SURE5.0

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D. 2.1

Services catalogue for SMEs business transformation

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Table of Contents

Executive Summary

This deliverable summarises the services portfolio offered to mobility, transport and automotive, aerospace and defence, and electronics SMEs as part of their transformation process towards Industry 5.0 considered in SURE5.0. The services considered will encompass advanced technological services (assessment and proof-of-concept), an Industry 5.0 training programme considering seven different modules, investment readiness support services and human centricity and social innovation support services.

All these services will be offered to the SMEs accepted in the acceleration programme, being distributed between phase 1 and phase 2. SMEs will be capable of selecting the most adequate services to be integrated in their phase 2 projects to complement the FSTP scope and maximising the uptake of Industry 5.0 principles of sustainability, resilience and human centricity.

1. Introduction

1.1 Purpose of Document

The aim of this document is to summarise the portfolio of services offered by SURE5.0 consortium towards the SMEs involved in the Acceleration Programme. Actions will encompass different technological, training, business and social innovation-oriented services aligned with mobility, transport and automotive, aerospace and defence, as well as electronics sectorial needs in relation to Industry 5.0.

The services offered aim at expanding SMEs personnel knowledge on Industry 5.0 principles related to sustainability, resilience and human centricity pillars, how the main Advanced Technologies for Industry (ATIs) can enable their alignment with these principles, and how sound and reliable business models and social innovation initiatives can be deployed following Industry 5.0 concept towards contributing to the Digital and Green transition.

1.2 Intended audience

The main target of this deliverable are SMEs participating in SURE5.0 Acceleration Programme and aiming to set up a customised service pack for their Industry 5.0 projects from a broad approach considering technological, training, business and social innovation perspectives.

2. Advanced technological services

As a key part of SURE5.0 services provisioning, involved Research and Technology Organisations partners, namely AIMEN (Spain), FHG IPT (Germany) and TALTECH (Estonia), will offer technological services based on their existing capabilities and expertise. The services will be divided by organisation, ATI considered and linked Industry 5.0 pillars addressed.

The services considered to be provided are:

- Individual technological assessment regarding Industry 5.0 uptake and specific technological challenges for their businesses. SURE 5.0 RTOs will give individualised support to SMEs in assessing their potential and technological focus towards Industry 5.0, setting up interviews (live or online) between the SMEs Industry 5.0 project leaders and relevant RTO experts in the different fields.

- Proof-of-concept testing: Based on the assessment provided, some SMEs may require specific proof-of-concept for better understanding the potential of certain ATIs and Industry 5.0 technologies, instead of directly moving towards an Industry 5.0 deployment project. The proof-of-concept will need to be sufficiently justified in terms of TRL and specific SMEs needs. In those cases, the RTOs will provide support for these SMEs to define this testing programme and will offer their Open Pilot facilities and expertise to establish a clear research and innovation plan, to be deployed within and after SURE 5.0 project lifespan based on budget and personnel effort availability.

Table 1 – Advanced technological services provided by AIMEN

Title
Advanced manufacturing processes for Sustainability and Resilience
Lead partner
AIMEN
Objective of the service aligned with Industry 5.0
• Provisioning of advanced manufacturing processes expertise with a special focus on sustainability based on Zero-Defect Manufacturing strategies combining online control, quality assurance for an early detection of defects and avoiding its propagation to downstream manufacturing stages, as well as the automatic process parameters tuning and dynamic motion control, avoiding wastage and improving efficiency are considered. • Resilience-related assessments based on the ability to cope flexibly with change, de-risking the investment by increasing sovereignty against external factors. This is accomplished through flexible and highly reconfigurable manufacturing systems (plug & produce) capable to offer high-reactivity to changes (demand, supply disruptions, etc.), as well as through novel control systems with cognitive capabilities (AI) to react to unpredictable situations.
Target audience
SMEs interested in exploring the potential of advanced manufacturing processes in their production lines.
Service description
Manufacturing companies are currently confronted with multifaceted challenges created by rapid technological changes, as short product life cycles, lower volumes, high mix of different products, high complexity, volatile demand and customization. To face those challenges the service based on the AIMEN AM Pilot Factory and other advanced

manufacturing processes expertise of the research centre (composite fabrication processes, laser-based manufacturing), provides an insight towards new manufacturing processes and strategies to align with sustainability and resilience objectives while considering novel digitalisation strategies.
Technological expertise
• Metal Additive Manufacturing expertise for large metal parts (Laser Metal deposition processes, wire arc additive manufacturing) • Laser-based manufacturing processes for high power processes (welding, cutting, surface treatment, cladding, heating) and pulsed laser applications (micromachining, surface modification and functionalisation). • Polymers and composites additive manufacturing base on Automated Fibre Placement, Fused Filament Fabrication and Micro-additive of photocurable resins. • Advanced manufacturing of thermoset and thermoplastic composites, composites welding and multi-material fabrication processes.
Infrastructure available for potential Proof of Concept
The AIMEN AM Pilot Factory encompasses semi-industrial Additive Manufacturing facilities and equipment for the development and validation of sustainable processes and technologies oriented to different sectors (automotive, aeronautics, metal mechanics, etc.). The pilot factory infrastructure is automated, sensorised and fully digitalised, being capable of complex monitoring and control strategies deployment and testing.

Title
Robotics service for Human Centricity
Lead partner
AIMEN
Objective of the service aligned with Industry 5.0
• To support the implementation of industrial and collaborative robotics in industrial production environments with a special focus on human centricity aspects, oriented towards guaranteeing safety while enhancing lead times and synergic work between robotic solutions and human operators. • To facilitate the uptake of embodied robotic solutions for ergonomic solutions implementation in shopfloor working environments for enhanced workers health and extended physical capabilities.
Target audience
SMEs oriented towards the integration of robotic solutions for shared working environments.
Service description
The implementation of robotics in industrial facilities has supported process automation in different sectors during the last decades. The inclusion of robotics in complex non-structured environments such as the ones associated with large parts manufacturing (such as in bus & coach or aeronautics sectors) is a major demand for industrial sectors in the last few years, aiming at significantly improving lead times, quality and safety of shopfloor environments. Synergic collaboration between industrial, collaborative and embodied robotics with operators is considered a major innovation driver for these sectors in relation to human centricity. AIMEN will focus on providing technological assessment for the uptake of these solutions based on the centre experience in their deployment in industrial environments, being

capable of recommending specific robotic systems and viable application scenarios based on end user needs under the AIMEN Didactic Factory framework.
Technological expertise
• Process and environment perception systems oriented towards both part and components identification and classification, as well as shopfloor workers in real-time, supporting zero-defect operations and agile collaboration and synergic human-robot working environments. • Dynamic tasks allocation for robotic solutions in non-structured and dynamic working environments. • Embodied robotic solutions evaluation for different operator profiles and tasks.
Infrastructure available for potential Proof of Concept
The service will be intimately related to the AIMEN Didactic Factory initiative, an open pilot factory addressing the need of making human and digital technologies capabilities compatible in industrial environments, searching for synergies towards increasing productivity, quality, performance, well-being and safety with a special focus on large-part manufacturing industries.

Title
Photonics service for Resilience
Lead partner
AIMEN
Objective of the service aligned with Industry 5.0
• To support SMEs in the identification and implementation of photonic-based monitoring and NDT systems for assessing key materials and products parameters for resilience objectives.
Target audience
SMEs looking for integrating photonic-based solutions to monitor their industrial processes.
Service description
The evolution of photonic technologies for real time detection of quality parameters both for the materials used and the products fabricated within manufacturing applications has enabled agile decision making and production optimisation under changing operating circumstances (materials quality & scarcity, energy consumption fluctuation) and short series and customised demand.
Technological expertise
• Selection of sensors and monitoring systems hardware solutions for industrial environments. • Definition of industrial IoT networks and edge computing hardware systems adapted to monitoring and NDT needs. • Development of signal processing algorithms based on Deep Learning and Machine Learning algorithms for defects, components and features identification.
Infrastructure available for potential Proof of Concept
• Optical laboratory: Optical laboratory equipped with optoelectronic equipment: Spectrometer AvaSpec-NIR512-2.5, Optical Power Meters, fibre optic fusion splicers, fibre optic tools, Optical spectrum analyser AQ6370D, photodiodes, illumination sources, cameras, detectors, 3D printer, optical filters, optical polarizers. • Laboratory of CPS and embedded systems: A laboratory of CPS and embedded systems for electronics design (FPGA, GPU, ARM) and software development (VHDL,

CUDA, C++) applied to condition monitoring, real-time signal processing and pattern recognition.

Table 2 – Advanced technological services provided by FHG IPT

Title
Artificial Intelligence service for Sustainability and Human Centricity
Lead partner
FHG IPT
Objective of the service aligned with Industry 5.0
Sustainability can be created through many avenues. The application and integration of Artificial Intelligence (AI) and Machine Learning (ML) solutions in production is playing an increasingly decisive role in the efficient use of resources. Fraunhofer IPT will share its experience with artificial intelligence in production that was obtained within several research and industrial consultancy projects. With this service employees of SMEs will be enabled to understand AI/ ML and integrate suitable solutions in the production processes.
Target audience
SMEs with ambitions to integrate artificial intelligence and machine learning into their production processes.
Service description
In this service provided by FHG IPT SME will be enabled to both comprehend and implement the integration of AI and ML into production using the CRISP-DM framework. We will provide an overview of different methodologies and software solutions for ML and AI and highlight various use cases in the production context. Also, we can provide guidance to set up an environment for the development of artificial intelligence.
Technological expertise
Experience and expertise in planning and implementing Industry 4.0 projects with manufacturing companies.
Infrastructure available for potential Proof of Concept
For training purposes, Fraunhofer IPT can provide GPU clusters that are required for training exhaustive deep learning networks. Also, Fraunhofer IPT can offer 8000 square metres of machine halls and laboratories with demonstrators in the fields of digitalization, individualization, electrification in the context of sustainable production as well as Industry 4.0 and Industrial 5G.

Title
Cybersecurity service for Resilience
Lead partner
FHG IPT
Objective of the service aligned with Industry 5.0
A resilient production should be affected by as few external circumstances as possible. Ensuring that production continues smoothly and unhindered is an essential part of this. In addition to external circumstances such as supply chain difficulties, cyber-attacks are an external factor with enormous risk potential and high costs. The damages from cyber-attacks at manufacturing companies range from the loss of production data and blackmail to complete production line standstills and factory shutdowns.
Target audience
SMEs with the aim of resilient production through safeguarding from cyber-attacks.
Service description

This service provides an analysis of the main cybersecurity risks for SMEs and proposes adequate countermeasures. For this purpose, the use case of an actual attack on an SME in the manufacturing sector is analysed and processed in detail. Possible attack vectors are discussed and a framework for safeguarding, preventing, and responding to cyber-attacks is presented.
Technological expertise
Experience and expertise in Cybersecurity project for industrial companies.
Infrastructure available for potential Proof of Concept
A cybersecurity testbed is available for proof-of-concept demonstration.

Title
Augmented and Virtual Reality service for Human Centricity.
Lead partner
FHG IPT
Objective of the service aligned with Industry 5.0
Human Centricity can be achieved by equipping employees with modern Augmented Reality (AR) and Virtual Reality (VR) tools. AR/VR can be applied for various use-case in production and enable humans to efficiently adopt to unplanned changes in production.
Target audience
SMEs with the goal of developing their own employees by empowering them to efficiently use modern AR/VR tools to increase their productiveness.
Service description
In this service, SMEs learn about various smart device solutions and the potential of Augmented Reality and Virtual Reality glasses. Further, different use cases and application areas also be discussed in depth.
Technological expertise
Experience and expertise in AR/VR projects for manufacturing companies.
Infrastructure available for potential Proof of Concept
Various Augmented Reality and Virtual Reality glasses can be tested or experienced.

Table 3 – Advanced technological services provided by TALTECH

Title
Robotics service for Human Centricity
Lead partner
TALTECH
Objective of the service aligned with Industry 5.0
The evolution of new production models driven by flexibility and fast adjustments to the market, is reflected by the interest and expansion of the automation and robotics industries and the growing application of collaborative robots towards the Industry 5.0 paradigm. Collaborative systems involve the close cooperation of workers and machines. The integration of human decision making, and soft skills with automation workforce is one of the goals of the new industrial trends. Activity, task, and physical space sharing should be mediated by new Human Robot Interaction (HRI) methods and supported by suitable evaluation metrics. Recent studies and research activities in the IVAR lab at the TalTech Mechanical and Industrial Engineering Department moved towards the evaluation of novel interface and control methods for HRI based on implementation and assessment of Extended Reality systems. Augmented and Virtual reality interfaces allow close contact between the operator and the industrial robot Digital Twins for a faster design of cooperation and control methods, safety systems and definition of evaluation metrics.
Target audience

SMEs that are using or planning to use industrial robots as part of their manufacturing or assembly process. Best suited are companies that have semi-automated processes where humans and machines have to work in cooperation and in close proximity to one another.
Service description
Current activities include user testing of XR interfaces against real robot teach pendant with evaluation of effectiveness, efficiency, user experience and operator workload based on qualitative and quantitative evaluation metrics.
Technological expertise
• Connecting industrial robots to XR • creating interfaces for controlling the robots • creation of active digital twins.
Infrastructure available for potential Proof of Concept
Industrial robots from different manufacturers (ABB, Yaskawa), VR headsets, Android and iOS-based handheld devices; wristbands for biometric data collection; depth camera systems for body and hand posture tracking.

Title
Augmented and Virtual Reality service for Human Centricity
Lead partner
TALTECH
Objective of the service aligned with Industry 5.0
Training and upskilling workers through various extended reality (AR+VR) applications that enable more intuitive learning of new skills, increase the efficiency of manufacturing and assembly process and reduce risks to the workers when training. Additional benefit is that it also reduces risks to the machinery.
Target audience
SMEs working in the direction of digital solutions for production + assembly process optimization. Upskilling workers in an intuitive new environment and operator support on the assembly line. A second field of application is research including use cases developed within academia.
Service description
Digitalizing equipment, manufacturing- and assembly processes so they can monitored, accessed and controlled remotely. Research is done in order to teach new skills in an intuitive digital environment (high quality UI) to increase efficiency and reduce risks to the workers.
Technological expertise
Main focuses on research: • extended reality applications for industrial robot control, path planning and teleoperation, while providing support and instructions to inexperienced users in operating complex machinery. • immersive 360-degree visualization and interface control using Virtual Reality (VR) headset for large industrial equipment (i.e. forestry crane operations). • industrial semi-automated assembly process by means of digital twins.
Infrastructure available for potential Proof of Concept
The technologies employed for user centric studies and extended reality system developments include the following: VR headsets, including Meta Quest 2, HTC Vive pro eye, Valve Index and Oculus Quest; HoloLens2 for AR visualization; Android and iOS-based handheld devices; wristbands for biometric data collection; depth camera systems for body (Microsoft Kinect) and hand (Leap Motion) posture tracking.

Unity real time render engine is employed as a main software for development of the applications together with different SDKs for AR/VR development, hand- and eye tracking integration.

Title
Internet of Things service for Resilience
Lead partner
TALTECH
Objective of the service aligned with Industry 5.0
IoT is used mainly for monitoring and gathering information. This enables to get a better overview of manufacturing in real time and the information can be used to increase overall resilience of the supply chain, with the main focus on in-house processes.
Target audience
SMEs interested in monitoring, optimizing and predicting operations in the manufacturing process in a larger view (including transportation to and from warehouses).
Service description
Increase of Overall Equipment Efficiency, Overview of collaboration between different participants in the manufacturing process, input for AI to optimize virtual models of manufacturing systems.
Technological expertise
Identifying problems in manufacturing systems where IoT could help to improve the process, creating a theoretical and practical model of the solution, connecting various IoT equipment in the factory.
Infrastructure available for potential Proof of Concept
Basic IoT kits for setting up simple proof of concepts in the factories. Kits include sensors, controllers and other information collection equipment.

3. Training services

In addition to the service services provisioning, involved Research and Technology Organisations partners, namely AIMEN (Spain), FHG IPT (Germany) and TALTECH (Estonia), will provide SMEs with an advanced training programme for their Industry 5.0 transition. For this purpose, the training programme was co-created and co-designed among the RTO partners, based on their experience and expertise.

The advanced training programme consists of the following training modules:

Introductory training modules:

- Introduction to Industry 5.0. Challenges and Success Stories: This training module will teach SMEs the principle of Industry 5.0, it's challenges and how to integrate best practices.

Technological training modules:

- AI-enabled sustainability for industrial value chains: The topic of this training module is the application and integration of Artificial Intelligence (AI) and Machine Learning (ML) solutions in production. SMEs will be enabled to both comprehend and implement the integration of AI and ML into production using the CRISP-DM framework.
- Human-centric approaches for manufacturing shopfloors and value chains: SMEs will learn about a technology-driven approach towards the integration of human centricity aspects in automotive, mobility, aerospace and electronics manufacturing industries.
- Digitalisation as a main enabler for advanced manufacturing processes and products: In this training, companies will how identify, plan and implement digitalization for advanced manufacturing processes.
- Safe and connected factories based on IoT, 5G and cybersecurity technologies: This training points out the importance of connected factories and addresses manufacturing companies with various machinery and a physical factory that are looking to increase monitoring of their manufacturing system.

Innovation training modules:

- Designing of innovative and sustainable business models for the ecosystems under the perspective of Industry 5.0: This module introduces approaches to support practitioners in developing SBMs and focuses on idea generation and on analysing existing processes.
- Soft skills and HHRR challenges under Industry 5.0 paradigm: The goal of this training is to provide an overview of the meaning and importance of the human-centric approach in the context of industry 5.0 and to share business cases to prove that is feasible and worthwhile to put the worker in the centre of the production process.

Table 4 – Introductory training modules

Title
Introduction to Industry 5.0. Challenges and Success Stories
Lead partner & main contributors
AV
Objective of the training aligned with Industry 5.0

The objective of this training programme is that participants are made aware of what is Industry 5.0, what are its challenges, and how to integrate its good practices in their own enterprise.
Target audience
All SMEs included in the SURE5.0 acceleration programmes (100 companies)
Training programme
The training programme will be divided in 3 parts: 1/ Description of the basics about Industry 5.0 2/ Definition of the themes and challenges of the Industry 5.0 3/ Good practices and practical application to different types of businesses
Methodology and Didactic Resources
1/ Describe the fundamentals of Industry 5.0, namely the three mandatory themes: sustainability, resilience and human centricity Format: practical sheets that will be sent beforehand to the participants. They will be made by AV on the Canva platform Identify commonalities and differences with industry (before 4.0) Format: comparative graphs and highlighting the value of 5.0 today that will be send beforehand to the participants. They will be made by AV on Excel 2/ Describe the topics related to Industry 5.0 and the challenges that are inherent to this type of industry Format 1: videos made with the speakers of the following courses that will explain briefly the topics (5 minutes max.). They will be accessible to the participants on a private online repertory. They will be made by each members of the consortium Format 2: PPT type sheets linking the ecosystems of the SURE5.0 project and the types of sector of the participating companies with the 5.0 themes that will be sent to the participants beforehand. They will be made by AV on PowerPoint 3/ Discuss and exchange best practices Format: videos, interview or articles of success stories in terms of Industry 5.0. They will be accessible to the participants on a private online repertory. They will be gathered by AV beforehand. Explain different scenarios depending on the type of company vs. their rate of self-assessment Format: case study showing which companies are at the point of Industry 5.0 and which are not yet there. This will be done live during the session. We will use Webex to do the live session with a possibility to use Miro if we need more interactions.
Duration
3 hours per session, participants will have content to read before the course session
Planned dates for delivery
1 training per Acceleration programme/calls: For Acceleration Programme 1:01/2024 For Acceleration Programme 2 (first call) (to be confirmed): 04/2024 For Acceleration Programme 2 (second call) (to be confirmed): 09/2024

Table 5 – Technological training modules

Title
AI-enabled sustainability for industrial value chains
Lead partner & main contributors
FHG IPT
Objective of the training aligned with Industry 5.0

The application and integration of Artificial Intelligence (AI) and Machine Learning (ML) solutions in production is playing an increasingly decisive role in the efficient use of resources. Through the targeted use of AI and ML in production, production quality can be sustainably improved and through less rejects, fewer resources such as time, money, raw materials, and energy are wasted.
In this training provided by FHG IPT the SMEs will be enabled to both comprehend and implement the integration of AI and ML into production using the CRISP-DM framework.
We will discuss the different methodologies and software solutions for ML and AI and highlight various use cases in the production context. Based on the CRISP-DM framework, all necessary steps for the integration of AI and ML into production will be illustrated and explained. With this seminar employees will be enabled to understand AI/ ML and integrate suitable solutions in the production processes.

Target audience

Companies that want to learn about the basics of Artificial Intelligence

Training programme

Module 1: Understanding the concepts behind artificial intelligence and machine learning.

- Differences between artificial intelligence, machine learning and deep learning
- Main building blocks of a machine learning model

Module 2: Implementing machine learning projects

- Tasks for machine learning applications
- CRISP-DM as a framework for machine learning projects.

Module 3: Best practice examples

Methodology and Didactic Resources

The training will make use of the CRISP-DM framework.
Quizzes for assessing the proper understanding of module content will be used.

Duration

1-2h

Planned dates for delivery

1 training per Acceleration programme/calls:
For Acceleration Programme 1:02/2024
For Acceleration Programme 2 (first call) (to be confirmed): 05/2024
For Acceleration Programme 2 (second call) (to be confirmed): 10/2024

Title

Safe and connected factories based on IoT, 5G and cybersecurity technologies

Lead partner & main contributors

TALTECH (FHG IPT)

Objective of the training aligned with Industry 5.0

Increased resilience in the supply chain through factories connected to various IoT elements. The more specific emphasis is on manufacturing process monitoring and optimization and increase of resilience through these activities. To a lesser extent the warehouse and materials/semi-products' in-house transportation is included in the IoT range. One of the goals is to predict any disruptions in the supply chain. It needs to be pointed out that the focus of the supply chain is limited to the specific factory and does not include raw materials or distribution of finished goods. A training for cybersecurity basics and 5G opportunities in production will be included in this training.

Target audience

Manufacturing companies with various machinery and a physical factory that are looking to increase monitoring of their manufacturing system, determining areas where the processes can be improved, especially in reliability and fault prediction.
Training programme
Module 1: Connected factories based on IoT -Overview and evolution of IoT -Main areas of use -Problems IoT can help to solve, with focus on increasing resilience -How IoT elements are implemented, data gathered, processed, and analysed -Obstacles of implementing IoT solutions and how to overcome them -Examples of best practices, results, and short comings -Questions and discussion. Module 2: 5G opportunities -Overview -Problems and solutions -Main benefits -Examples of practices -Questions and discussion Module 3: Cybersecurity -Overview -Problems and solutions -Main benefits -Examples of practices -Questions and discussion
Methodology and Didactic Resources
Real life problems from various, different size companies from very different fields are presented. The problems are presented in a way that IoT solutions can solve them or help understand the situation better. Then a solution is presented in two stages. First at a theoretical level, where a block schematic shows the flow of information, type of sensors used and how the information is processed. After that a practical version on how to realize the theory is presented with specific hardware solutions and proposition on how to analyse the data and how the results can improve the company's overall efficiency. Dimusa, MS Teams are planned to be used. Quizzes for assessing the proper understanding of module content will be used.
Duration
Module 1: 40 min Module 2: 40 min Module 3: 40 min
Planned dates for delivery
1 training per Acceleration programme/calls: For Acceleration Programme 1:02/2024 For Acceleration Programme 2 (first call) (to be confirmed): 05/2024 For Acceleration Programme 2 (second call) (to be confirmed): 10/2024

Title
Digitalisation as a main enabler for advanced manufacturing processes and products
Lead partner & main contributors

FHG IPT (AIMEN, TALTECH)
Objective of the training aligned with Industry 5.0
Digitalization of manufacturing processes is playing a decisive role on today's manufacturing landscape. In this training, companies will how identify, plan and implement digitalization for advanced manufacturing processes. We will guide companies through a seven-step process, that will help them to identify digitalization opportunities in their company. Further, companies will learn about Digital Twins and augmented and virtual reality that can be used to digitalize their production. Also, a safe human machine-collaboration is introduced.
Target audience
Companies that want to find a starting point for digitalization in their company. Especially SME with semi-automated manufacturing and/or assembly systems that are interested in safe environments for human-machine collaborations.
Training programme
Module 1: Developing Digitalization Roadmap (FhG) - A 7-step process for a Digitalization Roadmap Module 2: Digital Twins (AIMEN) - Digital Twins for industrial data interoperability Module 3: Basics of augmented and virtual reality (TALTECH) - Interfaces for AR/ VR - Application of AR/ VR for design and cooperation - Examples of AR/ VR for a real robot teach pendant
Methodology and Didactic Resources
A seven-step process will be used to explain some of the main concepts of digitalization. Quizzes for assessing the proper understanding of module content will be used. An overview of different approaches and methods are introduced and examples of frameworks for an implementation (e.g. Unity) is introduced. Furthermore, a digital twin toolkit developed for companies and universities is made available - VLFT (Virtual Learning Factory Toolkit) that includes: • Graphical User Interfaces (GUIs) to access the knowledge base, explore and generate new factory models • Performance evaluation via Discrete Event Simulation • 3D visualization and interaction with production systems and production resources by means of Virtual and Augmented Reality
Duration
3h (1h per module)
Planned dates for delivery
1 training per Acceleration programme/calls: For Acceleration Programme 1:03/2024 For Acceleration Programme 2 (first call) (to be confirmed): 06/2024 For Acceleration Programme 2 (second call) (to be confirmed): 11/2024

Title
Human-centric approaches for manufacturing shopfloors and value chains
Lead partner & main contributors
AIMEN (TALTECH, FHG IPT, COR)
Objective of the training aligned with Industry 5.0

Provisioning of a technology-driven approach towards the integration of human centricity aspects in automotive, mobility, aerospace and electronics manufacturing industries, considering both shopfloor- and value chains-oriented solutions based on AI, robotics, extended Reality and Distributed Ledger technologies.
Target audience
SME owners and engineers interested in exploring the potential of human centric technologies for optimising production and industrial value chains.
Training programme
Module 1: Human centricity as a driver for industrial digitalisation - - The need for a human centric approach towards Industry 5.0. How to integrate workers into the digital transformation of industries (AIMEN). Module 2: Technological advances towards human centric industries - Decision Support Systems and Explainability for effective human- AI collaboration (AIMEN). - Collaborative robotics for synergic and agile shared industrial working environments (AIMEN) - Extended Reality solutions for information provisioning and training to operators (TALTECH, FHG IPT). Module 3: Industrial success stories on human centricity - Case 1: AI and robotics solutions industrial uptake through Didactic Factories networks (AIMEN) - Case 2: Integration of XR solutions into operational environments (FHG IPT, TALTECH) - Case 3: Blockchain technology for decentralised governance models in aerospace value chains (COR).
Methodology and Didactic Resources
Expositive sessions will be facilitated through MS Teams, while Slido will be used to dynamise the audience participation during the sessions. Quizzes for assessing the proper understanding of module content will be used. All the presentations, videos and materials used during the training module will be shared with the assistants through email.
Duration
Total duration: ~3h Module 1: 45 min. Module 2: 60 min (20 min per session). Module 3: 60 min (20 min per case).
Planned dates for delivery
1 training per Acceleration programme/calls: For Acceleration Programme 1:03/2024 For Acceleration Programme 2 (first call) (to be confirmed): 06/2024 For Acceleration Programme 2 (second call) (to be confirmed): 11/2024

Table 6 – Innovation training modules

Title
Designing of innovative and sustainable business models for the ecosystems under the perspective of Industry 5.0
Lead partner & main contributors
INI

Objective of the training aligned with Industry 5.0
The training will focus on providing SME representatives with up-to-date tools to understand, design and implement innovative and sustainable business models (SBMs). Activities will align to Industry 5.0 practices covering aspects such as: - increased resource efficiency, cost savings on energy and resource consumption, minimizing waste; - increased competitiveness and improved reputation, attracting customers and stakeholders who value sustainability and human-centricity; - first movers' benefits, early adoption and compliance with upcoming regulations
Target audience
Manufacturing SMEs across the value chains of SURE5.0's three industrial sectors
Training programme
The tools and approaches presented to support practitioners in developing SBMs will focus on idea generation and on analysing existing processes. Business model innovation can be more incremental (adjustment/adaptation), or radical (improvement/full redesign); quick recognition of the company's needs and the most suitable action is necessary. The training module will showcase to the attending SMEs best practices, first movers and convincing examples (i.e.: EU's Industry of the Future Award's winners, Interreg Europe's I5.0 webinar speakers, more case studies to be identified) that embracing I5.0 practices won't threaten their viability and profitability, but has all the potential to enhance them, instead. During the training session, SME representatives will be encouraged to use a triple bottom line approach in measuring their organization's performance: people, profit, planet. **Activities of business modelling** will be conducted to enable entrepreneurs to consider the short- and long-term challenges and opportunities facing their companies, as they step-up their efforts to balance growth, prosperity, sustainability and profitability. A pre-condition for the Industry 5.0 transition is the **identification of areas of critical gaps in strategically crucial aspects**; the training activities will refer to and benefit from the SURE5.0 self-assessment and its results, giving SME representatives tools to further elaborate the result of the evaluation received in the early stages of the project. Said activities will maintain a strong focus on the adoption of technologies for greener business models. Finally, the main aspects of the EU Taxonomy and how it impacts the SMEs' businesses and funding perspectives will be presented.
Methodology and Didactic Resources
- The SURE5.0 approach to business modelling will focus on: **value proposition** (including profit, people, planet); **value creation** (addressing stakeholders, activities, resources and capabilities); **value capture**, cost structure, revenue streams; **value delivery**, such as customer segments, relationships, etc. - SBMs canvas (Ostwerwalder & Pigneur, 2010) and its 9 elements of analysis - Conceptual templates, value mapping tools, models and methodologies on business innovation (Flourishing BM, Doblin's 10 Types of Innovation, …) - "RESTART Sustainable Business Model Innovation" (Jørgensen, Pedersen, 2018) - "Sustainable Business Models" (N. Bocken, Maastrict University, 2021) - "Working Definitions of "Sustainable Business Model" & "Business Model for Sustainability" (Lüdeke-Freund, 2014) - Platform: Zoom (TBC) - Dynamizing tool: Slido (TBC)
- **Duration**
2h 45min
Planned dates for delivery

1 training per Acceleration programme/calls: For Acceleration Programme 1:02&03/2024 For Acceleration Programme 2 (first call) (to be confirmed): 05&06/2024 For Acceleration Programme 2 (second call) (to be confirmed): 10&11/2024

Title
Soft skills and HHRR challenges under Industry 5.0 paradigm
Lead partner & main contributors
CEAGA
Objective of the training aligned with Industry 5.0
The goal of this training is to provide an overview of the meaning and importance of the human-centric approach in the context of industry 5.0 and to share business cases to prove that is feasible and worthwhile to put the worker in the centre of the production process.
Target audience
Specially addressed to HR directors and, in general, to any person who holds people management responsibilities in an industrial SME.
Training programme
<u>Module 1: Workers within industry 5.0</u> - Introduction: Human Centric approach as a core element of industry 5.0. - Challenges and opportunities resulting from putting the worker at the centre of the production process. - Soft skills required to digitalize manufacturing plants while becoming more human-centric, sustainable and resilient. <u>Module 2: Best practices session</u> Best practices from two companies (TBC) in the MTA ecosystem (either in aerospace and defence or in electronics) - Business case 1: The journey to become a human-centric company (presented by HR Director). - Business case 2: reskilling/upskilling approach for the development of industry 5.0 soft skills (presented by HR or Training & Development Director).
Methodology and Didactic Resources
The training will be based on an expositive methodology. The first module will incorporate quiz/surveys with tools such as mentimeter, to actively involve the participants.
Duration
2 hours
Planned dates for delivery
1 training per Acceleration programme/calls: For Acceleration Programme 1:01/2024 For Acceleration Programme 2 (first call) (to be confirmed): 04/2024 For Acceleration Programme 2 (second call) (to be confirmed): 09/2024

4. Investment readiness support services

The Investment Readiness (IR) Level assessment will analyse each company's 5.0 transition challenges, establishing recommendations and actions and contribute significantly to providing a qualitative overview of each SMEs' profile.

In the context of WP2, INI-led services in support of IR will showcase relevant examples to the involved SMEs of how their viability and profitability are not threatened, but rather can be enhanced, by embracing Industry 5.0 practices. Activities of business modelling will be particularly important in enabling entrepreneurs to consider the short- and long-term challenges and opportunities facing their companies, as they step-up their efforts to balance growth, prosperity, sustainability and profitability.

The IR support services will be delivered in two phases:

- **Phase 1**: all SMEs entering SURE5.0 programme will be delivered an IR level in relation to the adoption of Industry5.0 paradigm in their business models: (i) *Investment ready*, (ii) *Almost ready* and (iii) *Not ready*. The first condition for performing the IR assessment is to understand the context within which the business is placed in its path towards Industry5.0 transition. This context will be addressed by deploying **a proprietary Industry5.0 business model analysis methodology** through one-to-one interviews led by Iniziativa, building on the results of the SURE5.0 self-assessment tool, individual assessment and the current state of the company within its life cycle. Based on the applied methodology, 4 (four) key vectors will be used to evaluate the Industry 5.0 IR:

✓ **Offering**, in terms of product/service system and product/service performance;
✓ **Process**
✓ **Network and channels**
✓ **Customer engagement**

At the end of the assessment, the SME will be categorised under the three above-mentioned groups and recommendations (inclusive of an action plan) will be provided.

- **Phase 2**: the SMEs accessing the SURE5.0 grant will receive further IR support based on the IR level assessed and on the recommendations received. In particular, ad-hoc business support services will be provided, based on the specific needs of each SME involved: business modelling and planning towards Industry 5.0, assessment of financial needs for the implementation of Industry 5.0 transition, scouting of financing resources, support in the definition of the rout-to-market in case of a new value proposition, support for IPR management and technology transfer services. All the services provided will be characterised by a very innovative approach in relation to the methodologies they are based on and their deployment. For example, the business model innovation towards Industry 5.0, which represents a critical aspect in the adoption of a new paradigm, will be based on a new business model framework developed by INI that contains, beyond Industry 5.0 pillars (resilience, sustainability and human-centricity), the ReSOLVE framework (proposed by the Ellen MacArthur Foundation), an advanced business model innovation framework and the EU Taxonomy regarding the definition of sustainable activities.

The final aim of the IR support services will be to allow the participating SMEs in advancing and following up the Industry 5.0 transition roadmap.

5. Social innovation and Human Centricity services

Industry 4.0 brought “smart” technologies such as artificial intelligence (AI), cloud connectivity, and real-time data analytics to the world of industry and manufacturing. At the core of the Industry 4.0 revolution is a drive toward efficiency, productivity, and cyberphysical systems.

While Industry 4.0 put smart technologies at the centre of manufacturing and supply chains, Industry 5.0 came to augment and “embed” that digital transformation with a more meaningful and efficient collaboration between humans and the machines and systems within their digital ecosystem. The partnership of humans and smart machines marries the accuracy and speed of industrial automation with the creativity, innovation, and critical thinking skills of humans.

Industry 5.0 provides a vision of industry that aims beyond efficiency and productivity and reinforces the role and the contribution of industry to society. It aims to create a more sustainable, ethical, and inclusive manufacturing process for the benefit of the worker, the customer, the society and the environment, transferring value from shareholders to stakeholders.

Main “additives” in the concept of Industry 5.0 (with respect to Industry 4.0) is the recognition of the extra potential of human-centricity and social innovation in the business environment to address the challenges facing the manufacturing industry today, towards a more sustainable, resilient and social friendly European industry.

The aim of the services of this task is to make SMEs aware of social innovation and human centricity and acknowledge the benefit to their businesses.

The services will cover the following aspects:

- Present the SMEs with a A “**Guide for social innovators**” as a first reference point that will cover:
    - What is Social Innovation?
    - Why social innovation and a human-centric approach matter to business?
    - What are the business benefits?
    - How to get started: A framework for implementation
    - Typical examples of social innovation worldwide
    - Inspiring examples from the 27 European States
    - EU funding opportunities for Social Innovation

- Organisation of one Training Session for each Phase 1 of each Acceleration program on “Business model elaboration addressing more human-centric and social approaches”.
- Organisation of one Training Session to present the Social Innovation Tournament or any other similar opportunity, addressed to all Phase 2 selected SMEs and interested to apply to the tournament for additional funding along with other funding opportunities.

- Inform about the SURE5.0 project and its scope relevant authorities and stakeholders, e.g. local municipalities, central / regional RIS3 authorities etc.

  To make this happen, we will publicise SURE5.0 project, its scope, development and achievements directly approaching all possible stakeholders and especially the ones that are local / close to SURE5.0 beneficiary SMEs, i.e.: municipalities, local government, chambers of commerce, regional RIS3 authorities etc.

  Purpose is for all stakeholders to be exposed to Industry 5.0 principles (and especially human-centricity and social innovation), to be aware of ambitious local SMEs adopting these principles and to understand, embrace and to assist if possible, SMEs to this direction.

  The following indicative actions are planned:

  - Email contact with information about SURE5.0
  - Phone calls for follow up
  - Meetings either physical or online with stakeholders

  Corallia will prepare sample emails with relevant SURE5.0 information to be communicated to stakeholders and share with SURE5.0 cluster partners to distribute locally.

  Webinars are as described below:

➢ **Business model elaboration addressing more human-centric and social approaches**

According to McKinsey & Company, human-centric innovation is necessary for companies to remain agile in an unpredictable modern world (https://www.mckinsey.com/featured-insights/themes/heres-why-human-centric-innovation-is-necessary).

Accenture also suggests that by adopting a more human-centric approach, companies can remain agile in an unpredictable modern world (https://www.accenture.com/us-en/insights/strategy/human-centered-business).

The World Economic Forum has also published a report on the importance of human-centricity and data which can serve as a useful route towards increased innovation and business-facing opportunities (ttps://www3.weforum.org/docs/WEF_On_the_Importance_of_Human_Centricity_2021.pdf).

Change towards greater sustainability and resilience needs to happen in business as well as at many levels of our societies. Although global business activities are one of the major causes of the current environmental as well as many social issues, businesses also hold great potential to take the lead in creating more sustainable organizations and practices.

Topics of the session

1. Business plan **summary** –Elevator Pitch
2. **Who** are the people behind the idea?
3. Are you **human centric** as a company?

4. **What** is your product/service?
5. Who are your **customers**?
6. Are you **human centric** with respect to customer?
7. Have you validated your **market**?
8. What is the **social impact** of your company / product?
9. How will you **reach out** to your customers?
10. How do you compare with your **competitors**?
11. How will your company **operate** on a daily basis?
12. Has **human centricity** entered the company DNA?
13. How much will it **cost?**
14. How much **money** will you **make**?
15. Lessons Learned (the hard way)

Duration of the session: 1.5hrs with a 10 minutes break

Web platform to be utilized: Zoom

This service is to be provided to beneficiaries of Phase 1 of each acceleration programme.

Dates:

For Acceleration Programme 1: within 2023

For Acceleration Programme 2 (to be confirmed): 04/2024

- **Training Session to present the Social Innovation Tournament**

The Social Innovation Tournament recognises and supports the best European impact entrepreneurs. It promotes innovative ideas and rewards initiatives that contribute to creating social, ethical and/or environmental impact. Typically, it covers projects in the areas of education, healthcare, the environment, circular economy, climate change, sustainable cities, blue and green economy, inclusion, job creation, ageing and many more.

The prizes are awarded by a jury of specialists from the academic and business worlds. There is also the Audience Choice Award that it is decoded by the public, based on their votes.

Since 2013, the competition has been a beacon for social innovators across Europe, employing a proven methodology for supporting early-stage ideas and facilitating a network of radical innovators shaping our society for the better.

Topics of the session

1. What is the **Social Innovation Tournament?**
2. What is **the structure** of the tournament?
3. How is the **Application Procedure?**

4. About the **selection criteria**
5. What are the **obligations**
6. About the **Process and Prizes**
7. Other relevant –

   What the **Commission does on Social Innovation**

   Social Innovation Academy

Duration of the session: 1.5hrs with a 10 minutes break

Web platform to be utilized: Zoom

This service is to be provided to beneficiaries of Phase 2 of each acceleration programme.

Dates:

For Acceleration Programme 1 (to be confirmed): 02/2024

For Acceleration Programme 2 (to be confirmed): 10/2024