PID IN PRACTICE 4: POLICY IMPLEMENTATION RELEVANT TECH RADAR ON ARTIFICIAL INTELLIGENCE

D.T2.3.5 – PID in practise 4 – Policy Implementation relevant Tech Radar Artificial Intelligence

Version 3.00
04.2022

Author:, PBN, PP9

Document Control

Document Summary	
Project Number	CE1662
Project Title	CEUP 2030
Work Package/Activity	A.T2.3 – Establish PID to Translate TINs Work into Future Robust Policy & Strategy Building
Deliverable	D.T2.3.5 – PID in practise 4 – Policy Implementation relevant Tech Radar on Artificial Intelligence
Deliverable Responsible (if applicable)	PP9 / PBN
Deliverable Reviewer (If applicable)	All PPs, PP6/AFIL as WPT2 Leader
Deliverable Due Date	November 2020 (Delayed to November 2021)

Dissemination Level		
PU	Public	
PP	Restricted to other programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	CO

Document History			
Date	Version	Issuer	Description of Changes
11.2021	1.00.00	PIA	Working draft, for review
11.2021	2.00.00	PIA	Working draft updated, for review
04.2022	3.00.00	PIA	Final document

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Executive Summary

Project Overview

CEUP 2030 aims to generate stable innovation networks which foster better understanding on **C**entral Europe **A**dvanced **M**anufacturing and **I**ndustry **4.0** ("**CAMI4.0**") topics, to generate improved knowledge resource exchange on these technologies leading to an upgraded framework for policy-making and implementation.

Ultimately CEUP 2030 creates and tests a common method to promote improved knowledge dissemination to policy-making stakeholders using a collaborative exchange framework based in physical and digital-methods. These methods and the technology use-cases disseminated within the project, are harvested from existing, high-quality innovation know-how in the CE area.

The project focuses on:

- Identifying the highest-quality innovation know-how in the CE Area, on the CAMI4.0 Topics.
- Enhancing skills capabilities and knowledge of people in charge of local, regional, and (trans)national RTI Policies, associated to the CAMI4.0 Topics.
- Creating a sustainable structure for awareness-raising and shared, sustainable RTI knowledge resource use to enhance policy decision support.
- Anticipating and fast-tracking policy / strategy policy pilot actions to promote a joint RIS3 for CAMI4.0 Excellence in CE/EU.

Work Package and Activity Overview

The overall objective of WPT2 links to the project's specific objective of ensuring awareness and shared sustainable responsibility on using research, technology and innovation knowledge resources in CE/EU for enhancing policy decision support.

The challenge manifests in two sub-objectives which are:

- To coordinate technology experts across the CE/EU regions for solution-oriented trend monitoring (the Trend and Innovation Networks)
- To streamline, process and manage the knowledge for improved policy decision making, in a practicable and sustainable manner (Policy Intelligence Dashboard).

The specific activity which is of relevance for this document is Activity A.T2.3, which is a common activity for all WPs and covers the development of the project's Policy Intelligence Dashboard, which should translate the Trend & Innovation Network knowledge into future robust policy and strategy building. It is designed to establish strong partnerships around the 4 main CAMI4.0 topics in order to raise awareness and ensure a shared sustainable responsibility on using RTI knowledge resources in CE/EU for enhancing policy decision support. The Trend Innovation Networks (TIN) will be equipped with practicable, efficient policy tools, available on Policy Intelligence Dashboard (PID). Both those instruments will be exploited by the partners to select and channel appropriate decision-relevant information out of the daily big data cloud, assess it and provide understandable knowledge in a compact and high-quality format.

Specifically, the practical activities which are supported in this document are:

- Establishing links to key good – practice tools which can power the policy intelligence dashboard;
- Explain the process for the key requirements of the Policy Intelligence Dashboard;

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

- Establish the working processes to develop these key requirements into a wireframe/base operating framework;
- Establish the working processes to develop the tech radar and risk heat maps on technology trends;
- Develop a link to the use-cases the Partners will develop on policy-instruments.

Project-Relevant Reference Material & Reading Prerequisites

(1) **CE1662 CEUP 2030 Application Form** (Version 1, 07/2019): The application form regarding CEUP 2030 for Interreg Central Europe

(2) **Guidance on Harvesting Agenda** (D.T2.1.1; Version final, 04/2020): A guidance document for A.T2.1 on harvested methodologies for the Trend & Innovation Networks and Policy Intelligence Dashboard.

(3) **Harvesting Agenda on CAMI 4.0 for Trend & Innovation Networks and Policy Intelligence Dashboard** (D.T2.1.2; version 2.0, 11/2020): A report and selection grid for best-in-class use of identified outputs and results in WPT2

(4) **Policy Intelligence Dashboard (PID) Design & Elaborate Technology Radar to improve CE/EU (DT.2.3.1.; version 3.0, 04/2022): A manual to establish the IT-based Policy Intelligence Dashboard, with CAMI4.0 Tech Radars and Industry Risk Heat Maps on Technology Trends**

All documents can be found on the project's central repository - Alfresco

Scope of Document & Deliverable Summary

Deliverable D.T2.3.5 is defined in the Application Form as a Trend Radar and Risk Heat Map on Artificial Intelligence developed under joint Policy Intelligence Dashboard for the four 4 CAMI4.0 topics. The PID in Practise for AI represents a Tech Radar (TR) including a Risk Heat Map where policy-relevant data sources (use cases, policy instruments, organisations and networks) are identified and classified with a goal to transfer and deliver relevant content for decision makers. The database of use cases collects 10 the most representative case studies collected within CEUP2030 project, as well as recommended and varied by PPs policy instruments dedicated to CAMI4.0 topics and descriptions of flagships originating from the project partnership. To deliver the tool that is functional and answers the expectations of the varied stakeholders groups a model of PID is to be tested with a balance group of stakeholders. DT2.3.5 presents the scope of the survey and delivers feedback received (test transfer to practice among target groups; feedback loops with regional/national stakeholders. The structure of Trend Radar and Risk Heat Map on AI is in line with manual which provides the guidance required to establish an IT-based Policy Intelligence Dashboard which evidences CAMI4.0 Technology Radars and Risk Heat Maps on Technology Trends (DT.2.3.1)

This document contains the summary of PID in Practise demonstration testing and insights and conclusions collected valuable for further development of PID. It represents the "Policy Intelligence Dashboard in Practice", which highlight technology trends for AI – one of the four CAMI4.0 topics. The Document provides background insight necessary to deliver the Dashboards along with implementation procedures and testing procedures. The purpose of

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

the PID in practice 4: Policy implementation relevant Tech Radar on Artificial Intelligence (T2.3.5) is to provide the Partners the information which is required to create the Policy Intelligence Dashboard for artificial intelligence technology. which is a part of the key output of WPT2.

Output O.T2.2	CEUP 2030 Policy Intelligence Dashboard – Refocusing technology trend insights for policy makers	The Policy Intelligence Dashboard monitors, fine-tunes and streamlines policy relevant data on technology trends for a fast-track assessment based on a solid data gathering and evaluation (Tech Radars, A.T2.3). The PID will be tested in a common transnational manner, established and anchored in the activated stakeholder scheme (PLLs, TINs). The PID methodology sets the base for the joint policy exploitation with pilots as well as a future planning for 2021-2027 in T3 and beyond project´s end.	S.O.1.1 - Number of tools and services developed and/or implemented for strengthening linkages within the innovation systems	1,00	11.2021

Audience

This document is directed at all project partnership members, because all PPs are asked to participate in the development of the Policy Intelligence Dashboard and in testing its content.

Change Control Procedure & Structure

The Deliverable Responsible: PBN, Hungary **(PP9)** created this document and it is hosted on the Project's common repository in the appropriately named deliverable folder. The document is under project deliverable change control protocols whereby Partners are requested to give feedback on the Draft Version within five working days. Feedback will be incorporated and Final Version will be issued by PBN. Thereafter the PPs have five additional working days for any final comments. At any time, partners believe a project methodology should change, the request should be brought to the Deliverable Responsible (PBN/PP9) and the Work Package Leader (AFIL/PP6) to consolidate feedback from other partners, and then further integrate and disseminate the final agreed changes. A new version of the document should be created, and recorded in the document's "Document History" table.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Contents

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Abbreviations

Abbreviation	Explanation
AF	Application Form
ASP	Associated Partner (i.e. Strategic Partner)
CAMI4.0	Central European Advance Manufacturing and Industry 4.0
PI	Policy Instrument
PIF	Policy Implementation Framework
PLL	Policy Learning Lab
PP	Project Partner
RIS3	Regional Innovation Strategy for Smart Specialisation
S3	Smart Specialisation Strategy
SBU	Strategy Boost & Upgrade
TGP	Technology Good Practice
TIN	Trend & Innovation Networks
TTTDM	TIN Transnational Technology Dialogue Meeting

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

1. Key background information

1.1. AT2.3 activity within CEUP2030 project

Within WPT2 and between work packages, Activity T2.3 Establish PID to translate TINs work into future robust policy & strategy building is highly embedded within the other work of CEUP 2030. This is primarily because the PID is the partnership lasting model of how to deliver insight (beyond workshops) in an ongoing and sustainable way to key policy-making stakeholders (and also other stakeholders) who are interested in the four CAMI4.0 topics specifically or Industry 4.0 and Advanced Manufacturing in Central Europe, more generally.

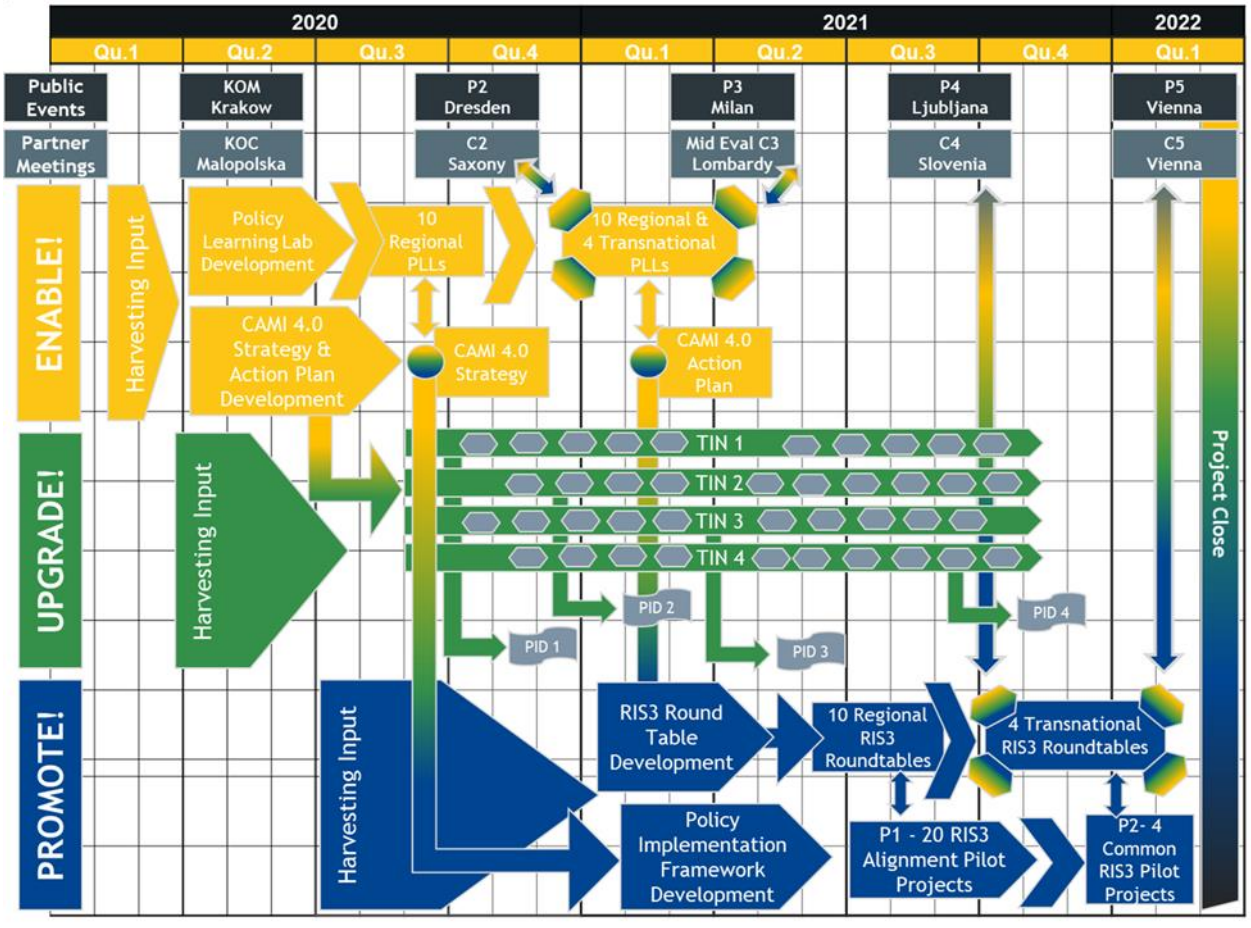


Figure 1 CEUP 2030 Plan on a Page (Source: Author Generated)

In particular, within AT2.3, four main activities have been performed:

- AT2.3.1 PID design & elaborate technology radars to improve CE/EU policy making (Responsible: PP1/KPT)
- AT2.3.2 PID in practice 1: Policy implementation relevant Tech Radar on Intelligent Production System (Responsible:PP10/HAMAG)
- AT2.3.3 PID in practice 2: Policy implementation relevant Tech Radar on Automation and Robotic (Responsible:PP3/PIA)

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

- AT2.3.4 PID in practice 3: Policy implementation relevant Tech Radar on new materials (Responsible:PP8/PTP)

- **AT2.3.5 PID in practice 4: Policy implementation relevant Tech Radar on Artificial Intelligence (Responsible:PP9/PBN)**

1.2. AT2.2 - Connection to the Trend & Innovation Networks

The strongest connection exists between the PID and the Trend & Innovation Networks (TINs). This is because it is the insights, and input from the TIN Dialogue Sessions, which should be used to fill and validate the PID in Practice. The TINs are the "playground" where key foresight discussions should take place. These discussion points, technology foresight and development interpretations should be recorded within the PID in Practice. The TINs are directly connected to the Policy Learning Labs (AT1.2) and RIS3 Round Tables (AT3.2)

The PLLs and the RIS3 Roundtables (the consortia's workshop series with policy-influencing stakeholders, and the lasting policy-making stakeholder engagement forum), are key areas where the Partnership should gain insight on the PID in Practice key Target Group. It is via exchange and presentation of concepts within these forums that the Policy Intelligence Dashboard will gain its purpose & its relevance.

The Policy Intelligence Dashboard is connected to the Policy Implementation Framework (PIF) and the Strategy Implementation Blueprint (WPT1). The Partners should be working to align the information provided in the PID, particularly success stories, to those recommendations which are provided in the use-cases delivered in the final phase of the project. The insights provided in the PID should lead stakeholders reviewing the document, to a logical understanding about what is presented in the Policy Implementation Framework. For instance, by trying to capitalise on a specific good practice or by trying to align for specific support for an emerging technology area.

This also means that Partners should be using all conversations associated to the development of the draft use-cases for the Strategy Implementation Blueprint, to be considering what would be effective use cases to present in the Policy Intelligence Dashboard.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

2. Description and goal of the Policy Intelligence Dashboard

Policy Intelligent Dashboard is the most complete one-stop-shop for policy makers and policy influencing stakeholders as research technology organizations and enterprises operating around intelligent production system area. PID gathers in one place practical and streamlined knowledge and insight on technology trends and potential industry impact for the entire innovation eco-system. Artificial Intelligence area represents a Tech Radar including a Risk Heat Map, where policy-relevant data sources as use cases, financial instruments, flagships and organizations are presented with a goal to support, transfer and enrich policy decision making processes in the area of this technologies. The AI Trend & Innovation Network (TIN) established under CEUP2030 project played a big role in creating the PID. Community of stakeholders representing different target groups established around IPS discussed and shared trend and innovation foresights on the IPS topic. This community built on the stakeholders involved in PLL in WPT1 and were enriched with key experts identified by each partner. In order to foster the discussion on trend and innovation foresight on the IPS topics, 10 TTTDM - TIN Tech Trend Dialogue meetings were organised by CEUP2030 partners involving the regional stakeholders identified in the community. Besides their regional configuration, TINs also had an interregional dimension thanks to action of PPs that guaranteed connections among the different network exploiting the synergies that emerged during TINs development. In particular, PPs contributed and fostered the identification and development of use-cases in each network that can be concretely implemented in flagship projects involving partners from different regions, either PPs or their stakeholders. In summary, 300 stakeholders from 7 countries were involved in expert workshops on the CAMI 4.0 Topic AI Materials. The AI TTTDMs were also aimed at supporting the definition, development and submission of the flagship projects, use cases and policy instruments. All these above mentioned feedback from stakeholders helped to create and developed the Policy Intelligence Dashboard. The PID is built around a core project principle, that policy-makers can directly benefit, and create onward benefits for the entire innovation eco-system, when they have practical and streamlined knowledge and insight on technology trends and potential industry impact.

The Partnership will, in total, create four “PID in Practice”, one for each CAMI4.0. This document presents D.T2.3.5 PID in practice 3: Policy implementation relevant Tech Radar on Artificial Intelligence /PP9/PBN, due in March 2022

PID artificial intelligence represents a Tech Radar (TR) including a Risk Heat Map (RHM), where policy-relevant data sources (use cases, organisations, actors, instruments) are identified and classified with a goal to transfer and interpret to policy-decisions. Key use cases should be presented in an easy- way enabling interactive enquire of knowledge and understanding of the key technologies and with contact details to hosting organisation.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

3. Policy implementation relevant Tech Radar on Artificial Intelligence

Policy implementation relevant Tech Radar on Artificial Intelligence is located on the website http://ceup2030pid.eu/ and integrate knowledge and insight developed from dialogue occurring within the Partnership's workshop series includes the following elements for each CAMI4.0 topics :

- Introduction
- Analysis of theTech Radar
- Risk Heat Map
- Summary of the flagships
- Interesting use-cases
- Policy instruments
- Tools

This document D.T2.3.5 PID in practice 4: Policy implementation relevant Tech Radar on artificial intelligence includes all above mentioned elements.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

3.1. Introduction

Artificial intelligence (AI) refers to systems that display intelligent behavior by analyzing their environment and taking actions with some degree of autonomy to achieve specific goals (European Commission).

- Software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems)
- AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones, or Internet of Things applications).
- AI has a wide range of applications in diverse sectors, but the working group is going to focus mainly on the manufacturing context, with the specific goal to address the most common challenges highlighted by industrial stakeholders

SUB-TOPICS:

1. Advanced Analytics: Systems that learn from data (through direct observation or instruction), identify patterns and, based on mathematical models, make decisions with minimal human intervention.
2. Recognition Technologies: Recognition technologies (i.e. facial recognition, emotion recognition, object detection, image processing, NLP) are meant to improve machine learning algorithms with a variety of data coming from different sources and with increasing precision. For example, the interpretation and processing of human language used to analyze free text and extract a huge number of relevant information is offering companies the opportunity to improve operations and services.
3. Decision Management: Decision management systems have raised a number of benefits for companies allowing faster decisions, detection of risks, and process automation. AI methods and techniques are increasingly being embedded in decision Support Systems to gather and analyze evidence, identify and diagnose problems, propose possible courses of action and evaluate the proposed actions. The aim of the artificial intelligence techniques embedded in an intelligent decision support system is to enable these tasks to be performed by a computer.
4. AI-enhanced hardware and robotics: Set of technologies applied to machines to automate the tasks that are repetitive and with no value added, allowing humans to focus on more conceptual and strategic activities.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

3.2 Analysis of the Tech Radar

The Tech Radar and Risk Heat Map for Artificial Intelligence under CEUP 2030 Policy Intelligent Dashboard offer open access to policy-relevant data sources as use cases, policy instruments, organisations and networks, technology trends in the most convenient, practicable and efficient way. They present impact of emerging technology and applications of Artificial Intelligence, with the most easy-to digest and streamlined knowledge and insight on technology trends and potential industry impact.

It reflects also individual vision of Project Partners with some suggestions for how the negative impacts can be minimised, and the positive impacts maximised.

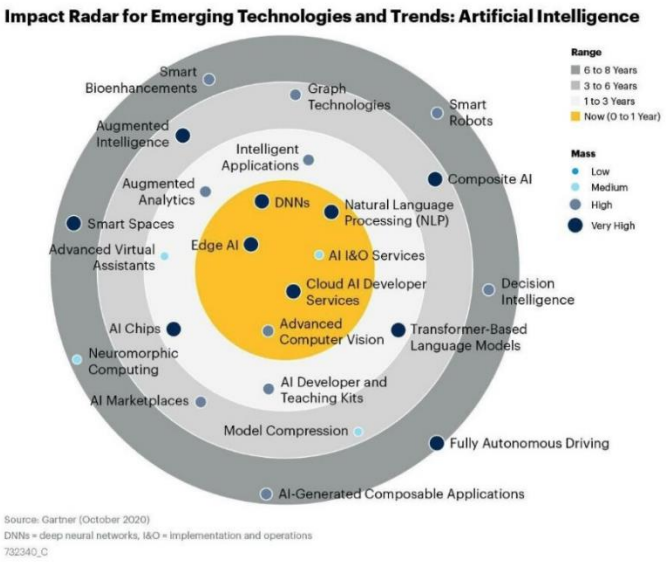
Artificial Intelligence (AI) is one of the most important digital topics of the future and has already become an everyday technology. AI applications support and advance industry, finance, logistics and transport, healthcare, trade, public administration, media and many more. AI applications offer great potential for business and academia, but still many companies face some challenges in AI adaption and need to catch up faster and wider when it comes to the application of AI in their businesses. Artificial Intelligence is often perceived by the policy decision makers as a plug-and-play technology that provides an immediate return on investment. However AI deployment requires not only technologies and talents, but also relies on a company's culture, structure and way of working that all need to be harmonized to create space and achieve a broad acceptance of AI.

The four technology trends in AI implementation include:

- Artificial intelligence (AI) developer toolkits, services, marketplaces and easy-to-use APIs are beginning to "democratize" AI.
- Growing AI adoption is beginning to shift business automation from process automation to intelligent business automation.
- Advanced hardware, innovative software techniques and micro-AI are accelerating Edge AI adoption moving more and more processing from the cloud to the edge.
- AI (advanced NLP) is actually starting to transform how humans and machines interact.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Analysis of the Tech Radar



Source: Gartner Top Strategic Technology Trends for 2022

In the Artificial intelligence Trends Impact Radar, the rings represent the Range. Range estimates the distance (in years) that the technology or trend is from “crossing the chasm” from early-adopter to early majority adoption. The size and color of the emerging technology or trend radar blip represents its Mass. This indicates how substantial an impact the technology or trend will have on existing products and markets.

AI Developer and Teaching Kits

Artificial intelligence (AI) developer and teaching kits are instructions, examples, tools and software development kits (SDKs). They provide an abstraction layer on top of data science platforms, frameworks, analytic libraries and devices. And so they make it faster and easier for software engineers to build AI into applications.

These kits are 1 to 3 Years from early majority because they address a subset of needs including kits for virtual assistants, AI design kits, and AI-mobile-serving SDKs. Also, dependencies associated with vendor specific toolkit offerings limit usability. Additionally, there are challenges with scaling outputs and the cost of integrating different formats and interfaces across the stack.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Their impact mass is high because AI developer and teaching kits are a significant accelerator to AI adoption. This enables a much larger set of software developers to more effectively and efficiently contribute to AI development and implementation. Over the next three years, AI developer and teaching kits will provide a strong foundation for the expansion of more complex AI-enabled capabilities.

Transformer-Based Language Models

Transformer-based language models are DNNs that process words as sequences in a sentence. This approach preserves the context or meaning surrounding terms. It also substantially improves translation, transcription and natural language generation. These models are trained on enormous data sets of billions of phrases. Example transformer-based models include BERT, BART and GPT-3.

The 1-3 year range is driven by the effectiveness of the training tools, the runtime efficiency and the ease of deployment. Transformer-based language models such as GPT-3 have the capability to generate paragraphs of text that are indistinguishable from those written by a well-educated human.

The impact mass of transformer-based language models is very high because they are displacing RNN systems at a surprising rate. And new tools deliver substantial improvements in advanced text analytics and all the related applications such as conversational user interfaces, intelligent virtual assistants and automated text generation.

Intelligent Applications

Intelligent applications are enterprise business applications with embedded or integrated artificial intelligence technologies, such as intelligent automation, data-driven insights and guided recommendations. They represent a transformational shift in business applications from primarily procedural tools that help execute tasks to intelligent software that also assists in acquiring knowledge, visualizing key data and advising on relevant decisions.

Intelligent applications are 1-3 years from crossing the chasm because many of the large software vendors are now embedding AI into their products. And their efforts will create competitive momentum further driving adoption across application domains such as enterprise resource planning (ERP), sales force automation (SFA), HR and customer relationship management (CRM). Intelligent applications are the next major battleground for enterprise application providers and it will be many years before we hit the top of this s-curve.

The impact on existing technologies is high because it refactors enterprise applications. This is a competitive opportunity for new entrants into the market. It also creates potential for

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

existing players to gain, or lose, market share as competitive advantage shifts to intelligent application capabilities.

AI-Generated Composable Applications

AI-generated composite applications build business applications using artificial intelligence to assemble application components (without human developer involvement) to meet new and even ad hoc business needs. Context-aware AI will detect a specific business need in response to a business situation and automatically assemble the application using packaged business capabilities (PBCs) as building blocks.

This technological capability is 6 to 8 Years from crossing the chasm because it is dependent on the emerging trend where technology providers shift from delivering large and mostly static business applications to offering smaller PBCs with robust application programming interfaces (API). Most of the technology already exists (e.g., APIs, microservices, self-integration, containerized software). But pulling it all together into a composable applications ecosystem with standards that facilitate interoperability is still a long way off. In this instance AI technology advancement is not the primary inhibitor.

AI-generated composable applications will have a high impact on the entire application software market and businesses across industries and geographies. They represent a substantial improvement in business agility allowing businesses to respond more quickly to changing technology and business situations. The entire business world will be able to move faster which can lead to even more rapid change across business and society.

Conclusions:

Artificial Intelligence has meshed into various industries. There is a significant increase in tools, applications, and platforms based on AI and Machine Learning (ML). These technologies have impacted healthcare, manufacturing, law, finance, retail, real estate, accountancy, digital marketing, and several other areas.

Companies are investing in AI research to find out how they can bring AI closer to humans. By 2025 AI software revenues alone will reach above $100 billion globally (Source: Tractica).This means that the advancement of AI and Machine Learning (ML)-related technology will be dominating in foreseeable future.

There are several significant emerging trends in AI that have a big impact on a wide variety of industrial sectors.

1. **Intelligent Process Automation**

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

In the latest technology trend, organisations are looking for intelligent automation tools to solve business challenges and increase productivity, efficiency, and accuracy, benefiting the organisation. One of the successive waves, Intelligent Process Automation, or IPA, brings together Robotic Process Automation (RPA) and Artificial Intelligence (AI) technologies to empower rapid end-to-end business process automation and accelerate digital transformation. In RPA, computer software 'robots' handle repetitive, rule-based digital tasks which are driven by structured data. However, many business processes now are fed by or generate large amounts of unstructured and real-time data. IPA makes it possible to automate processes with machine learning and analytic capabilities and cognitive technologies, like computer vision, Natural Language Processing (NLP), and fuzzy logic. The adoption of IPA is expected to grow in the coming days, with large-scale growth expected across several industries.

2. **A Shift Toward Cybersecurity**

With data becoming more precious than ever before, there's no shortage of cyber criminals out there looking for new ways to compromise it. One of the downsides of novice-level AI is that hackers can manipulate them to access the sensitive information. So, a significant trend in AI is developing technology to recognise and report common types of attacks. Anti-virus software is also being developed by using AI in the same manner as this technology can help prevent a malware threat from having devastating consequences. When it comes to businesses, AI-powered cybersecurity tools also can gather data from a company's own communications networks, digital activity, transactional systems, and websites, as well as other external public sources. These tools then run algorithms to identify patterns and detect or predict threatening activity, potential data breaches, etc. This is a trend we can expect to continuously see in the future as criminals constantly create new malware and data acquisition methods.

3. **AI for Personalised Services**

As AI becomes more powerful and efficient at researching a particular market and demographic, acquiring consumer data is becoming more accessible than ever. The biggest AI trend in marketing is the increasing focus on providing personalised services. One of the most common ways that AI can do so is through analysing the online activity of individuals who search for specific keywords. This level of personalisation is virtually guaranteed to provide a better experience for customers, which will directly increase the revenue of companies that take advantage of it. As machine learning becomes more adept at understanding what people want in specific instances, AI will become less of a sales tool and more of a digital friend.

4. **Automated AI Development**

In coming years, expect to see significant innovations in the area of 'AI for AI': using AI to help automate the steps and processes involved in the life cycle of creating, deploying, managing, and operating AI models. At a certain level, AI can develop its algorithms to solve problems, increase efficiency, and provide humans with useful research data.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Using automated AI will allow even non-experts to use AI algorithms and techniques. One example is Google's AutoML, a tool that simplifies creating machine learning models and makes the technology accessible to a wider audience. These tools can create as much customisation as required without knowing the complex workflow of Machine Learning in detail. Although this type of development is in infancy, automated AI is renowned for growing exponentially and is a major AI trend.

5. **Autonomous Vehicles**

With companies like Samsung, Nvidia, Volkswagen, Uber, and Google's Waymo, the scope of autonomous driving has increased many folds. Everyone knows AI's functionality into autonomous vehicles, and to tap such immense potential, car, and tech companies are infusing billions of dollars in this domain. The process is driven by the economic and social benefits involved. Car manufacturers hope that autonomous driving technology will sway consumers' minds. Supporters believe that self-driving car technology will reduce traffic deaths and be a safe alternative to drive.

6. **Incorporating Facial Recognition**

Facial recognition appears to be en vogue at the moment. It is popping up in many aspects of our lives and is being adopted by private and public organisations for various purposes, including surveillance. More countries are readying themselves to incorporate facial recognition technology and enhance their security measures. Deep learning algorithms are being set to ensure that this technology goes beyond regular facial recognition and more understanding images and scenarios. It will also help provide more personalised communications to customers, making it a notable AI trend for coming years.

7. **Convergence of IoT and AI**

The lines between AI and IoT are increasingly blurring. While both technologies have independent qualities, used together, they are opening up better and more unique opportunities. The Internet of Things (IoT) devices create a lot of data that needs to be mined for actionable insights. On the other hand, Artificial Intelligence algorithms require the data before making any conclusions. So the data collected by IoT is being used by AI algorithms to create valuable results that are further implemented by the IoT devices. AI's ability to rapidly glean insights from data makes IoT systems more intelligent. In upcoming years more than 80% of enterprise IoT projects will incorporate AI in some form, up from just 10% today.

8. **AI in Healthcare**

The contributions that AI can import to the healthcare industry are working in groundbreaking ways, allowing people worldwide to receive safer and more efficient care and making it easier to detect, prevent, and cure diseases. Also, AI's ability to acquire data in real-time from electronic health records, emergency department admissions, equipment utilisation, staffing levels, etc. – and to interpret and analyse it in meaningful ways enables

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

a wide range of efficiency and care-enhancing capabilities in hospital administration. Drug discoveries are another field where AI is acerbating.

AI is playing an essential role in helping healthcare professionals respond to the coronavirus (COVID-19) outbreak. AI is being used to distinguish COVID patients and essential hot spots. COVID vaccine drug discovery is being repurposed and speeded up using AI techniques. Researchers have developed AI-based thermal cameras and smartphone apps for estimating the temperature of people and assembling data for healthcare organisations. Intelligent robots are being deployed to implement "contactless delivery" for isolated individuals, helping medical staff ensure that the key areas stay disinfected and safe for use.

9. **Augmented Intelligence**

For those who may still be worried about AI cannibalising their jobs, the rise of AI should be a refreshing trend. It brings together the best capabilities of both humans and technology, giving organisations the ability to improve their workforce's efficiency and performance. By 2023, Gartner predicts that 40% of infrastructure and operations teams in large enterprises will use AI-augmented automation, resulting in higher productivity. The healthcare, retail, and travel industries have already created uses of Augmented Reality. Therefore, following this AI trend, there will be an increase in the number of augmented reality apps.

10. **Explainable AI**

Despite becoming so ubiquitous, AI has suffered from trust issues. Much of what machine learning accomplishes becomes unknowable at various points of the process and appears as a black box. It's often impossible to explain how the AI came to an inevitable conclusion. Explainable AI is designed to simplify and visualise how ML networks make decisions. There is a more significant push for deploying AI in a transparent and clearly defined manner. While companies will make efforts to understand how AI models and algorithms work? AI/ML software providers will make sophisticated ML solutions more explainable to users.

11. **Ethical AI**

Rising demand for ethical AI is at the top of the list of emerging technology trends. In the past, organisations that adopted Machine Learning and other Artificial Intelligence technologies were not much preoccupied with their ethical impact. Today, however, values-based consumers and employees expect companies to adopt AI responsibly. Over the next few years, firms will deliberately choose to do business with partners that commit to data ethics and adopt data handling practices that reflect their values and customers' values.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Risk Heat Map

Within PLLs and TTTDM dedicated to CAMI4.0 Artificial Intelligence, the consortium Project Partners have identified several challenges:

- **Managing large volumes of data**

The collection of large amounts of data linked with AI applications can be used for trying to predict future business and individual behavior scenarios.

- **Lack of AI implementation traceability and Data sourcing**

Traceability is considered a key requirement for trustworthy artificial intelligence (AI), related to the need to maintain a complete account of the provenance of data, processes, and artifacts involved in the production of an AI model. However quite often AI is increasingly being implemented outside the official IT team, which makes all process of AI implementation traceability complex and fragmented. Moreover managing large volumes of data can be difficult and time-consuming and AI's reliance on big data is already impacting privacy in a major way. The key to managing large volumes of data is data automation. The challenge which appear in the data automation is data quality and data accuracy.

- **Introducing Program Bias into decision making processes**

One of the more damaging risks of artificial intelligence is introducing bias into decision-making algorithms. AI systems learn from the dataset on which they were trained, and depending upon how this compilation occurred there is potential for the dataset to reflect assumptions or biases. These biases could then influence system decision making.

- **Violation of personal privacy**

The proper regulations and self-imposed limitations should be introduced into business and individual relations. Respect to human values, including privacy if not controlled and monitored it can have a negative impact on personal privacy and the right to freedom from discrimination. There is a high real risk that commercial and state use will have a detrimental impact on human rights due to wide AI applications tracking humans.

- **Lack of transparency**

One of the challenges of adopting wider AI applications and technologies is keeping personal data safe and secure with high level of data anonymization if required and maintaining a high level of information privacy without uncontrolled leaks or due to exposition to cyber-attacks.

- **Black Box Algorithms and Lack of Transparency**

The primary purpose of many AI systems is to make predictions, and as such the algorithms can be so inordinately complex that even those who created the algorithm cannot thoroughly explain how the variables combined together reach the resulting prediction. This lack of transparency is the reason why some algorithms are referred to as a "black box," and why legislative bodies are now beginning to investigate what checks and balances may need to be put in place.

- **Lack of time for continuous improvement**

Organizations are always striving to improve their business processes and reduce costs. One way that organizations can do this is by having continuous improvement meetings and audits.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

However, many companies struggle with the time it takes to conduct these meetings and audits resulting in little to no improvements being made.

- **Integration and compatibility of legacy systems**

To take benefits of AI technology and application partially or fully introduced into business, the company must be able to integrate with the various business line applications used internally to complete the process cycle.

- **Unclear Legal Responsibility**

Future of AI.

Trends 2022

AI is important because it forms the very foundation of computer learning. Through AI, computers have the ability to harness massive amounts of data and use their learned intelligence to make optimal decisions and discoveries in fractions of the time that it would take humans.

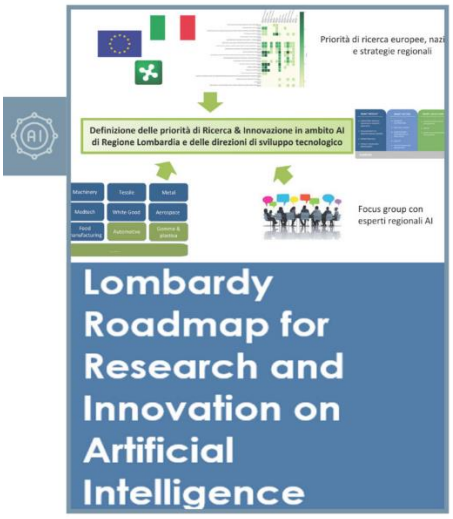
AI will continue to have huge impact on future industries:

- **Manufacturing:** AI powered robots work alongside humans to perform a limited range of tasks like assembly and stacking, and predictive analysis sensors keep equipment running smoothly.
- **Transportation:** Although it could take some time to perfect them, autonomous cars will one day ferry us from place to place.
- **Healthcare:** In the comparatively AI-nascent field of healthcare, diseases are more quickly and accurately diagnosed, drug discovery is sped up and streamlined, virtual nursing assistants monitor patients and big data analysis helps to create a more personalized patient experience.
- **Education:** Textbooks are digitized with the help of AI, early-stage virtual tutors assist human instructors and facial analysis gauges the emotions of students to help determine who's struggling or bored and better tailor the experience to their individual needs.
- **Media:** Journalism is harnessing AI, too, and will continue to benefit from it. Bloomberg uses Cyborg technology to help make quick sense of complex financial reports. The Associated Press employs the natural language abilities of Automated Insights to produce 3,700 earning reports stories per year — nearly four times more than in the recent past.
- **Customer Service**: AI in customer service is now more than a buzzword – it's becoming a must-have. AI can be in the form of customer support chatbots, customer self-service, machine learning to analyze customer data, natural language processing for speech recognition and support, and many other potential use cases.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

3.4 Summary of the flagships

AI Roadmap



AI Roadmap

AFIL promotes the identification and collection of industrial needs within its AI Strategic Community, where academic and research actors, SME, LE, startups and associations periodically meet and discuss on AI topics. Through the organization of Innovation Labs, webinar and workshops, the AI Strategic Community increases the awareness on the potential applications and benefits of AI-driven solutions and fosters the collaborations among the relevant stakeholders, particularly between industrial users and technology providers. The Community also works to transform the innovation interests and topics in concrete actions, through the submission of projects and the collaborations with different regional, national and European initiative (e.g., Vanguard Initiative).
Although lots of actions are running and regional stakeholders are involved and commit in these, additional supporting tools and mechanisms could be activated in next years to favor the implementation of AI-driven solution at industrial scale. To do that, AFIL wants to develop a structured AI Roadmap to highlight the current barriers and priorities to be shared at regional level with Lombardy Region.

CROBOHUB++

CROBOHUB++

In align to the Digital Europe Program, Croatian Ministry of Economy released the call in November 2020 to elect the best consortium which will be established as a digital hub for the North Croatia region. CROBOHUB++ vision is to act as a major digital innovation center in the North Croatia. It will offer a mix of business, technology services, access to funding, skills and training to its users, provided by the different partners in the CROBOHUB++ consortium. Services are based on detected needs thru already established DIH CROBOHUB and survey of the Croatian Digital Index (HDI) that had 300 companies in their questionnaire. Based on this we have defined main needs for services as improvement of organization and business model for implementation of digital transformation, improving operational efficiency and reducing cost, ensuring the quality of manufactured products, responding faster to the changing market requirements and customer demands, sustainable use of resources, data driven public administration, sustainable and clean energy, networking for exchange of digital technologies, opening markets, precision farming, transforming services, engaging stakeholders, enabling employees.
The CROBOHUB++ consortium gathers all key triple helix eco innovation system stakeholders. Namely they are: University of Zagreb, Faculty of Electrical Engineering and Computing (FER) which is a leading partner; Innovation center Nikola Tesla; SRCE (University Computing Centre); HAMAG-BICRO (Croatian Agency for SMEs, Innovations and Investments); Croatian Chamber of Economy (HGK) and University College ALGEBRA, specialized in IT programmes.
It is specialized in three key areas:

1. Artificial intelligence,
2. High Performance Computing,
3. Cyber security and robotics, and their application in the fields of agriculture,

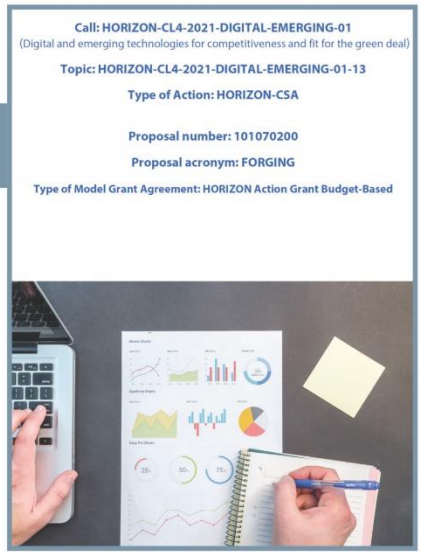
This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Smart senior room

Smart senior room

Szombathely City - and Western Hungary - are dominantly oriented on automotive industry. It results in a one-legged, labour-intensive positioning, that makes the region vulnerable. With the lead of PBN efforts were made to exploit the potential of digitalization to a achieve paradigm shift. These actions were supported by universities, companies and the municipality, and after a 6-months preparation the work was culminated in a strategic program, called Szombathely2030.
As first step, analysis was provided by PBN to care organizations, including seniors, formal and informal caregivers. It was concluded that complex and integrated solutions are needed. As a result, PBN elaborated and communicated a concept of smart senior room. Social care educational institutes - secondary and university level, as well -, social care organization also expressed their motivation to utilize the infrastructure for demonstration and training use, and questionnaires also confirmed the societal need for such a possibility to learn. The physical smart senior room being established, can serve as a potential vision for the citizens and inspiration for companies. It includes elements based on preliminary research. The key areas will be senior safety, socializing, self-monitoring and communication.

FORGING



FORGING

Technological breakthroughs empowered by enabling technologies hold a transformation potential that can be funneled to address industrial and societal grand challenges, like greening and digitalisation. To exploit this transformative potential, the innovation journey that leads new emerging technologies to their market-uptake shall embed since its early value-sensitive considerations, such as environmental and societal implications.
With FORGING we propose a new methodology based on a value-sensitive innovation journey that breaks linear innovation trajectories to stimulate new technological visions and pathways attentive to the environment and society, and human-centred in alignment with Industry 5.0. technological frameworks.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

3.5. Interesting use-cases

Watchman project, Lombardy

WATCHMAN (Workload-reduction machine vision-based technology Hub for manufacturing) project aims to develop a hub of expertise and experimentation on the application of Artificial Intelligence techniques in Machine Vision in manufacturing. In particular, two use-cases has been developed, the first one concerning pharma industry and the second related to automotive sector:

- SALF demonstrator: creation of a flexible and easily configurable system capable of detecting print defects and specific parts in bags of saline. The challenges are related to different shapes of the saline bags, the hard-to-identify printed text, the reflection of the liquid inside the bag and other issues related to the presence of bubbles and other artifacts inside the bag. The developed AI solution is related to machine vision and image analysis, in order to analyse the shape and presence of all the parts that make up the bag and to verify the correctness and legibility of the printed information.
- BREMBO demonstrator: detection of paint or mechanical defects at the end of the painting or oxidation process of the brake callipers to ensure the quality of the products. The goal is to create a flexible and easily configurable computer vision system capable of detecting surface defects, or painting brake callipers. The developed solution should face several challenges, such as the high geometric, dimensional and colour variability, the different types of defects and the emergence of possible problems related to the development of new parts.

The solution is based on two approaches of deep learning techniques: a semi-supervised machine learning detection algorithm and the Few Shot Learning model that allows to classify different types of anomalies using a small amount of images in the initial training phase.

WatchPlant project

WatchPlant is a HORIZON four-year project started in January 2021. It will develop a new biohybrid system technology, a wireless wearable selfpowered sensor for in-situ monitoring of urban environments. This system equips urban biological organisms -plants- with Artificial Intelligence (AI) to create a smart sensor for measuring both, environmental parameters and the responding physiological state of plants, in a very early stage by the use of a barely explored fluid, phloem sap, in combination with chemical, and physical sensors.The aim is to measure several plants initially in the same room under the same conditions such as temperature, light or geomagnetic field. For this purpose, 4 prototypes were built, each consisting of a plant and a measuring unit. The measuring unit contains the sensors, which are attached to the plant, and a Rasperry Pi controller, which cyclically receives the data from the sensors and controls and monitors the entire measuring process. It will be integrated into complex network that allows performing distributed information processing,

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

decision making, modeling and data fitting, paving the way for the self-awareness or self-adaptation. Additionally, it will constitute a clean energy self-powered device due to the novel use of sap, not only for transforming plants into living sensors, but also for clean energy generation. Croatian project partner is University of Zagreb, Faculty of electrical engineering and computing.

Other partners are: Instituto Tecnologico de la Energia, Spain; KTH Royal Institute of Technology, Sweden, CYBRES GmbH, Germany, CIM-mes Projekt sp. z o.o. Poland; The Spanish National Research Council (CSIC) and UzL Lübeck, Germany. The project budget is 3,744,192.50 EUR.

Decreasing maintenance costs with Deep Learning

Costs for maintenance are a very relevant factor in manufacturing, typically they make up 15% to 40% of total costs. Approximately 30% of maintenance costs occur because of early, maybe unnecessary replacement of machine parts or delayed maintenance work and an increase in unplanned machine outages. The Austrian project COGNITUS aims at decreasing maintenance costs through a combination of datadriven maintenance planning and Deep Learning. One use case within the project focuses on the detection of anomalous pallets in a high-bay warehouse. The use case is conducted together with SPAR Austria, one of the country's major retailers. Through Exploratory Data Analysis (EDA) the sources for errors in the warehouse were analysed. After finding out, where and when errors occur, cameras with different viewpoints were installed at the crucial sites. The stream of pictures coming from the cameras was progressed with the help of Machine Learning, focusing on the different kinds of errors pallets could potentially arrive with at the warehouse. Through the clustering of pictures and with the help of "fuzzy rules" operators should now be able to choose the necessary quality of the pallets coming into the warehouse. Through a dashboard, the employees can directly observe faulty pallets and the kind of anomalies the pallets are arriving with. This approach should lead to the reduction of maintenance costs in the warehouse. The COGNITUS project will be completed and evaluated in the third quarter of 2022.

TEAMING.AI project

The international research project teaming.ai with 15 partners, deals with the interaction of man and machine as a team. The goal is to achieve true teaming through a novel software framework. For example, AI systems can very easily perform repetitive tasks with high accuracy, while humans find it easier to understand interrelationships. If both team partners compensate for each other's weaknesses, efficient, symbiotic working is possible. Technologically, the project is concerned with the combination of knowledge graphs and deep-learning-based machine learning. Here, too, the advantages of both worlds are to be combined. Explicit knowledge representation with fast, generalizable processing. In this project, PROFACTOR's product AssemblyEye enables the digitization of human work in the high-precision manufacturing of large wind turbine parts. The intended enrichment of the

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Profactor technology with the aspect of teaming capability is a valuable extension in this context.

COALA project, Horizon 2020

The EU-funded COALA project will design and develop a cutting-edge Digital Intelligent Assistant for the manufacturing sector. At its core is the privacy-focused, open-source voice assistant, Mycroft. COALA will integrate, for instance, augmented quality analytics, an experimental mechanism for explainable AI, and features for the assistance of on-thejob training. An AI focused change management process and guidelines for professional worker education will complement the technical work. The project will significantly decrease the costs of failures in manufacturing and will reduce training time for workers.

Customized quality control for medical device manufacturers

Creating a flexible, but reliable production line is an important aspiration for all manufacturers This is especially the case for the manufacturers in the medical technology sector, since the quality standards are high (EU 745 2017 (and ISO 13485 which can be challenging to maintain for SMEs because they tend to manufacture multiple products in a smaller scale.

3.6.Policy instruments (PIs) which might influence the development of the flagships

Public Tender for the Digital Transformation of Large Companies

Announcer: MGRT - Ministry of Economic Development and Technology Amount of funds: EUR 44 million (EUR 34 million for large companies and EUR 10 million for SMEs), 20 supported consortia Subsidy amount: up to EUR 2.2 million / project Amount of co-financing: under the De minimis scheme: up to and including 70% of eligible costs, under the RDI scheme: up to and including 60% of eligible costs depending on the size of the recipient under the temporary framework scheme (3.13) up to and including 35% of eligible costs Estimated deadline: Q2 2024

Purpose of the public tender:

- raising and growing productivity
- Optimization and reduction of production costs and costs of services and operations
- Greater competitiveness and a more open market, as well as greater opportunities for the commercialization of innovative solutions
- The key document that is the foundation for carrying out the digital transformation of a company or individual business function is the digital strategy.

If the applicant does not have a digital strategy prepared by the time of applying for the public tender, he must produce it no later than six (6) months from the deadline for

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

submission of applications for this public tender or within three (3) months after receiving the selection decision. Projects to be co-financed by consortia must meet at least the following basic requirements:

- envisage technological empowerment for the digital transformation through the use of advanced technologies that will at the same time contribute to reducing greenhouse gas emissions and address climate change accordingly,
- represent the integration of large companies with SMEs, which will create an open innovation business environment and accelerate the introduction of digital innovation, transfer of digital competencies and increase companies' access to an appropriate test environment for innovation and adaptability of technologies and business processes. introduction of advanced digital technologies and their introduction into business processes.

The introduction of advanced digital technologies can also support changes in the organizational structure and business functions.At least three of the advanced digital technologies must be used for the digital transformation that is the subject of the project:

- robotics and / or process automation,
- internet of things
- artificial intelligence to transform decision-making systems5 (including cyber security),
- blockchain / distributed record technology,
- platforms for connecting advanced technologies and synchronizing their use and optimal implementation of digital twins (internal and external integration platforms),
- big data and / or quantum computing,
- virtual reality (VR) or augmented reality (AR) or augmented reality (XR),
- 3D printing.

Application deadline: April 28, 2022

"AI for Green" - Utilizing AI to Address Environmental Challenges

The national Austrian funding scheme "AI for Green" supports the development of research-intensive technology in the field of artificial intelligence. To receive funding, the application fields of research projects need to include both the areas of environmental, climate, nature and species protection (mitigation) and the adaptation to the consequences of climate change (adaptation). The approaches and methods that are researched within the funding scheme must make a concrete contribution to achieving Austria's climate goals by 2040 at the latest and contribute to solving ecological challenges. "AI for Green" aims to connect the expertise of the climate/environmental research community and the expertise of the AI community. The first call for tenders was conducted in 2021. Eligible projects could last up until three years and needed to apply for funding between 100.000€ and 2.000.000€. In the first call, the technology focus areas to be addressed, researched and further developed by the R&D projects were:

- Adaptable AI models and situational learning

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

- Trustworthy AI: explanatory models for algorithms and predictions
- Data and data ecosystems
- Large-scale simulations
- Federated learning

Details of the funding scheme can be found here (in German): https://www.ffg.at/ai

Fostering the development of Trustworthy AI The responsible use of AI enables the technology to be used for the benefit of society and has the potential to become a significant international competitive advantage for Austrian companies, especially in manufacturing. For achieving that, it is necessary to further develop and promote the international standardisation of AI. Together, the Austria Wirtschaftsservice (aws) and the Platform Industry 4.0 Austria (PIA) are supporting domestic Austrian companies in the development of trustworthy AI norms and standards with a specific module as part of the "aws Digitalisation – Trustworthy Artificial Intelligence" funding scheme. The aim of the cooperation between aws and PIA is to enable Austrian companies to participate in standardisation bodies such as ISO, Austrian Standards or the Institute of Electrical and Electronics Engineers (IEEE) and to support them through providing relevant content. Details of the initiative can be found here (in German): https://plattformindustrie40.at/services/#vertrauen

Szombathely2030 Strategy

Szombathely 2030 envisages several measures to be taken in the city of Szombathely in the following 10 years. The flagship project defined by PBN in the AI topic, is compatible with the recently approved (September 2021) local strategy, called SZOMBATHELY2030 since the vision of the strategy is to contributing to the improvement of the standard of living in Szombathely and its region by focusing on education and research-and-development by promoting industrial transformation and specializing on complex rehabilitation within the health industry. Regarding the key elements, the strategy consists the followings which are relevant to the AI flagship defined by PBN:

- Complex rehabilitation focus for new companies
- Strengthening R&D and education to increase added value
- Building on Óbuda University in manufacturing technology with a focus on health industry
- Building on the health competences of the University of Pécs
- Building common inclusive research and test infrastructure to facilitate synergies
- Involving international actors to attract knowledge
- Development of a test environment in the field of complex rehabilitation

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Fondazione Compagnia di San Paolo: Bando "Intelligenza 14 Artificiale"

The Compagnia di San Paolo and the CDP Foundation are promoting the second edition of the Call dedicated to Artificial Intelligence with the aim of supporting innovative research projects, aimed at advancing scientific knowledge in the field of AI, with a concrete impact on territory in economic and social terms. The commitment to a topic of great importance such as that of Artificial Intelligence is reflected in the European agenda, in programs such as the Digital Europe Program, Horizon Europe and Next Generation EU. The Call intends to investigate the opportunities offered by AI in four areas:

- Health and wellness;
- Environment and green transition;
- Risk protection and insurance;
- Education and training.

The goal is to stimulate reflection and planning oriented towards pilot projects capable of using AI in the four identified areas. The applications of the projects will have the general objective of responding to needs expressed by the territories, with the aim of bringing significant benefits to the community both in economic and above all social terms. The project proposals, therefore, must be able to collect data and process analyzes on the territory, experiment with innovative solutions and encourage collaboration between universities, research bodies, companies and the third sector.

The following can participate in the call:

- Lead partner: departmental structures of the five universities affiliated with the Compagnia di San Paolo (University of Turin and Polytechnic University, Eastern Piedmont University, University of Genoa and Federico II University of Naples);
- Research and development partners: Universities and national and international public and private non-profit research bodies;
- Territorial partner: entities and companies based in Italy;
- Assessment body: bodies with proven expertise and experience in evaluating the impact of projects;
- Leaders and research and development partners must possess the subjective eligibility requirements pursuant to the Statute, the Regulations for Institutional Activities and the Application Lines of the Regulations for Institutional Activities of the Compagnia di San Paolo;
- The Instrumental Bodies of the Compagnia di San Paolo can participate in the Call exclusively in the role of territorial partner or evaluation body.

The submission of projects by partnerships composed of at least 7 subjects is required: a leader, an evaluation body, two research and development partners and at least two territorial partners. Deadline: May 2022

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Manifestazione di Interesse Regione Lombardia e Uniocamere

The regional initiative Manifestazione di Interesse per lo sviluppo di filiere produttivi ed ecosistemi industriali in lombardia will support projects aimed at:

- enhancing and consolidating the productive chains, services and industrial, productive, and economic ecosystems existing in Lombardy
- identify new supply chains and new ecosystems emerging in the region
- stimulating business combinations and synergies by encouraging the exchange of skills and the achievement of common objectives for consolidation and development of industrial ecosystems and supply chains
- innovate and improve the quality of the production process of the supply chain and increase the competitiveness and attractiveness of industrial, productive, and economic sectors and ecosystems on national and international markets

Priority areas for project proposals where CEUP2030 CAMI4.0 topics could be involved are sustainability and circularity, innovation and technology transfer, digitisation, research and intellectual property and training.

PNRR

The Italian national COVID-19 recovery plan is called Piano Nazionale di Ripresa e Resilienza (PNRR) and it is aligned with the European Next Generation EU (NGEU) programme to facilitate Recovery and Resilience after pandemic. The plan consists in a set of actions on three main strategic axes: digitisation and innovation, ecological transition, and social inclusion. The short-term objective is to address the economic and social disruption caused by the pandemic crisis. In the medium-long term, the Plan intends to remove structural weaknesses of the Italian economy, namely innovation, territorial, generational and gender gaps. Finally, PNRR will lead the country along a path of ecological and environmental transition.

The Plan has six specific missions. The most connected to Advanced manufacturing are:

Mission 1 “Digitalisation, Innovation, Competitiveness, Culture” (à IPS, AI and A&R flagship and related activities) aimed at relaunching the competitiveness and productivity of the country through a digital revolution, with a total budget of €40,29 billion. In particular, Component 2 “Digitalisation, Innovation, Competitiveness in production systems” supports technological innovation and digitalization of SMEs and large enterprises on international market for made in Italy products with different investments:

- Transition 4.0 recognizes three funding lines, namely tangible and intangible assets for digital transition of production processes, training activities and investments in research and innovation.
- High-tech investments for the purchase of machines, equipment and systems for Advanced Manufacturing.
- Industrial value-chain policies and internationalization, mainly addressed to SMEs, to decrease value-chain fragmentation and to support industrial competitiveness on international markets through feasibility studies, participation to fairs, consultancy services, etc.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

Mission 2 “Green Revolution and Ecological Transition” (à SM flagship and related activities) allocates a total of €68.6 billion to improve the sustainability and resilience of economic system and to ensure a fair and inclusive environmental transition.

Mission 3 “Education and Research” (à all CEUP CAMI4.0 topics) aimed at strengthening the educational system, the digital and techno-economic skills, the research, and the technological transfer with a total budget of €30,88 billion. In particular, Component 2 “From research to Enterprises” supports the dissemination of innovative models for the applied research in synergy between universities and industrial stakeholders, favours processes for the innovation and technological transfer and strengthens the research infrastructures and the competences boosting innovation.

The Plan also includes an ambitious programme of reforms to facilitate the implementation phase, contributing to the modernisation of the country and making the economic environment more favourable to the development of business activities.

S3 Strategy The Smart Specialization Strategy (S3) of Lombardy Region for the period 2021-2027 continues the path taken with the previous 2014-2020 of declination of an “integrated trajectory” of development of its territory. The objective is the identification of areas of competences and innovative potential priorities in terms of industrial transformation and resilience of the Lombardy economic and productive system, as well as emerging technological areas to focus regional investment over the next seven years. In particular, the priorities of Lombardy identified on Advanced Manufacturing area are:

- Integration and development of AI technologies for Manufacturing à AI flagship and related activities
- Sensorization of machines and processes, collection and management of big data and IT security interventions, development of hybrid production processes, collaborative robotics, control and automation technologies of machines, systems, and production processes à A&R flagship and related activities
- Development of innovative technologies and methods for product dynamic management, process, systems and environmental monitoring, from the design phase to the production
- Development of industrial systems and solutions for the Circular Economy (e.g. eco-design, recycling, remanufacturing, sorting, disassembly testing, Reverse logistics, Valorisation of industrial waste, etc.)
- Support for the development of innovative production processes and technologies (e.g., direct energy deposition, bio-manufacturing) à IPS flagship and related activities
- Developing production technologies and validating advanced materials/ smart materialsà SM flagship and related activities
- Technologies and methods for flexible, proactive, resilient, and robust management of supply chains and production systemsà IPS flagship and related activities
- Developing innovative technologies for human inclusion and enhancement in the factory

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.

- Developing virtual reality and augmented reality technologies to foster virtual mentoring pathsà A&R flagship and related activities
- Developing digital platforms for Advanced Manufacturing
- New tools and technologies for industrial design, co-design, and end customer interaction.
-

4. Conclusions & Next Steps

Deliverable D.T2.3.5 is defined in the AF as a Trend Radar and Risk Heat Map on Artificial Intelligence developed under joint Policy Intelligence Dashboard for the four 4 CAMI4.0 topics.

The structure of Trend Radar and Risk Heat Map on Artificial Intelligence is in line with manual (DT.2.3.1) that provides the guidance required to establish an IT-based Policy Intelligence Dashboard to evidence CAMI4.0 Technology Radars and Risk Heat Maps on Technology Trends. To deliver the tool that is functional and answers the expectations of the varied stakeholders groups a model of PID was tested with a balance group of stakeholders. Testing as a critical part of the PID in Practice exercise covered 40 surveys cross the full partnership, with each Partner facilitating a minimum of 4 stakeholders to review the PID in Practices.

The tests were addressed to the community built within CEUP2030: those organisations who were attending the PLL and RIS3 Round Table and also new actors from business, RTO and RTD. The Project Partners gained insight from 4 stakeholders for each PID in Practice.

These experts provided feedback on the process of gathering content for input into the PID in Practice concerning on the functionality, usability and quality of content.

To ensure simplicity and effectiveness of the PID in Practise validation process, test survey will be organised using Microsoft Forms.

The summary of PID in Practise demonstration testing, insights and conclusions collected valuable for further development of PID will be attached as Annex to the deliverable D.T2.4.2- Interim Evaluation & Impact Assessment Report on TIN and PID in CE/EU policy context

5. Call to Action

The model, associated to each CAMI4.0 topic, which the PPs delivered for the PID have been tested with a balanced group of stakeholders and the recommendation and insights collected should be analyzed, verified and implemented if relevant. The scope of modification of PID content will be agreed by relevant Deliverable Responsible Projects Partners and Lead Partner.

6. Next steps

KPT and PBN will integrate the recommended list of improvements on PID in brochure and PID website platform.

This project is co-financed by the European Regional Development Fund through Interreg Central Europe.