the same, if we consider the applied methodologies.

There is, however, a strong common base: the importance of having training carried out by experts (regardless of the topics covered), of supporting networking relationship and to properly organise the events (in terms of timing, communication, lengths, language...)

And, equally, the effective engagement of the clients that goes beyond the organisational matters, is a point on which to dedicate proper time and efforts.

Suggestions:

- It is quite important that the training is held by experts (technical, HR, Organisational...), having both theoretical as well as practical knowledge: this will allow not only to have speakers with strong competences and skills, but also to interact directly with them for an in-depth analysis of specific topics.



- In some cases, the participation has been lower than expected: even if the success rate (in terms of participation) is usually in percentage low compared to the number of contacted clients, the preparatory activity is important. Therefore scheduling, awareness campaigns, recalls, should be well planned. On top of this, the strategy on the identification of the subjects to be treated is fundamental: which are the issues to be tackled, which kind of information is needed by our clients...?
However, the planning can only partially compensate the justification from the SMEs “unfortunately, I am overloaded, I have no time...”. This is a mental attitude that can be changed only with a dedicate accompanying mentoring activity (here, we return back to advisory services). If a measure like this is difficult to activate, unfortunately there will be a “Darwinian” process: the companies firmly aware of the need of change will adopt the related countermeasures (technical and organisational), while the other ones unfortunately will continue navigating by sight.
- The format of the training is important: scheduling dates and length according to the local practises
- The training activity should be carried out preferably using the local language: if not possible, the information should be clearly given during the communication campaign
- The twinning of the training with events is a strength
- Training should also be an occasion for networking and exchange of experience
- Online meetings: the communication technicalities have to be managed and tested well in advance
- Training activities should represent not only a moment in which dedicated information is provided to clients, but also an occasion for collecting inputs for other development activities (e.g. organisation of further training, advisory services, ... and loyalty)
- E-learning: the online courses proved to be a good tool, since they can be completed in any time and anywhere. If twinned with a consolidation test and a direct link with experts, they can provide a high added value service
- Learning game: the setting up of games for training is an interesting tool: usually they produce more stimulation, and give an immediate feedback
- If some BSOs are not used providing specific support services to SMEs, they would need training sessions in order to understand methodologies and being able to transmit proper messages to companies.

Support in the preparation of feasibility studies, projects

The reported support activities concerned mainly the assistance in participating in calls and tenders. Indeed, this is a subject that sees high interest from the SMEs. However, in many situations, the question “how far we go with the assistance?” is a delicate issue.

Therefore, these services should be fine-tuned with the owned skills of the PPs (or of external experts) and with the degree of in-depth assistance that every support organisation can/wants provide.

Suggestions:

- If, internally, the BSO has no specific skills, a call of proposal for external experts could be useful.
- A customer care activity, supporting the companies along the project preparation process is fruitful. Most probably, the main weak points are not concerning the technology innovation side: SMEs have difficulties in understanding the schemes, how to manage them, which documents to provide, how to set up a budget, and, first of all, understanding how to structure properly a proposal (what and how to stress in the writing the “complementary” parts, that are important such as the technical ones: impact, exploitation, KPIs, social/environmental aspects, working plan, coherent budget, ...). Therefore, a polyhedral assistance is needed from BSOs: if not owned, a learning process should be set up.



On top of this, beside the problems related to the technicalities, a project editing implies also knowledge on how to structure a Business Plan, a Business Model, market perspectives, ...

Providing Access to demonstration centres and testing facilities

This section had as pivot goal the one of supporting companies in using demo centres and testing facilities: in reality, the analysed projects focused their intervention in accompanying companies in demo centres, and showing them the potentialities.

At this regard, several support models have been implemented by the partners, each one of them facing the topic in a different way: visiting centres, using a mobile lab or adopting the living lab concept.

Suggestions:

- The activation of an online tool that allows to search profiles of the organizations offering infrastructure and services is an effective service: this allows the search and selection of the most suitable test activities.
- Visiting a Demo-Lab is fruitful for better understand the potentialities of the support: the presence of experts facilitates the process
- Using a mobile laboratory allows to reach companies also in less advantaged areas

B2B networking on behalf of I4.0 suppliers

This section examined the methodology used by partners in the organisation of B2B events: this activity implies a strict cooperation/assistance activity with the involved SMEs, in order to prepare a good cooperation form, and be supported in the negotiation phases

Suggestions:

- B2B networking is always a good tool for enhancing collaborations and open new market perspective. However, as with all activities, everything should be planned and organised taking into account the boundary conditions: we can count also the SMEs engagements as one of these. SMEs, on average, suffer of some inertia in participating in support initiatives organised by BSOs: therefore, it's a good practice to avoid an overexposure of initiatives, and to propose them the ones most fitting.
Also here, as said before several times, activities aimed at getting to know well in advance the companies allow to better calibrate the support initiatives, and avoid overwhelming.
- Well carried out preparatory activity is fundamental
- In case of physical meetings, the venue should be easily reachable
- During the matchmaking events, an external facilitator could be helpful: however, external facilitators can mainly support the development of the discussions, and not substitute the SMEs in the core negotiation activity.

Other services

Two specific support services not included in previous categories that could be in general very profitable for SMEs are described below: they support companies in their business development.

Suggestions:

- Most of the SMEs need a support in structuring an organised business model and a business plan: this need is frequently pointed out when the companies are interviewed by BSOs. Therefore, a tool such as the Business Model Canvas can be used, with the support of an expert that will have the task of facilitating the data collection.
Apart from the strategic importance of the exercise, the main funding schemes are asking clearly which are the growth and market strategies of the proposers, and hardly fund projects not having a clear idea on how to progress economically and towards the market.



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- Resource-Process-Value framework, concept developed within disruptive innovation theory and used to understand whether the organization is capable or incapable of tackling the challenge and implement innovation: it takes into consideration the factors that define what particular company can or cannot do: its resources, its processes, and its values.



5. Conclusions

The aim of the deliverable is to analyse and integrate the outputs from the partners' projects for setting up a comprehensive BSO support pack for SMEs.

Therefore, we extracted from each project a number of indications, that could help us in make a synthesis of the performed activities: on top of that, the lessons learnt provided by the partners allows us to make also a fine-tuning of the tools in view of their future adoption.

For a better analysis, we decided to categorise the main activities carried out in the projects, to pick the methodologies that have been applied, and to elaborate suggestions for the tool box.

Here below, we can synthesize the main outcomes:

- Ideally, the assistance to SMEs should follow a long-term strategy, incorporating several types of services in order to be more effective.
- The support for introducing technology innovation is only one of the pieces of the puzzle: indeed, other topics, such as HR, market, management, ..., are strictly connected, and have to be taken into account when setting up a service.
- Audit and training are activities enabling the BSOs to better know and assess the clients, and consequently to set up development strategies and activation of services.
- According to the level of awareness of the clients on the I4.0, the training or the workshops should treat general or more specific issues. This is made properly if we know well the clients (see previous point).
- BSOs should be aware that, despite the efforts that can be made, many SMEs have large inertia to the change ("I have always made in this way", "I have no financial resources for change", "I should change the internal organisation"....). Therefore, how the SME is managed is fundamental for applying the change.
- However, after having suggested, trained, informed, supported in using demo-centres and mentored the SMEs clients, the risk of a slowing down of the interest is usually high. A little financial bridge that can support the change could be helpful: however, this is a matter under the responsibility of the local Institutions.
- The assistance plan should take into consideration that the companies, or, better, the management of the companies, have many engagements: therefore, BSOs should be careful in not overwhelming companies with a calendar of activities too much busy.
- Customer care is important.
- BSOs too need some support, if not used in providing a particular type of service.
- "Physical" Training, with possibility of interlocution with experts, are positive: even more, if some networking action is planned.
- Learning games are a fruitful service.
- E-learning service is useful, and it's not tied up to precise timing or scheduling.
- B2B are positive, but need an accurate organisation.
- Support in preparing proposals/feasibility study: it's a service always needed, since usually SMEs have little unfamiliarity with drafting project proposals. The "languages" are different than they are used to.
- Testing Centers/Demo Lab are useful for awareness before implementing new technical solutions.
- A service supporting SMEs in elaborating the Business Canvas is important: breaking the business model down into segments (such as Key Partners, Key Activities, Key Resources, Value Propositions, Customer Relationships, Channels, Customer Segments, Cost Structure, and Revenue Stream) allows SMEs to better evaluate the potentialities of their business.



6. ANNEXES: Questionnaires and analysis

We adopted the following procedure:

- Analysis of the single services reported in the questionnaires, their methodology and field of application
- Analysis of the outputs/results, and lessons learnt
- Wrap up, and suggestions (for each service and overall)



Table 1: Audits to identify needs and challenges for implementing I4.0 solutions

| Audits to identify needs and challenges for implementing I4.0 solutions | | |
|---|--|---|
| | Deliverable / Output | Lessons Learned - Options for integration |
| Things+ | O.T1.1 Key tools portfolio for servitization of CE product-based manufacturing companies | Particular tools used during the servitization process, precisely during workshops with SMEs, are intended for self-assessment and evaluation of certain elements when introducing changes into the business model. These tools can be also applicable with audits to identify needs and challenges for implementing I4.0 solutions. They could be effective for timely identification of obstacles related to elements of change (processes, tasks, structure and people), or can be support to strategic management of the change process. |
| | O.T1.2 SIM (service innovation methodology) guidelines to create a new offer based on Product-Service System for CE manufacturing SMEs | |
| InnoPeer AVM | D.T1.1.1 D.T1.1.3 | The survey and concluding benchmark analysis showed: - No. of SME is significantly higher in Eastern countries, with smaller R&D expenses and less/no readiness in implementation of Industry 4.0 technologies - All companies are becoming aware, that I4.0 is not only about technology, but also related modification of HR/organizational management and business models are crucial + important - Many SME (in all countries) do not know, which is the best and most beneficial way to start with I4.0 - small invest and max. benefit |



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| <p>IoT4Industry</p> | <p>D 1.4</p> | <p>INTEREST AND OPPORTUNITY AREAS: the analysis outlined a strong interest in the industry 4.0 with a special attention to:</p> <ul style="list-style-type: none"> -Sensors and data acquisition (including big data and analytics) -Robotics and Automation (including communication and sensor technology) -Cyber security -Simulation and Modelling (including VR and AR) <p>MANUFACTURING SME BARRIERS TO ADOPTION OF IOT TECHNOLOGY: Lack of knowledge/skills, Lack of awareness, Cultural change, Cost of investment. The main needs of manufacturing SMEs is to increase their knowledge and awareness about the IoT application in typical manufacturing problems. It also suggests that manufacturers are reluctant to invest, because they do not understand the true benefits of IoT and the potential return on investment.</p> <p>Cultural change: the general feeling amongst the workforce was in negative as underlined also by the IoT solution providers interviewed that affirmed the main barriers to overcome are ‘human’ factors.</p> <p>The main technological concerns on the IoT providers side were on (the lack of) security in IoT devices and the (lack of) standardization/protocols.</p> <p>The analysis of the WP1 provided quantitative the data and qualitative information about the EU contexts to set up a strategy and the related activities developed in each WP.</p> |
| <p>EACN</p> | <p>The questionnaire results are concluded in point “4.3 Conditions, challenges and success factors for action” of D2.1. Drivers and motivators for industrial modernisation in the Automotive Industry” report (available at: https://www.eacn-</p> | <p>20 filled-in questionnaires.</p> <p>Lessons learned:</p> <p>Issues related to industrial modernisation and digitalisation of vehicles and factories are expected to have a positive impact on the industry</p> <p>Three most important strategic priorities for automotive SMEs: 1) Introduction of improved or new relations with customers, 2) Introduction of improved or new products, 3) Focussed market expansion</p> <p>Surveyed SMEs indicated that they see EACN as an opportunity to develop common solutions with other SMEs in automotive mainly in:</p> |



| | | |
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| | <p>initiative.eu/media/deliverable)</p> | <ul style="list-style-type: none"> - The development of a portfolio of industrial modernisation projects - Industry 4.0 competencies among the employees - A competencies development policy to improve data-analytics and human-machine cooperation - The development of a strategy for industrial modernisation |
| | <p>D2.3</p> <p>Not available - deliverable is restricted to other programme participants (including the Commission Services)</p> | <p>Technical documentation of the support package - Technical documentation describing the commonly elaborated business support service that will be applied to support the SMEs addressed by the EACN Partnership.</p> <p>Deliverable contains:</p> <ul style="list-style-type: none"> - The audit questionnaire - The project concept template - The SME audit report template - The methodological approach for the WP3 online workshops - The report template presenting the outcomes of the workshops - The project template (B2B events) including an action plan - The standardised cooperation agreement between SMEs - The standardised three-party agreement (expert support) <p>Difficulties observed:</p> <p>PPs found it difficult to assess the quality of legal documentation (agreements) themselves. Some needed to consult their legal departments.</p> <p>Lessons learned:</p> <p>PPs need to be aware of the content of developed deliverables so that they can use them in a later stages of the Project.</p> |



| | | |
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| | | <p>Formal documents such as cooperation agreements could be produced also in all native languages of PPs. This would make it easier to comprehend for engaged SMEs.</p> |
| | <p>D3.1 Collection of audits Not available - only for members of the consortium (including the Commission Services)</p> | <p>30/50 audits completed These audit questionnaires enabled project partners to assess their SMEs' potential in terms of capacity to go to EU-funding desk and of familiarisation with Industry 4.0 tools and impacts. Alongside the audits, the aim was also to fill-in project concept templates with companies, to guide them towards an innovation or investment collaborative project</p> <p>Difficulties observed: Objective has not been achieved (30/50 audits completed)</p> <p>Main difficulties encountered to fill-in the audit questionnaire: SMEs were reluctant to speak English, some of them found the audit too long, others were not interested in the added value of European projects and funding opportunities since regional and national funding are easier to get (the case for French companies); the lack of time and personnel which can be allocated to the project in these structures; difficult to find manufacturing SMEs that are completely independent and which do not have any TWAs or large groups in their capital.</p> <p>Lessons Learned: PPs who personally approach their companies with audit and assisted the SMEs with it, noticed higher audit success rate. Thus, it is good to make sure to conduct audits in person, rather than just send the questionnaire. It is also important to involve experts for audits, who are able to indicate potential places of implementation in the company, as well as show the financial and organizational benefits.</p> <p>Majority of the audited companies earmarks 2-2.9% of their revenue 2016-2018 for Industry 4.0 expenditures</p> <p>Main benefits foreseen by SMEs when implementing solutions of: - virtualization - an overall productivity increase (26%)</p> |



| | | |
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| | | <ul style="list-style-type: none"> - robotics & AI solutions - specific productivity increase (28%) and the reduction of costs of quality (25%) - elasticity of production processes solutions: an overall productivity increase (29%) - Industry 4.0 skills and competences - reduction of costs of quality (26%). |
| <p>Mittelstand 4.0</p> | <p>Examples of potential analyses can be found on the project website (in German):</p> <p>https://kompetenzzentrum-augsburg-digital.de/praxisbeispiele/?_sft_category=potenzialanalysen</p> | <ul style="list-style-type: none"> • The Mittelstand 4.0-Kompetenzzentrum Augsburg offers assessments of potential for the introduction of digitization as a free service to SMEs • A team of experts from the project visits the site several times to get a clear picture of the needs and challenges for implementing I4.0 solutions and to identify where digitization can lead to greater efficiency • Often times, companies already have an approach to digitization in mind, but hesitate to implement it as long as the "old way" still works • It is important to include the staff that will be working with the digital solution into the assessment phase and listen to their needs and wishes in order to have them on board with the change • Often times, companies are reluctant to make financial investments until they actually face a challenge in their production process |
| <p>ProsperAM and Entertransfer</p> | <p>Not allowed to share due to data protection</p> | <p>Interviews with companies and business support organizations asking for the challenges manufacturing companies have in service export - summarizing these challenges as a basis for developing a tool based on artificial intelligence that assists manufacturing companies in service export. The challenges of the companies have been discussed in a knowledge sharing group of service managers.</p> <p>The interviewed companies expressed, overall, a large range of difficulties: therefore some better focused export issues should have been defined beforehand, in order to be able to set up an homogeneous service in their favour.</p> |



These services have been developed by 7, out of 9, projects, following different pathways, under the methodological and operational point of view.

Methodological approach:

The analysed projects were starting from different bases; therefore, they gave contributions embracing a wide spectrum of activities.

We can broadly identify two main categories of audit:

- investigation made interviewing directly the companies
- investigation made contacting clusters or companies' representatives

Inevitably the level of deepening of the activities brought to different results; however, both approaches are useful for getting an overall picture of the needs.

The two intervention spheres produced, on one hand, information on the overall necessities from SMEs in the field of I4.0 transformation: and, on the other hand, a deeper scouting on the factors that could hinder SMEs in the implementation of the change processes.

How the audits have been carried out?

- Survey by the means of questionnaires sent by mail
- Survey by the means of questionnaires made “physically” from officers belonging to the interviewer Organisation
- Survey by the means of questionnaires made “physically” from a team of experts

Main Audit themes:

- Analysis of the requirements for manufacturing SMES in relation to IoT technologies to identify the technologies of interest, the barriers, challenges and potential interest in the project/analysis from the offer side
- Identification of the challenges and opportunities for industrial modernisation projects
- Audits among SMEs in the automotive industry to identify the needs and challenges of industrial modernization
- Challenges manufacturing companies have in service export



Table 2: Advisory services and workshops to prepare I4.0 strategy, roadmap, action plan

| Advisory services and workshops to prepare I4.0 strategy, roadmap, action plan | | |
|--|--|--|
| | Deliverable / Output | Lessons Learned - Options for integration |
| Things+ | <p>Output O.T1.2 SIM (guidelines to create a new offer based on Product-Service System for CE manufacturing SMEs)</p> <p>Output O.T2.2 End users training on service innovation management</p> | <p>The activity has been structured as a set of workshops supported with mentoring during the entire process of designing and integrating a new service.</p> <p>Such structure of the program that is focused on exploration, assessment and strategic approach to change management could be the basis for creation of a support program for integration of I4.0 technologies among SMEs, which would also be a combination of workshops and consultation/mentoring support.</p> |
| InnoPeer AVM | <p>D.T3.2.9 D.T3.2.</p> | <p>The strategy camps focus on 2 macro-topics: 1) the human resources and organizational management 2) the development of new business strategies and models. The main learning goal of the Strategy Camp is teaching how to drive a corporate change for competitiveness by aligning technologies, people and organization. These training activities are primarily directed to all the people who have a coordination/supervision role within a corporate organization and has to contribute to the organizational decisions of their companies.</p> <p>Additionally, participants were encouraged to share their own challenges in digital transformation with regard to HR, organisational management and business models. Common challenges were elaborated on within the strategy camp. Participants benefitted from the practical tools and partly already applied them in their company.</p> <p>Very positive feedback, but quite a lot of work for a relatively small group of beneficiaries.</p> |
| IoT4Industry | <p>D 2.3</p> | <p>The Creation of the material: the audiences received clear and homogeny explanations. This standardised tool finally gave the possibility to extract from training customers satisfactions relevant KPIs and suggestions/ adjustments for the next actions.</p> <p>The training for the trainers has a double effect, 1) providing a scheme about the storytelling of the call relevant information and 2) stimulating the emerging of questions/ problems not imagined/addressed in the project writing. This audience point of view simulation helped consortium to identify and find clear and homogeny answers.</p> |



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| | | The methodology could be considered at the same time an activity and a lesson learnt because it gave the possibility to adopt / integrate refine the actions better address to the (national) targets. |
| PlatformaAVO + | Strategy | The core output is the road map of applied research strategies to support the implementation of innovation, introduction of advanced technologies, industrial modernization for the transition to the concept of I4.0 and advanced technologies- |
| EACN | The pipeline of 5 project proposals is not yet ready. There are currently 3 joint project proposals formed in the project. Due to COVID-19 PP will continue working on further project proposals. | <p>Difficulties observed: Low number of joint project concepts formed - SMEs were not willing to join project concepts; greater focus put on individual needs rather than common issues.</p> <p>In some cases, PPs experienced lack of technical knowledge to understand the project's core and therefore found it difficult to summarize the idea of the project so that it can be presented to other SMEs. More technical/ market knowledge would be beneficial to facilitate the process.</p> <p>Lessons learned: The low number of projects could result from the fear of getting involved in cooperation with a foreign competitor (joint projects assume the participation of companies from different countries).</p> |
| Mittelstand 4.0 | <p>Examples of potential analyses can be found on the project website (in German):</p> <p>https://kompetenzzentrum-augsburg-digital.de/praxisbeispiele/?_sft_category=potenzialanalysen</p> | <p>Often, companies already have an approach to digitization in mind, but hesitate to implement it as long as the "old way" still works.</p> <p>Furthermore, companies are reluctant to make financial investments until they actually face a challenge in their production process.</p> <p>It is important to include the staff that will be working with the digital solution into the assessment phase and listen to their needs and wishes in order to have them on board with the change</p> |

Methodological approach:

The advisory services are the consequence of a preliminary activity aimed to detect needs or problems to be tackled. In the analysed projects most of the inputs came from activities dealing with training, more than from the audits (as one might have been expected).

In other projects, the advisory services have been provided following a pathway of assistance that was finalised in supporting SMEs on specific issues.

How the advisory services have been carried out?

For most of the analysed projects, workshops and training courses have been the picklock for assessing the needs: therefore, functional and preparatory to targeted support services on specific issues identified as important by the participants.



However, we can also count on direct interlocution with SMEs, with the identification of the needs and a mentoring activity in order to find the possible solutions.

Main Advisory Services themes:

- exploration, assessment and strategic approach to change management (human resources and organizational management)
- development of new business strategies and models
- support on specific topics: project proposal preparation and cooperation agreements (Business negotiations)
- Identification of solutions for the digitization

As we can see, a wide panorama of topics has been treated, showing how complex and interdisciplinary are the questions to be tackled for introducing innovation in SMEs: change management, human resources, new skills to be implemented, technicalities to be introduced and harmonised with the traditional processes, financial implications...



Table 3: General training on the impact of I4.0 on SMEs

| General training on the impact of I4.0 on SMEs | | |
|--|---|--|
| | Deliverable / Output | Lessons Learned - Options for integration |
| InnoPeer AVM | D.T3.2.1 D.T3.2.6. | <p>Basic courses on 3 AVM knowledge dimensions (Technology, HR/organizational management & business models) have been implemented locally in all partner regions with participants from local SME (and larger companies) involving trainers from PP, regional thematic experts and AVM practitioners from local companies for practical inputs. The aim of the basic training was to get a general overview of the 3 topics mentioned above, e.g. Technicians got an insight into HR topics, and HR managers got an insight in technology topics, etc.</p> <p>The feedback was very positive and the participants emphasized how important it is to consider all 3 knowledge dimensions in a transformation process.</p> <p>A further advantage is, that the trainings are held in native language and participants individually exchange their experiences about their approach towards digital production.</p> |
| IoT4Industry | D 2.4 | <p>About 940 organisations got involved in the 14 training events implemented by the project partners, learning information about the IoT4Industry project as well as on Industry 4.0 technologies, ecosystems and opportunities.</p> <p>The use case contributed to encourage the “newcomers”, the “early adopters” and the “followers” companies to raise awareness and engage with them.</p> <p>For example a physical matchmaking event of April 2nd was organized by PMT, on the Wallonia booth during the Hannover Messe 2019. It offered the possibility to 9 companies to pitch a project idea. Approximately, 30+ people joined on the booth. 5 of these companies submitted a proposal in the second call.</p> <p>Talking directly with them in coincidence of events dramatically contributed to better understand the lack of knowledge, awareness and cultural barriers of the companies and our activities hopefully contributed to reduce those biases.</p> |
| EACN | The main output of the three thematic online workshops is a list of common issues interesting groups of actors to be included in common projects. | <p>Difficulties observed:</p> <p>Even though PPs sent information about the workshops to more than 200 SMEs, out of expected 40, 26 companies took part in the 4 online workshops.</p> <p>Workshops were organized in English - even though nobody complained about it, some could experience language barriers.</p> |



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| | <p>Results concluded in D3.2 Report on thematic workshops' results (deliverable not yet approved)</p> | <p>Lessons learned: Many companies informed, that although the topics are interesting, they were not able to participate in the workshops in this period, because of lack of time (reasons: new business projects launched at the beginning of the year, lack of employees, audits from clients provided in the company on the same moment as the workshops were planned).</p> <p>It is important to make everyone aware that the workshop is organized in English so that participants can prepare for expressing their opinions in English.</p> <p>As with all online meetings, the technical side is essential. Before the workshop, good online connection and conference room with all necessary equipment should be secured. During the meeting - participants should speak clearly and follow rules.</p> |
| <p>Mittelstand 4.0</p> | <p>Training courses: https://kompetenzzentrum-augsburg-digital.de/veranstaltungen/?_sft_tribe_events_cat=schulung E-Learning: https://kompetenzzentrum-augsburg-digital.de/e-learning/</p> | <p>Due to the half-day format of the courses (1pm-5.30pm), they can easily be integrated into the participants' daily work routine</p> <p>Participants particularly appreciate the networking and exchange of experience with other participants as well as practical examples</p> |

Methodological approach:

The projects with training activities have been organised focusing the attention to the industry 4.0 main issues: however, not only the technical ones, but also treating all the other aspects (such as HR competences to take care of business modelling) since a holistic approach is the most appropriate. For most of the analysed projects, workshops and training courses have been the picklock for assessing the needs: therefore, functional and preparatory to targeted support services on specific issues identified as important by the participants.

How the training services have been carried out?

Most of the training activities have been developed physically: however, also online workshops have been carried out.



Involvement from other actors apart from the PP has been guaranteed (e.g. external experts, managers...).

Some of them have been organised in English, due to the international framework of the project.

In another project, the training coincided with outreach campaigns.

In one project, a strong interaction among participants (networking) has been supported, in order to exchange experiences and develop ideas

Main training services:

Update and information on:

- HR/Skills/Organisational management
- Business models
- Technical issues related to Industry 4.0
- Future opportunities/Trends given by the Industry 4.0 technologies

As we can see, also for the general training a wide panorama of topics has been treated, touching all the issues that have to be examined when a strong change, like the one caused by I4.0, is going to be implemented.



Table 4: Specialised training on selected issues

| Specialised training on selected issues | | |
|---|---|---|
| | Deliverable / Output | Lessons Learned - Options for integration |
| Thing+ | Output O.T1.1 Key tools portfolio for servitization of CE product-based manufacturing companies | Service Innovation Methodology is based on globally recognized tools and approaches that are universally applicable with SMEs regardless of the industries they are coming from. These tools, just as entire phases of the methodology, can be included in specialized trainings that tackle issues arising from integration of I4.0 technologies into the business processes |
| InnoPeer AVM | D.T.3.2.7 | The advanced training is the second level in the InnoPeer AVM Qualification Programme and has the goal to increase the knowledge in the adv. manufacturing technologies as well as the HRM, organizational management and business models. These trainings summarize the content of the basic trainings and provide more in-depth information. The 5 courses consist of approx. 5h of videos are available 24/7 on the VHB (Virtuelle Hochschule Bayern https://open.vhb.org/login/index.php) and were recorded in English. The courses were very popular due to the high quality content and the constant availability, and last but not least due to COVID-19 - webinars were the only possibility of up-qualification. Easy to capitalize |
| IoT4Industry | D 3.2 | To understand better their work, a couple of days before the training, the evaluators received the project presentation to be able to make comments or questions on the training. The webinars (training sessions) contributed to clarify some doubts and to reduce to potential “discrimination” between sectors. |



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| <p>EACN</p> | <p>The main output of the three thematic online workshops is a list of common issues interesting groups of actors to be included in common projects.</p> <p>Results concluded in D3.2 Report on thematic workshops' results (deliverable not yet approved)</p> | <p>Difficulties observed: Even though PPs sent information about the workshops to more than 200 SMEs, out of expected 40, 26 companies took part in the 4 online workshops.</p> <p>Workshops were organized in English - even though nobody complained about it, some could experience language barriers.</p> <p>Lessons learned: Many companies informed, that although the topics are interesting, they were not able to participate in the workshops in this period, because of lack of time (reasons: new business projects launched at the beginning of the year, lack of employees, audits from clients provided in the company on the same moment as the workshops were planned).</p> <p>It is important to make everyone aware that the workshop is organized in English so that participants can prepare for expressing their opinions in English.</p> <p>As with all online meetings, the technical side is essential. Before the workshop, good online connection and conference room with all necessary equipment should be secured. During the meeting - participants should speak clearly and follow rules.</p> |
| <p>Mittelstand 4.0</p> | <p>Training courses: https://kompetenzzentrum-augsburg-digital.de/veranstaltungen/?_sft_tribe_events_cat=schulung</p> <p>E-Learning: https://kompetenzzentrum-augsburg-digital.de/e-learning/</p> | <p>Due to the half-day format of the courses (1pm-5.30pm), they can easily be integrated into the participants' daily work routine</p> <p>Participants particularly appreciate the networking and exchange of experience with other participants as well as practical examples</p> |
| <p>ProsperAM and Entertransfer</p> | <p>Presentation of Monitor training</p> | <p>Business support organizations that had no background in service had difficulties in understanding the benefit of the monitor. Therefore, they were not able to really transmit the message to companies, what their benefits are and how they can use the tool. A learning was that it is crucial that all the partner really understand the tool used and especially the benefits for the users. Paying more attention and investing more time resources for this step pays off in the later stages.</p> |



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| NUCLEI | D.T3.2.1 | Open Seminars have been piloted in the project NUCLEI. These seminars start with 1-3 expert's presentations on a specific topic. Then the participants walk through the hosting companies' production facilities and finally an (optional) workshop is held to discuss aspects of the chosen specific topic. |
|--------|----------|--|

Methodological approach:

PPs, in their projects, offered some more training activities, reinforcing the specialization: therefore, going deeper on some issues. Their experience, in this service, shows a predominance on technical subjects, more than on general management ones.

The main goal was the one of increasing the knowledge on the I4.0 topics, and to provide more in-depth information.

Beside the “physical” training activities, we can also count on a e-learning offer, useful for reaching a wider audience with the engagement of less efforts

Learning factory: in one of the projects, the training is carried out using a learning game, with simulations and quick reactions needed by the participants.

How the specialised training services have been carried out?

- Physical Presence
- Videos
- E-learning format
- Learning game

Main specialised training services:

- HR/Skills/Organisational management
- Business models
- Technical issues related to Industry 4.0
- Future opportunities/Trends given by the Industry 4.0 technologies



Table 5: Support in the preparation of feasibility studies, projects

| Support in the preparation of feasibility studies, projects | | |
|---|--|--|
| | Deliverable / Output | Lessons Learned - Options for integration |
| IoT4Industry | D 3.2 | <p>The support activities have been very strong: the 40% of the companies who got in contact with clusters asked for advices on proposals.</p> <p>An interesting result of the calls is the gap between what people said and what actually realise: in the WP1 the interview respondents were asked to give their opinion on the type of projects that SMEs may apply for through the calls. The result was 18% feasibility studies, 40% prototyping, 42% demonstrators. The results of the 2 calls showed quite different outputs: only 5% applied for Feasibility studies, 25% for prototypes and 70% for demonstrators.</p> |
| PlatformaAVO + | Proposal submitted to the international program (H2020, INTERREG, EUREKA etc.) | <p>The AVO platform supported members of AVO to participate in the international cooperation and preparation of project proposal, 3 projects were successful:</p> <ul style="list-style-type: none"> - www.eucleg.eu for Zemedelsky výzkum, spol. s.r.o. - Research and finding a suitable varietal composition of spring barley - INTERREG SR - CR, Výzkumný ústav pivovarský a sladařský , a.s. - 3D COVER - INTERREG CR - Bavaria, Comtes FHT, s.r.o. |

Methodological approach:

Only 3 projects envisaged an activity supporting SMEs in the preparation of new projects.

We can identify two main methodological pathways:

- Individual info and support: partner search, matchmaking and Support in the proposal preparation (not writing, but suggestions, advices, proposal reading)
- Launching of a call for proposals to support project preparation and filing under selected support instruments and to support tender procedures was launched.

How the support in the preparation of feasibility studies, projects has been carried out?

- Direct interlocution with the SMEs, partner search, advices, proposal pre-evaluation, ...
- Selection of experts delivering support to the selected companies



Main themes/requests of support:

- Project Idea evaluation
- Partner search
- Advices on how to better tackle the call requirements
- Pre-evaluation
- Use of external experts for the proposal setting up and editing



Table 6: Providing Access to demonstration centers and testing facilities

| Providing Access to demonstration centers and testing facilities | | |
|--|---|---|
| | Deliverable / Output | Lessons Learned - Options for integration |
| InnoPeer AVM | D.T3.2.2 | <p>The living labs bring together SME participants from all PP regions in webinars/online learning sessions. Participants solve teaching case tasks in interaction with a transnational trainer team and define technological test assignments for model factory.</p> <p>Specialised PP carried out the model factory. Interested ones had the chance to participate the study visit to the model factory. Due to COVID-19 the planned model factory in Augsburg took place online. The teaching cases of the living labs describe challenges that real companies handled with different level of success - many participants identified themselves with the teaching case challenges - very positive feedback.</p> <p>The solved teaching cases have been included in the trainings on VHB - easy to capitalize.</p> <p>D.T3.2.3 - The report on the model factories is not yet finished</p> |
| PlatformaAVO + | Event (conference, workshop) Advisory services | - |
| SYNERGY | <p>O.T3.1 -Synergic Crowd Innovation Platform</p> <p>D.T3.1.4 Guidebook for potential Synergic Crowd Innovation Platform users</p> | <p>The Infrastructure Sharing functionality creates an opportunity for the owners/providers of high-tech equipment and services in the domain of Industry 4.0 to offer it for commercial use through the platform. These organizations are companies and R&D centres. Online module allows to search among profiles of these organizations that include their infrastructure and services. Such online tool enables SMEs to quickly find and get in contact with technology providers or testing facilities in order to test or rent the I4.0 technologies before integrating them into their business processes. It is also a valuable access point for BSOs that want to get in touch with technology providers/owners.</p> |
| EACN | <p>2 out of DEMO-LABs organized so far in the Project. One more is to be organized.</p> <p>The foreseen output includes Report on DEMO-LAB visits with information on signed cooperation agreements resulting from the DEMO-LAB visits.</p> | <p>Lessons learned: The so far organized DEMO-LAB days (2 out of 3), did not conclude (as initially planned) with the discussion on conditions for future cooperation; preparation of a letter of intent or preliminary cooperation agreement. Instead, they were considered more as a chance to show the applicability of I4.0 technologies.</p> |



| | | |
|----------------------------|--|--|
| <p>Mittelstand 4.0</p> | <p>Mittelstand 4.0-Mobil: https://kompetenzzentrum-augsburg-digital.de/mobil/</p> | <ul style="list-style-type: none"> • Trying out and experiencing digitization for themselves makes I4.0 and its possibilities tangible for the visitors • Many of the visitors follow up their initial playful contact with the project by asking for further information on the project's business support services or by participating in training courses |
|----------------------------|--|--|

Methodological approach:

Each project followed different approaches for providing the access to demonstration centres:

- Living Lab, as a preparation for the practical test runs in the model factories: participation in on-line learning lessons, and interaction with trainer team defining
- Use of I4.0 infrastructures in open days to encourage SMEs involvement and cooperation
- Use of and Infrastructure Sharing Platform that allows SMEs to find and get in contact with technology providers or testing facilities in order to test or rent the I4.0 technologies before integrating them into their business processes
- Demo-lab days on specific topics
- Use of a mobile laboratory, with experts' availability for assessing the possible applications

How the access to demonstration centers and testing facilities has been carried out?

- Open days or workshop to stimulate SMEs in using laboratories
- Promotion via different means of the possibility of using demonstration centers and testing facilities
- The use of a mobile laboratory facilitated the interaction with SMEs
- The availability of experts facilitated the comprehension of the innovative solutions

Main themes for access to demonstration centers and testing facilities

- 3D printing
- Digitization
- Micro and Nano technology
- Additive manufacturing
- Industry 4.0.
- Virtualisation for planning processes



- Elasticity of production processes in SMEs
- Robotics & Artificial Intelligence in production processes



Table 7: B2B networking on behalf of I4.0 suppliers

| B2B networking on behalf of I4.0 suppliers | | |
|--|--|--|
| | Deliverable / Output | Lessons Learned - Options for integration |
| IoT4Industry | D 2.2 | <p>The matchmaking had an impact on the companies that notified an expression of interest (online or offline): 1st CALL: 42 companies, who participated in the 1st expression of interest, joined a project proposal in the 1st call for project (53 submitted). 2nd CALL: 89 companies who participated to the expression of interest process, joined a project proposal in the 2nd IoT4Industry call for project (96 submitted).</p> <p>Direct Contacts matter: Many more EoI did arise through the “offline” negotiations/ take in charge or during the events has been realized the “connection” between companies. In particularly the offline process was more suited to attract end-users. THE PLATFORM : “NEVER RUN OUT OF”! The platform helped us to receive homogeneous documents, monitoring the activities even if the (manual) implementation to set up the structure was very complex sometimes. The platform allowed to have: -The Eligibility check internally performed by consortium members. -A clear and automatized evaluation process (Experts evaluated independently the proposals) - to simplify dramatically the matchmaking activities reducing time and errors : it briefly gave us the possibility to upgrade our approach towards these kind of activities, that in the past were manual with negative externalities explicated above (Time, errors, difficulty to be aligned on one document..)</p> <p>The success of this action refers to a proper mix of digital and human tools: once again, if the digital tool performed in collecting data, the human factor matters in using technology self-confidence (companies) and qualitative analysis, and sensitiveness (clusters abilities to understand and orient their companies)</p> |
| PlatformaAVO + | Digital Map Event (conference, workshop) | AVO members participated on the meetings for European Technological Platform, AVO became a member of EuMaT - The European Technology Platform for Advanced Engineering Materials and Technologies |
| SYNERGY | O.T3.1 -Synergic Crowd Innovation Platform D.T3.1.4 Guidebook for | Already mentioned Infrastructure Sharing tool can support B2B networking among the SMEs and the I4.0 suppliers. |



| | potential Synergic Crowd Innovation Platform users | |
|------|--|---|
| EACN | Results concluded in D3.3 Report on matchmaking events | <p>Difficulties observed: SMEs were not eager to participate in matchmaking events. Some participating SMEs have all come to the conclusion that there are too many events proposed in the EACN project and that they will never have the time to participate in all these events.</p> <p>Vicious circle - if companies from one PP did not participate in earlier Project activities, they did not come to matchmaking. This resulted in worse networking possibilities.</p> <p>Lessons learned: SMEs are willing to participate in projects, nevertheless they can't be overwhelmed with extra activities which reduce their time for business. Thus, activities need to be carefully planned and scheduled sometimes it is better to merge 2 activities into 1 if it is thematically possible.</p> <p>When planning activities that require travels abroad, it is good to find location which is easy to reach for all participants - convenient to travel.</p> <p>In case of international matchmaking events is it of high importance to engage a moderator, who is capable of leading the discussion and has good interpersonal skills.</p> |

Methodological approach:

The projects adopted, overall, the same methodology: that is the use of a matchmaking platform, where the SMEs, once filled a cooperation form, can find potential counterparts.

This activity implies a strict cooperation/assistance activity with the involved SMEs, in order to prepare a good cooperation form, and be supported in the negotiation phases

In one case, the matchmaking activity has been carried out in a B2B event, where physically the counterparts had the chance to meet and to exchange their cooperation requests.

How the B2B networking on behalf of 14.0 suppliers has been carried out?

- Promotion of the initiative



- Interlocution with SMEs
- Support in the cooperation form editing
- Circulation of the cooperation opportunity
- Support in the matching and negotiation phase
- In the case of the B2B event, organisation of the planning of the physical meetings

Main B2B networking on behalf of I4.0 suppliers themes

- I4.0 topics



Table 8: Other services

| Other Services | | |
|----------------|--|---|
| | Deliverable / Output | Lessons Learned - Options for integration |
| Things+ | Output O.T1.1 Key tools portfolio for servitization of CE product-based manufacturing companies Output O.T1.2 SIM guidelines to create a new offer based on Product-Service System for CE manufacturing SMEs Output O.T2.2 End users training on service innovation management | Entire servitization support program developed under Things+ (Service Innovation Methodology) is supporting sustainability and scalability of the entrepreneurial initiative that involves integration of Industry 4.0 technology. All the tools in frame of Service Innovation Methodology could be used for elaboration and definition of the commercialization strategy and precise activities |
| IoT4Industry | D 3.2 and D 3.5 | This result could have 4 main positive reasons: The modified financial viability self-check: in the 1st Call a high number of companies (especially start-ups) had difficulties to manage the self-check viability doc; consequently 104 companies started the proposal, but only 58 finally accomplished it. Some companies already joined the 1st call and they acquired experience in the call mechanisms or they already have a partner to easily join the 2nd call Outreach campaigns long term effect: |
| | D1.4 and D 3.5 | Despite the ecosystems described, the consortium received several proposals on energies, food & beverage and medical & pharma sectors. Cooperation attitude : Almost the 20% of the IoT solutions will be installed in Italy: one reason could link to: 1)the presence of MESAP the Italian cluster on smart products and smart manufacturing, 2)or to the slight backwardness of the Italian SMEs than the Germany companies (which is the home of I4.0), 3)or the reactive attitude of the Italian companies on this opportunity On the other side the impact of the BREXIT consequences has been well described by the UK companies that ONLY cooperated with other regions of the United Kingdom. |



Methodological approach:

- methodology for service innovation in order to effectively initiate and support transformation of traditional manufacturing SMEs into providers of holistic solutions based on product-service systems
- preparation of methodological documents, field studies in the field of direct and indirect R&D support, interpretations of EU directives, comments on legislative materials, comments on the Methodology of evaluation of research organization

How the other services have been carried out?

- Use of Business Model Canvas for developing new or documenting existing business models
- Resource-Process-Value Tool, used to understand whether the organization is capable or incapable of tackling the challenge and implement innovation
- Analysis and field studies

Main other services themes:

- Business development

