DELIVERABLE DT1.3.4

Development of common methodology for efficient knowledge transfer from BSOs to SMEs

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Lead Contractor of the Deliverable:	PP 3 – STEP RI Science and Technology Park of the University of Rijeka
Authors:	PP 3 – Boris Golob, Mario Vukelić, Andrea Oštrić Petropoli
	PP 1 – Eva Breuer, Stefanie Neumayer, Georg Alber
	PP 2 – Francesca Pozzar, Saverio D'Eredità
	PP 5 – Marco Mangiantini, Alessia Menduni, Fabrizio Fallarini, Paolo Dondo, Marialuisa Sanseverino
	PP 6 – Łukasz Górecki, Ewa Dudzic-Widera
	PP 7 – Marie Kubankova, Dagmar Dolezelova
	PP 8 – Sophie Wiesinger, Markus Vorderwinkler, Michal Hudec, Margarethe Ueberwimmer

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1. Introduction

Boost4BSO application form defines common methodology as robust, pragmatic and highly usable training for SMEs, formats for knowledge transfer to SME – knowledge relevant to I4.0 technologies and solutions in general, following principles of transferability and adaptability.

Deliverable DT1.3.4 Development of common methodology for efficient knowledge transfer from BSOs to SMEs (as deliverable which defines process of supporting SMEs by BSOs during I4.0 implementation) is direct result, but also defined by the deliverable DT1.3.3 Comprehensive I4.0 competence pack and toolbox for BSO capacity building (as deliverable which identifies BSOs competences for supporting I4.0 implementations in SMEs). In parallel, to assure transferability and adaptability with existing SME support methodologies, both deliverables are built on deliverable DT1.3.2 Upscaling of selected CE+H2020 project content for BSO capacity building (as deliverable which identifies valuable and useful deliverables and results of previous H2020 and Interreg CE projects).
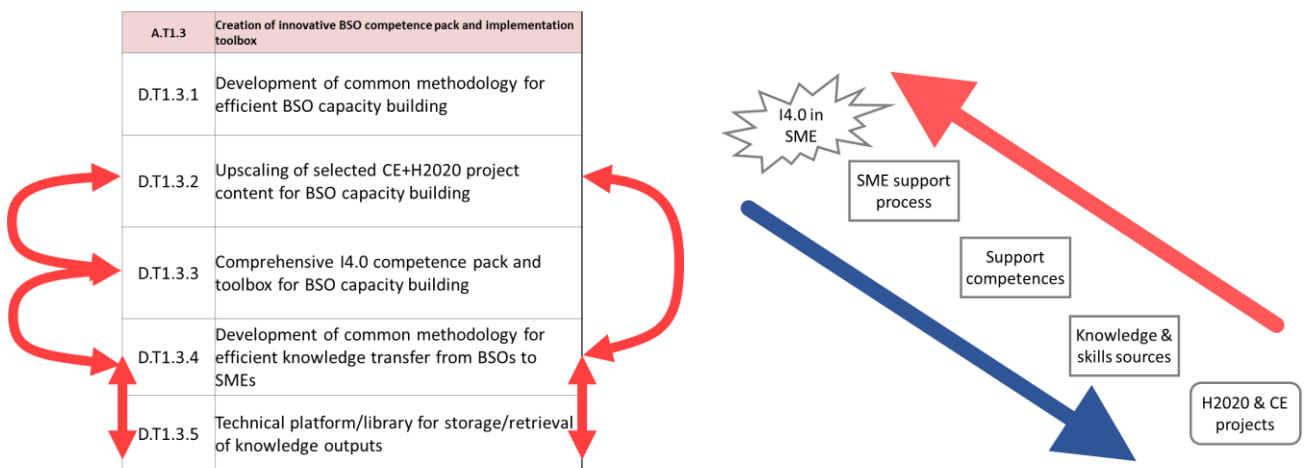
Common methodology as, de facto, SME support process is defined as structured but simple process, thus enabling various BSOs – from different countries, level of specialisation, focus or maturity to integrate it and apply it in own practice of supporting SMEs. Important aspect is experience and practice exchange, as a learning process as well as a part of the future validation and improvement process of the methodology. As a follow up to each activity, there is a non-exhaustive list of relevant deliverables from H2020 and Interreg CE projects for easier reference and to enable accelerated learning and adoption of the methodology.

2. Overall concept of common methodology for efficient knowledge transfer from BSOs to SMEs

Process of BSOs supporting SMEs

Efficient knowledge transfer from BSOs to SMEs is envisioned as robust, pragmatic and highly usable training for SMEs. Its main goal is to enable SME I4.0 induced transformation(s) by addressing SMEs needs for relevant knowledge, in appropriate form and timely manner.

As defined by the project application, common methodology for efficient knowledge transfer from BSOs to SMEs should assure integration of two principles:

- **transferability** – methodology should enable efficient knowledge transfer from BSOs to SMEs in line with SMEs capability of using and benefiting from acquired knowledge and newly created I4.0 relevant organisational competences and capabilities.

- **adaptability** – methodology should be applicable and appropriate for implementation in various "doing business" environments. It should aim at filling in the gaps or reducing negative impacts of inefficient national legislation, conservative entrepreneurial culture, low technology development level, lagging traditional industries – regardless of the company size.

Knowledge transfer focus is not just about educating and increasing individual knowledge and competences, but also about understanding enabling I4.0 relevant technologies and understanding how they can be used as a mean to improve company's organisational performance, position within own industry and targeted markets and overall competitiveness.

Therefore, wide variety of formats for knowledge transfer are proposed to be flexibly used, depending on the context and circumstances, capabilities of targeted SMEs to comprehend and apply I4.0 technologies and leverage newly created, technology enabled capabilities.

Secondly, common methodology should assure integration of transferability and adaptability from BSO to BSO perspective and respective knowledge exchange. BSO2BSO transferability will be leveraged by proposing common methodology as standardized sets of activities which each BSO will follow when supporting SMEs in I4.0 transformations. BSO2BSO adaptability will be assured with proposal of non-prescriptive common methodology in which activities are adjusted to BSOs and SMEs capabilities, current state of development and expected scope of I4.0 induced transformations.

Standardized support methodology might enable B2B best practise exchange, outcome based comparisons and methodology improvements, introduction of benchmarks measuring regional, industrial and specific I4.0 technologies results and easier knowledge transfer to other BSOs – beyond Boost4BSO project or Central Europe scope.

3. Common methodology phases

In order to assure **compliance with transferability** and to enable **standardised knowledge transfer activities and their sequence**, a common methodology is proposed. Three main/crucial phases of BSOs' support towards SMEs in their I4.0 transformation process are identified:

1. Enabling I4.0 idea (inception)
2. Designing I4.0 change
3. Supporting I4.0 implementation

Each phase has distinct sets of activities and knowledge transfer formats, with specific focus and expected impact on the SME's I4.0 relevant knowledge and I4.0 implementation capability.
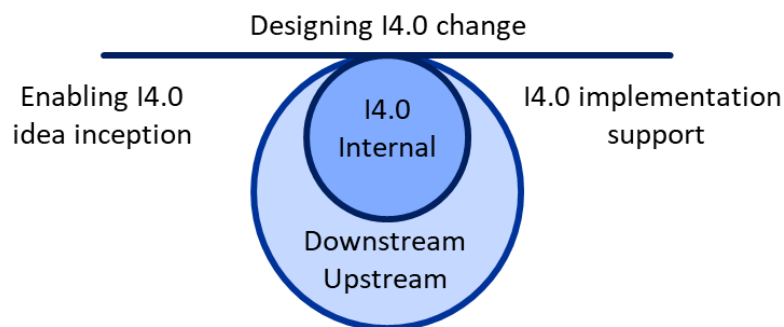
I4.0 support process

Figure 1 – I4.0 support process

3.1. Methodology first phase: Enabling I4.0 idea (inception)

"Learning what is possible"

Initial phase aims to assure availability of appropriate and actionable information, relevant for companies with limited or no previous knowledge of what I4.0 is and how it could transform company inner-capabilities. It is about creating basic awareness of what I4.0 is, availability of particular I4.0 technologies and transformational potential for company's performance and overall competitiveness. From a specialized BSO's perspective, this phase could be ideally structured in three distinctive sets of activities:

- **Building I4.0 awareness** are all activities targeting entrepreneurs and companies in general, aiming to create awareness of I4.0 technologies and how they impact society, markets and industries.

  Knowledge transfer to SMEs activities include public events like lectures, round tables, success stories, webinars, testimonials, white papers, best practice examples, open lab demonstrations and any other standard and repeatable "one to many" activity.

  Building I4.0 awareness activities relevant content from previous projects (D.T1.3.2):
  - *InnoPeer AVM - D.T3.2.6 – Basic Training concept*
  - *InnoPeer AVM - D.T3.2.7 Advanced Courses*
  - *InnoPeer AVM - D.T3.2.2 Living labs*
  - *InnoPeer AVM - Handbook 2020*
  - *IoT4 Industry - D1.4 Identification and analysis of focus sectors for collaboration support*
  - *IoT4 Industry - IoT4Industry webinar*
  - *IoT4 Industry - Anonymized use cases*
  - *EACN for joint Industrial Modernisation Investments - D2.1 – Drivers and Motivators for Industrial Modernization*
  - *EACN for joint Industrial Modernisation Investments - D2.2 – EACN Strategy*
  - *BMWi - Digital business models for I4.0*
  - *Things+ - D.T3.1.3 E-catalogue of new services & products developed by CE manufacturing SMEs during the pilot action 1; D.T3.3.3 E-catalogue of new services & products developed by CE manufacturing SMEs during the pilot action 2*

- **Understanding I4.0 opportunity** are activities targeting specific challenges that companies are facing, enabling initial understanding which I4.0 opportunities company has.

  Aim is to guide companies during (self)assessment and understanding of what is possible and achievable for a specific company. SME I4.0 (self)assessment can be carried out as "1on1" meeting or "1onFEW" workshop, depending on the BSO consultant/assessor capabilities.

  For many companies, financial resources to undertake the implementation are the first and foremost consideration ("Can we afford this new technology?"). To facilitate the decision making process, BSO should guide SME management through assessment of investment requirements, financial and non-financial (e.g. resource allocation, employee commitment, company values and culture change). Additional drafting of implementation timeline and activities ease decision making process and reduce barriers for initiation of I4.0 induced transformations.

  Knowledge transfer to SMEs activities include workshops, 1on1 meetings and consultations with teams from SMEs.

Understanding I4.0 opportunity activities relevant content from previous projects (D.T1.3.2):
  o Mittelstand 4.0 - 2020_Fragebogen_Potenzialanalyse_v01
  o *IoT4 Industry - Anonymized use cases*

- **Enabling I4.0 initiative** are knowledge sharing activities enabling individual self-learning as well as access to information and knowledge about I4.0 suppliers, specific technology experts, public support and technology infrastructure available.

  Aim is to enable individual learning curve and additional exploration after participating at public & promotional I4.0 events and/or follow up after I4.0 opportunity (self)assessment. BSOs should enable SMEs free access to knowledge exchange, foster networking and B2B meetings with experts and potential I4.0 solution suppliers.

  Knowledge transfer to SMEs activities include knowledge sharing platform, lectures, B2B matchmaking events, networking events, business and technology cooperation platforms like EEN Enterprise Europe Network or EDIH European Digital Innovation Hubs workshops or , 1on1 meetings and consultations with teams from SMEs.

  Enabling I4.0 initiative activities relevant content from previous projects (D.T1.3.2):
  o *InnoPeer AVM - D.T3.2.6 – Basic Training concept*
  o *InnoPeer AVM - D.T3.2.7 Advanced Courses*
  o *IoT4 Industry - IoT4Industry webinar*
  o *IoT4 Industry - Anonymized use cases*

3.2. Methodology second phase: Designing I4.0 change

"Creating vision and how to get there"
Second phase is supporting companies in the process of blueprinting I4.0 induced change, designing envisioned I4.0 state and identifying all steps that will lead to that. From company's perspective, impact on the value chain and relevant resources and activities that will be transformed by the I4.0 induced initiative, there are three possible strategic directions:

- **Upstream** – I4.0 enabled integration of suppliers and establishment of partnerships across the inbound value chain (e.g. I4.0 supported integration of value chain elements enabling specialisation, partnerships, outsourcing, enabled decomposition of internal value chain).
  Outcome: Transformations into orchestration and partnerships/network based business models like: Uber, Airbnb, automotive and alike "tier" based industries, retail, etc.
- **Internal** – I4.0 induced transformations focused on resource utilisation, process reengineering, "waste" reduction, enabling cost advantages, etc.; with aim to improve bottom line, speed, flexibility, productivity, customer-centricity, etc. (e.g. advanced manufacturing, data and evidence based management, IoT, big data, virtualisation…).
  Outcome: Incremental or radical improvements of selected business model elements without major change of the overall business model.
- **Downstream -** I4.0 enabled integration of customers based on servitization, customer data and usage based insights. Enables radical changes of customer understanding, revenue and profit sharing, active customer support and predictive maintenance.
  Outcome: Servitization or product service systems enabled by the business model changes and different customer perspective and understanding.

From BSOs perspective, this phase has three distinctive sets of activities:

- **I4.0 integration concept**

  Defining main elements of I4.0 integration, initial selection of technologies and relevant suppliers, defined goals and potential implications regarding strategy, business model, infrastructure, human and other resources, processes, initial timeline.

  Knowledge transfer to SMEs activities include individual consulting, limited participant workshops in case of experienced and skilled trainers, coaching and mentoring.

  I4.0 integration concept activities relevant content from previous projects (D.T1.3.2):
  - *InnoPeer AVM - D.T3.2.6 Basic Training concept*
  - *InnoPeer AVM - D.T3.2.7 Advanced Courses*
  - *InnoPeer AVM - D.T3.2.2 Living labs*
  - *InnoPeer AVM - Handbook 2020*
  - *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
  - *Things+ - D.T3.2.5 Key tools portfolio*
  - *EACN for joint Industrial Modernisation Investments - D2.1 – Drivers and Motivators for Industrial Modernization*
  - *EACN for joint Industrial Modernisation Investments - Joint project 1-3*
  - *BMWi - Digital business models for I4.0*

- **I4.0 change design**

  Elaborated I4.0 integration concept with detailed assumptions about future performance, strategy, business model, human resources, IPR, technology implementation, funding issues, identification of suppliers and other means of support.

  Knowledge transfer to SMEs activities include workshops, one on one consulting and mentoring, best practice exchange.

  I4.0 change design activities relevant content from previous projects (D.T1.3.2):
  - *InnoPeer AVM - D.T3.2.6 Basic Training concept*
  - *InnoPeer AVM - D.T3.2.7 Advanced Courses*
  - *InnoPeer AVM - D.T3.2.9 Strategy Camps*
  - *InnoPeer AVM - D.T3.2.2 Living labs*
  - *InnoPeer AVM - Handbook 2020*
  - *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
  - *Things+ - D.T3.2.5 Key tools portfolio*
  - *BMWi - Digital business models for I4.0*

- **Plan to change and to leverage**

  Creation of implementation plan with activities, timeline, commitments, responsibilities and support during suppliers' selection, access to finance, employee training support, etc. This is about project management generic competences implemented within the context of new technology

integration and organisational change management (including "soft" elements like organisational values and culture)

Knowledge transfer to SMEs activities include project management workshops, consulting and mentoring.

Plan to change and to leverage activities relevant content from previous projects (D.T1.3.2):
- o *InnoPeer AVM - D.T3.2.7 Advanced Courses*
- o *InnoPeer AVM - D.T3.2.9 Strategy Camps*
- o *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
- o *Things+ - D.T3.2.5 Key tools portfolio*
- o *BMWi - Digital business models for I4.0*

3.3. Methodology third phase: Supporting I4.0 implementation

"Going there"
Supporting companies in all aspects of I4.0 implementation: project management relevant to I4.0 technology implementation, organisational transformations caused by I4.0 and external transformations enabled by the I4.0.

Sets of implementation support activities which have different focus:
- **I4.0 implementation support**

    Supporting I4.0 project - all activities relevant to I4.0 initiative successful roll out and implementation. In a nutshell, it is limited to specific organisation I4.0 project implementation components - from project management, funding, supplier's appraisals…

    Knowledge transfer to SMEs activities include access to knowledge exchange platform, trainings, consulting and mentoring.

    I4.0 implementation support activities relevant content from previous projects (D.T1.3.2):
    - o *InnoPeer AVM - D.T3.2.7 Advanced Courses*
    - o *InnoPeer AVM - D.T3.2.9 Strategy Camps*
    - o *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
    - o *Things+ - D.T3.2.5 Key tools portfolio*

- **I4.0 change management**

    Supporting integration of I4.0 induced changes into organisation - all activities relevant to supporting roll out of I4.0 induced changes in the resto of the organisation – integration of I4.0 changes into business model, human resources requirements, new strategy roll out. Includes alignment, coordination, opposition and change opponents management to performance appraisal, improvements and reviews of internal changes needed for successful creation of new capabilities and competences.

    Knowledge transfer to SMEs activities include access to knowledge exchange platform, trainings, consulting and mentoring.

    I4.0 change management activities relevant content from previous projects (D.T1.3.2):

- o *InnoPeer AVM - D.T3.2.6 Basic Training concept*
- o *InnoPeer AVM - D.T3.2.7 Advanced Courses*
- o *InnoPeer AVM - D.T3.2.9 Strategy Camps*
- o *InnoPeer AVM - D.T3.2.2 Living labs*
- o *IoT4 Industry - Anonymized use cases*
- o *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
- o *BMWi - Digital business models for I4.0*

- **I4.0 leverage support**

  Supporting market capitalisation of newly created organisational capabilities - all activities relevant to increased competitiveness, value proposition transformation and associated business model elements (customer relationships, channels, revenues…), new markets, internationalisation, market scale up based on new capabilities and leveraging all aforementioned transformation efforts.

  Knowledge transfer to SMEs activities include access to knowledge exchange platform, trainings, consulting and mentoring.

  I4.0 leverage support activities relevant content from previous projects (D.T1.3.2):
  - o *InnoPeer AVM - D.T3.2.7 Advanced Courses*
  - o *InnoPeer AVM - D.T3.2.9 Strategy Camps*
  - o *Things+ - D.T3.2.4 Digital guidelines on SIM (phases 1-3); Guidelines for internationalization (phases 4-5)*
  - o *Things+ - D.T3.2.5 Key tools portfolio*
  - o *IoT4 Industry - Anonymized use cases*
  - o *BMWi - Digital business models for I4.0*