

# TREND & INNOVATION NETWORK 4: ARTIFICIAL INTELLIGENCE

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D.T2.2.5 - A report on the implementation  
of Artificial Intelligence Trend and  
Innovation Networks

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## Document Control

### Document Summary

Project Number	CE1662
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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

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09/12/21	1.1	PRO, KIT	1 <sup>st</sup> Revision
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# 1. Executive Summary

## Project Overview

CEUP 2030 aims to generate stable innovation networks which foster better understanding on Central Europe Advanced Manufacturing and Industry 4.0 (“**CAMI4.0**”) topics, to generate improved knowledge resource exchange on these technologies leading to an upgraded framework for policy-making and implementation.

1.1 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 show-cases disseminated within these method structures 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.

## 1.2. Work Package and Activity Overview

The overall objective of WPT2 is to upgrade and 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. This will be pursued by establishing sustainable structures of stakeholders called Trend Innovation Networks (TIN) as well as practicable, efficient policy tools, the so-called 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.

Practically speaking, in each partner region a TIN will be established, and it will work on future foresight, technology trend monitoring, scouting. These activities will also feed the PID with the gained data to produce Tech Radars and other insights able to support decision making.

1.3 The specific activity which is of relevance for this document is Activity A.T2.2, which is related to the establishment, development and upgrade of Trend and Innovation Networks (TINs) in CE regions.

## Scope of Document & Deliverable Summary

This document collects the outputs and the main achievements of the AI TIN during the organization of the 40 regional meetings (**TTTTDM - TINs Tech Trend dialogue meetings**), particularly the 10 meetings focused on AI topics.

Starting from the reports that each PP provided at the end of its own AI TTTDM and from all the relevant materials of these events (e.g., agenda, participant lists, recordings, presentations, screenshots, etc.), this deliverable analyses the commonalities, best practices and lessons learnt in order to highlight the relevance of this activity within



CEUP2030 project and, more extensively, for Central Europe ecosystem and competitiveness.

In order to fully understand this document, including the references made and abbreviations used, it is recommended to read the following deliverables in advance:

- **D.T1.1.2** CAMI4.0 Glossary
- **D.T2.1.2** Harvesting Agenda on CAMI4.0 for Trend & Inno Networks / Policy Intelligence Dashboard
- **D.T2.1.2** A report and selection grid for best-in-class use of identified outputs and results in WPT1
- **D.T2.2.1** A guidance document for A.T2.2 on the development and implementation of CAMI4.0 Trend and Innovation Networks

### Audience

This document is addressed to all the project partners that will be involved in the organisation of TTTDMs, following the suggested methodology and exploiting the results of 1.4 these workshops to further contribute to the project development.

### Change Control Procedure & Structure

1.5 The Deliverable Responsible, AFIL - Associazione Fabbrica Intelligente Lombardia (AFIL/PP6), created this guidance document which is hosted on the Project's common repository in the appropriately named deliverable folder ([CEUP2030](#)). The document is under project deliverable change control protocols whereby Partners are requested to give feedback on the Draft Version according to the timing proposed in the final section of this document. Feedbacks will be incorporated, and the Final Version will be issued by AFIL.

At any time, partners that believe a project methodology should change, should submit the request to the Deliverable Responsible 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.



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## 2. Abbreviations

Abbreviation	Explanation
AF	Application Form
IPS	Intelligent Production Systems
AI	Artificial Intelligence
R&A	Robotics and Automation
CAMI4.0	Central European Advance Manufacturing and Industry 4.0
PLL	Policy Learning Lab
PP	Project Partner
RIS3	Regional Innovation Strategy for Smart Specialisation
S3	Smart Specialisation Strategy
TIN	Trend & Innovation Networks
IWU	Fraunhofer Institute of Machine Tools and Forming Technology
KIT	Karlsruhe Institute of Technology
PBN	Pannon Business Network Associations
PTP	Pomurje Technology Park
HAMAG	Croatian Agency for SMEs, Innovations and Investments
AFIL	Lombardy Intelligent Factory Association
SIIT	Intelligent Integrated Systems Technology SIIT
PIA	Association Industry 4.0 Austria
KPT	Krakov Technology Park
PRO	PROFACTOR GmbH
TTTDM	TIN Tech and Trend Dialogue Meetings



## 3. Background information on TINs

### Description and goal of the TINs

The **Trend & Innovation Networks** are communities of stakeholders established/anchored around the 4 main topics of CAMI4.0: Intelligent Production Systems, Automation & Robotics, Smart Materials and Artificial Intelligence (Refer to D.T1.1.1 and 3.1 D.T.1.1.2 for detailed description of CAMI4.0 topics).

Each PP will establish a TIN for each CAMI 4.0 area, inviting representatives of the triple-helix who will **discuss and share trend and innovation foresights** on the targeted topics. Those communities will build on the stakeholders involved in PLL in WP1 and will be enriched with key experts identified by each partner.

Although TINs will be arranged as digital community, 40 regional meetings (**TTTDM - TINs Tech Trend dialogue meetings**) will be organised fostering interregional connection and with the aim to build on the inputs collected during PLL to generate relevant inputs for a future robust policy implementation in the form of technical reports on technologies trend for WP3. Accordingly, PPs will organise 4 workshops focused on each TIN topic and/or sub-topics starting from November 2020 and by November 2021. Due to the activities slow-down caused by COVID-19 consequences, these meetings might be organised in a longer timeframe and should be held in a virtual form.

Besides their regional configuration, TINs will also have an interregional dimension thanks to action of PPs that will guarantee connections among the different network exploiting the synergies that will emerge during TINs development. In particular, PPs will contribute and foster 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. By the end of CEUP2030, each TIN will guarantee the generation of 5 use-cases contributing to increase the amount of funds leveraged based on project achievements.

As an output of CEUP2030, Trend and Innovation Networks for CAMI4.0 will strongly contribute in the generation of stable innovation networks which will be designed to foster a better understanding, generate improved knowledge and exchange on new technologies relevant for Central Europe Advanced Manufacturing and Industry 4.0 and raise awareness on RTI knowledge resources to enhance policy decision making. Accordingly, the methodology and the processes of the TINs will enable for one side the exchange of good practices and available knowledge among stakeholders at regional and interregional level and on the other side the generation of professional inputs for future policies improvement.

### Specific objectives and outputs

CEUP2020 Trend and Innovation Networks are one of the main outputs of the project and they are meant to:

- Generate improved knowledge and exchange on new technologies relevant for Central Europe Advanced Manufacturing and Industry 4.0;



- Set-up stable innovation networks of stakeholders, to generate new project ideas and foster interregional cooperation
- Enhance policy making fostering a better understanding of stakeholders' needs and related priorities as well as highlighting existing knowledge gaps of the institutions

In line with these strategic goals and with expected project results, a set of detailed objectives to be pursued by each TINs has been defined, including concrete activities to be implemented by each partner as well as more strategic actions to be conducted in cooperation with all the partnerships:

> **Trend and Innovation Network Workshops**

In order to foster the discussion on trend and innovation foresight on the targeted CAMI4.0 topics, **40 TTTDM - TIN Tech Trend Dialogue meetings will be organised by CEUP2030 partners involving the regional stakeholders identified in the community.** TTTDM represent the main instruments that TINs should exploit to deliver the outcomes expected and meet the objectives set. TTTDM are envisaged as workshops that will be organised not only with the aim to discuss technical contents and foster the matchmaking among participants, but they will also address key challenges and barriers that might be overcome with the support of institutions. Indeed, the targeted audience will include participants from the triple-helix to be engaged in the discussion, with the aim to generate inspiring content both for the definition of new flagships projects as well as for the definition of strategic policy guidelines to be transferred to policy makers at different levels.

A dedicated paragraph (4.3. TTTDM Methodology) has been elaborated to describe in details the requirements connected to these meetings, complemented with a proposal of methodology to be implemented by partners in the organisation of the workshops.

> **Roadmaps Tips**

Leveraging on the outcomes of TTTDM, partners should elaborate a list of recommendations for policy makers, to be taken into account in WP T3 and eventually further developed during RIS3 Round Table. These policy recommendations could be elaborated from the preliminary inputs derived from PLL as well as from the discussions that are engaged during the TTTDM. More in details, they should be finalised to elaborate suggestions for improving industrial policies, based on the main needs and priorities highlighted by stakeholders participating in TINs and related to the development and uptake of specific technologies in the targeted CAMI4.0 area.

> **Use-cases and Flagship projects**

Project partners will have the opportunities to exploit TINs and TTTDM to foster the identification and development of use-cases that can be turned into flagship projects involving CEUP2030 partners and or their stakeholders. Each TIN, based on the topics and sub-topics identified and building on the competences and knowledge available in the participating regions, is expected to identify 5 use-cases in alignment with what has been pre-defined in WP T1 Harvesting for the different CAMI4.0 topics.

Interregional cooperation and connections among the regional communities have to be ensured by project partners involved in the TINs, making sure that their stakeholders can grasp all the opportunities coming from the TINs and more in particular ensuring their participation in relevant use-cases or flagship projects. To support this action, partners can also constantly look for funding opportunities coming from interregional or EU





programmes. To this end, open calls connected to EU projects as well as new INTERREG calls can be considered.

> **Community Building**

While establishing and reinforcing the connection among the ecosystems in the different regions, project partners will set-up cooperation mechanism to ensure long term sustainability of TINs. This will allow to continue activities beyond the project lifetime focusing on the implementation of flagship projects and fostering the cooperation also at institutional level, supporting policy maker in improving existing schemes and eventually designing new cooperation opportunities.

### Embedment within CEUP 2030

As mentioned in the Executive Summary, the TINs are one of the outputs envisaged in WP 3.3.T2. However, **TINs design has been carried out in strong alignment with Strategy Upgrade & Boost design in A.T1.3**, building from the results of harvesting activities as well as from the preliminarily inputs collected during the first round of PLL, which will continue to influence the contents and arrangement of TTTDM.

In addition to vision, mission and objectives alignment, TINs outputs will be delivered in accordance with the other WPs, in particular the organisation of TTTDM will build from the evidence collected in PLL and the targeted audience will include stakeholders involved in the two rounds of PLL related to WP T1. The same will happen with activities and outputs planned in WP T3, where **relevant insights emerged in the TTTDM are expected to feed RIS3 Round Tables and Policy Implementation framework** providing evidence on the specific needs and priorities related to technologies development and uptake.



## 4. CEUP2030 Artificial Intelligence TIN

Trend & Innovation Networks have been organised as digital communities of stakeholders anchored around the 4 main topics of CAMI4.0: Intelligent Production Systems, Automation & Robotics, Smart Materials and **Artificial Intelligence**. Each TIN has been led by one of the CEUP2030 partner, and **AFIL was responsible** to guide the definition of the Artificial Intelligence TIN specific objectives as well as supervise actions to be implemented by the group of partners involved ensuring that, by the end of the project, TINs goals and the targets will be met.

The other CEUP2030 partners contributed to the development of AI TIN by establishing a regional network in the different CAMI 4.0 areas, inviting representatives of the triple-helix who will contribute discussing and sharing trends and innovation foresights on the targeted topics. Particularly, each PP organized a **TIN Tech Trend Dialogue meeting** at regional level specifically focused on Artificial Intelligence, in order to detail and discuss the topic with relevant stakeholders and promote the awareness and the opportunities related to the adoption of AI-driven solutions in Advanced Manufacturing.

The information reported in the following is the result of PPs' reports after the organization of their regional TTTDMs, but it also collects the feedbacks discussed during the TIN Afternoons, i.e. internal meeting among CEUP2030 partners to monitor the WPT2 activities related to each TIN. During these sessions, generally divided into two days, PPs update the others on the status of their TTTDMs and share best practices and/or lesson learnt that could be useful for the organization of remaining TTTDMs. The list of TIN Afternoons is reported in Table 1.

**Table 1: TIN Afternoons**

	<b>TIN Afternoons</b>	<b>Date</b>
	IPS and R&A TIN Afternoons	02 March 2021
	SM and AI TIN Afternoons	03 March 2021
4.1	IPS and R&A TIN Afternoons	7 Oct 2021
	SM and AI TIN Afternoons	8 Oct 2021

### Partners' Role and activities

According to the definitions developed in AT2.2 and considering the heterogeneity of CEUP2030 consortium as well as the regional priorities, partners are classified with different roles in the TINs based on their competences, knowledge, and potential stakeholders' interest:

- **Leader:** partner in charge of guiding the development of the TIN, making sure that all the partners involved contribute to the definition of objectives and strategy and comply with the requirements. Leaders will take care of ensuring alignment among regional communities, organising periodic meetings and making sure synergies are properly exploited. Finally, the leader of the TIN will also be the responsible of writing the TIN deliverable reporting on the meetings organised by the group and the main achievements.



- **Core:** partners in this role are considered the main contributors to the TIN contents. They have well developed knowledge and competences in the field and through the organisation of TTTDM they are going to present regional best practices as well as building the basis for interesting use-cases to be developed with other partners or their stakeholders.
- **Learner:** partners who do not have a grounded experience in the field, though the field itself might be one that is of significance to the strategic priority of the region. Learners can therefore also leverage the expertise of other PPs and TINs of other regions to improve their competences and knowledge, exchanging with leader and core partners and eventually organising meetings and raising their overall competence with their support.

#### 4.1.1. Definition of partners' role in the TINs

Each PP organized a TTTDM on AI TIN, according to its role, with the specific objective to collect regional expertise and capabilities on the topic, to foster the creation of a regional community and to share best practices. AFIL as TIN leader started the AI TTTDMs with an interregional event, giving the possibility to other PPs to participate and to improve their knowledge, particularly for learner PPs.

The organizational details of AI TTTDMs are reported in Table 2.

**Table 2: organized TTTDMs in a nutshell**

PP	TIN Role	TTTDM			PP role
		Date	Size of event	Modality	
KTP	Core	14.04.21	148 regional stakeholders	Hybrid	Organize the TTTDM, create the background for further discussion on AI and policy instruments
PRO	Core	07.07.21	58 regional stakeholders	Physical	Organize the physical TTTDM to emphasize the importance of AI topics and the benefits to industrial ecosystem
PIA	Core	17.06.21	30 regional stakeholders	Virtual	Exploit the IMAGINE21 conference to find a new perspective on AI in Advance Manufacturing
IWU	Learner	22.04.21	26 regional stakeholders	Virtual	Organize the TTTDM to offer a space to discuss and collect regional activities on the topic
KIT	Learner	30.09.21	30 regional stakeholders	Virtual	Organize the AI and SM TTTDMs to maximise stakeholders' involvement
AFIL	Lead	09.12.20	54 interregional stakeholders	Virtual	Organize the TTTDM focusing on opportunities and advantages for manufacturing with the introduction of AI
SIIT	Learner	5.10.21	33 regional stakeholders	Virtual	Organize the TTTDM as a webinar to inform on regional industrial use-case and opportunities
PTP	Learner	23.11.21	36 regional stakeholders	Virtual	Organize the TTTDM presenting best practices and promoting discussion among industrial stakeholders.



PBN	Core	29.03.21	16 regional stakeholders	Virtual	Organize the TTTDM collecting AI applications in different sectors
HAMAG	Learner	14.04.21	23 regional stakeholders	Virtual	Organize the TTTDM to have an overview of ongoing initiatives and activities on AI at regional level

As reported, many of the events have been organized in the first part of 2021, in a virtual modality due to the unstable situation caused by the Covid pandemic. Only few regional TTTDM allowed for the physical presence of participants, expanding their impact and favouring an efficient networking. However, in order to promote the aggregation and to offer a space for discussion, each PP tried to make the session as much **interactive** as possible, using different kind of (online) tools and favouring the open discussion.

For learner PPs, the TTTDM represented the opportunity to understand and collect the regional expertise and capabilities and to identify a possible innovation topic to be further exploited in the next strategic programmes. For core PPs, instead, the events gave visibility to the ongoing actions to attract new interested stakeholders and to show the real industrial benefits of AI for the Advanced Manufacturing. According to this, some TTTDMs have been co-organized **in synergy with other projects** concerning AI:

- [Improve project](#) (Interreg Europe)
- [BOOST4BSO project](#) (Interreg CE)
- [ECOS4IN project](#) (Interreg CE)
- [DIH<sup>2</sup>](#) (H2020)
- [MAZI project](#) (H2020)
- [S3HubsinCE project](#) (Interreg CE)
- [SAFE4.0 project](#)
- [Synergy](#) (Interreg CE)

The connection and collaboration among different projects are essential at regional level to not repeat the same activities but join the effort and progress. The exploitation of existing synergies allows to save resources, to maximise the impact of results and to amplify the networking.

The good participation to TTTDMs, both in terms of number of interested stakeholders and positive feedbacks, was a confirmation of the optimal organization of the events. PPs, in fact, were responsible to set up an interesting agenda, to find key speakers and to properly disseminate the event in order to have representatives of triple-helix stakeholders. In case of PIA, the TTTDM was concurrent with the IMAGINE21 conference of the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology of Austria and this allowed to have valuable keynote speakers able to give a different perspective on AI.

#### 4.1.2. TIN specific topics

Considering that each CAMI4.0 topic has also been specified in term of sub-topics to clearly identify the contents to be discussed and developed, AI TIN sub-topics have been reported in Figure 1. They include both hardware and software aspects, that means the



development of algorithms as well as their application to specific technologies or industrial ecosystems. During the TTTDM, PPs discussed about AI benefits starting from these sub-topics, widening and detailing the discussion according to their specific regional capabilities and expertise.



- Advanced Analytics
- Recognition Technologies
- Decision Management
- AI-enhanced hardware and robotics

**Figure 1: AI TIN sub-topics.**

The detailed topics discussed during TTTDMs have been reported in Table 3, divided in terms of AI-driven tools and possible field of application of AI-driven solutions. Through the presentation of different industrial use-cases during the TTTDMs, these topics have been described from **different perspectives**: from the employers’ point of view, who should be supported by AI-driven technologies but could be reluctant to their introduction, to the innovation department, who is dedicated to a continuous progress to make their enterprise more competitive and efficient. All these topics highlighted the potential benefit of AI in Advanced Manufacturing and the current barriers and limitations that should be faced thanks to innovative policy instruments.

**Table 3: TTTDMs sub-topics**

TOOLS	Application field
<ul style="list-style-type: none"> <li>• Data Analytics</li> <li>• Real-time data acquisition and recognition</li> <li>• Machine learning</li> <li>• Image Analysis</li> <li>• Decision Management</li> <li>• Extended reality</li> <li>• Platform integration</li> <li>• Blockchain technologies</li> </ul>	<ul style="list-style-type: none"> <li>• ICT and monitoring of manufacturing processes</li> <li>• Additive Manufacturing</li> <li>• Optimization of white goods spare parts</li> <li>• Autonomous and flexible production system</li> <li>• Logistic and Transportation</li> <li>• Machine maintenance</li> <li>• Data protection and security</li> <li>• Telecommunications</li> <li>• Smart Vision Devices</li> <li>• Worker safety</li> </ul>

One of the main concepts emerged from TTTDMs is the **interdisciplinarity** of AI, that means its combination with all the other Advanced Manufacturing topics. This is particular evident discussing about robotics and production technologies and systems, where AI is a tool to increase their precision, efficiency, safety, etc. Furthermore, AI-driven solutions could be applied to any phase of the process-chain as well as any manufacturing sector, thanks to the infinite possibilities that could represent. However, the highly required



specificity of solution could represent a barrier when technologies or fixed variables change and when an interoperability among different systems is required. According to this, during the TTTDMs different discussions took place, sharing the knowledge and the experiences on the topic.

The TTTDM organized by PIA has deepened further the concept of interdisciplinarity, trying to understand and export innovation from other sectors to Advanced Manufacturing. In particular, PIA raised the attention to privacy issues and protection in health care sector to learn and apply the concept also in manufacturing, for the protection of sensitive data related to industrial operators. This represents an interesting change of perspective and exchange of knowledge and best practices, that could promote progress in manufacturing starting from innovation led in different applications.

### Summary of the main achievements

The success of TTTDMs is due to the implemented methodology and the involved 4.2 stakeholders, that allowed a fruitful discussion and the collection of valuable outcomes at the end of the events. In the following paragraphs, all these elements will be analysed and reported in detail in order to derive best practices and lessons learnt for the organization of further events (e.g., RIS3 Round Table within WPT3) and for the strengthening of the established networks well beyond CEUP2030 project.

#### 4.2.1. Methodology

According to D.T2.2.1 “A guidance document for A.T2.2 on the development and implementation of CAM4.0 Trend and Innovation Networks”, TTTDMs should be structured to facilitate the discussion of technical contents and to foster the matchmaking among participants. Three main sessions have been identified with specific objectives and implementations, summarized in Figure 2.

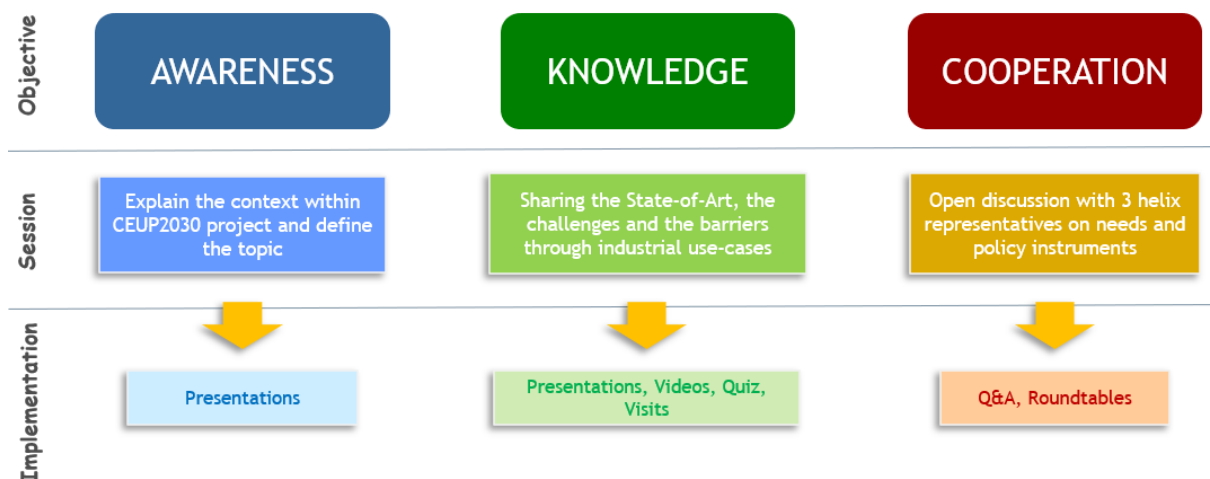


Figure 2: General structure of AI TTTDMs.

The first session is the introduction aimed at creating the right atmosphere, **explaining the framework** were the TTTDMs have been organized. The main activities and outputs of CEUP 2030 project were described with a specific reference to AI TIN and possible synergies with co-hosted projects were highlighted. During this initial phase, PPs clarified the scope of the meeting to the participants and explained the structure of the event and the expected outcomes of each session. Furthermore, if the following technical discussion



was sufficiently strong and focused, the introduction has been used also to provide a regional perspective on the current expertise and capabilities of attending stakeholders.

The introduction increased the *AWARENESS* of participants, introducing common terminology and necessary definitions to allow a subsequent fruitful discussion. Generally, the introduction was supported by one or two presentations, that visually helped participants to remain focused and fix basic concepts. This session represents the first main responsibility of PPs, who should give a clear vision of CEUP2030 projects, in terms of objectives, tasks and obtained and expected outcomes.

The second session is the **technical panel**, representing the core part of the TTTDMs. PPs invited different industrial and academic experts to present innovative AI-driven solutions and industrial applicative use-cases in order to provide a complete overview of the topic. The aim of this session is to:

- Explain the State-of-Art of AI in the regional ecosystem and at European level, showing the main progresses of last years and the current barriers and limitations.
- Show the future trends and the challenges that could be solved thanks to the use of AI-driven solutions. In particular, the benefit for enterprises has been highlighted.
- Share best practices at industrial level starting from their specific challenge and reporting the proposed solution or the activities running on the topic. Furthermore, the criticalities faced during the process or still in place have been explained to outline the need of support in terms of fundings and policy tools to be implemented.

During this session, different perspectives have been collected and included in the discussion, matching industrial applications already in place with innovative and challenging medium and long-term projects presented by research institutes and universities. PPs in this case had the responsibility to invite proper speakers, experts on the topics, able to represent the different regional activities on the topic.

The technical panel was aimed at increase participants' *KNOWLEDGE* on running activities in order to promote the acceptance at industrial level of AI-driven solutions and to maximise their impact thanks to the networking among the different stakeholders. This session could act as an inspirational driver for innovation and, again, a booster for the awareness on AI benefits, particularly for SME.

In order to have a fruitful and efficient session, presentations should include different perspectives, both technical providers and end-users, and should be strongly linked to industrial ecosystem giving concreteness to the topic. Real application examples and risk analysis have been showed. Furthermore, to make the technical panel more interesting and interacting, video have been shown during the presentation, quizzes have been proposed and virtual lab tour has been conducted.

The last session is the **open discussion** starting from specific challenges and barriers previously addressed. PPs engaged the discussion among participating stakeholders, representatives of triple-helix, bringing different perspectives at the table. The main topics of discussion were the regional situation on AI, the current barriers and their possible solution, the existing policy instruments and available opportunities. PPs supported the discussion organizing a proper slot for Q&A and roundtables and stimulating the interactions among participants.



This session allowed to promote the COOPERATION among industrial stakeholders to find synergies and common interests but also among academics, enterprises and policy makers to favour the development of a supporting strategy.

This structure, preliminary suggested in D.T2.2.1 “A guidance document for A.T2.2 on the development and implementation of CAMI4.0 Trend and Innovation Networks”, has been used by all PPs and some pictures and screenshots of the organized TTTDMs are visible in Figure 3 and 4.



Figure 3: examples of TTTDMs agenda.

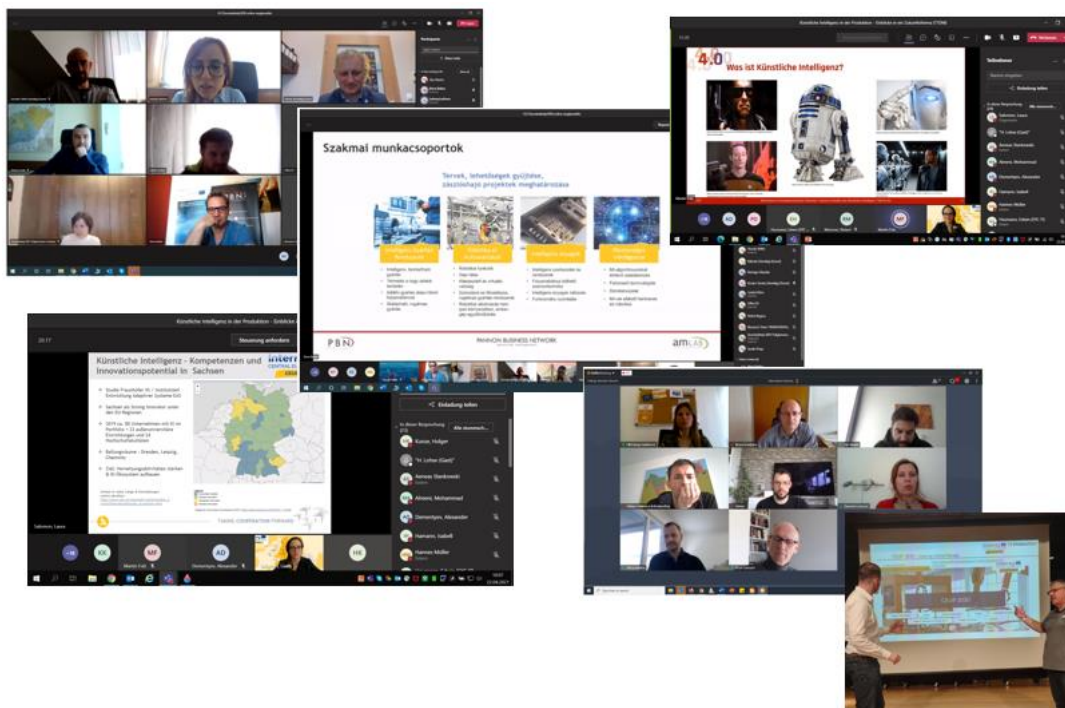


Figure 4: virtual and physical AI TTTDMs.





### 4.2.2. Involved Stakeholders

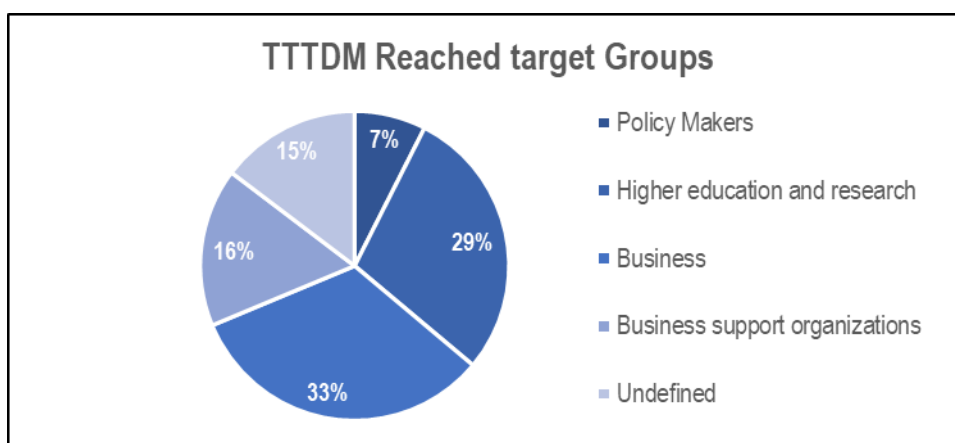
Differently from PLL, TIN Tech Trend Dialogue Meetings had a larger audience (around 30 people) and so they have been conducted more in the form of a seminar rather than a co-creation session. The participants have been invited starting from stakeholders already involved in PLL sessions and widening the audience also outside, to better represent the regional ecosystem. The participating stakeholders generally were policy-relevant individuals working for critical organisations which have experience in CAMI4.0 AI topic development or are interested in acquiring more competences and knowledge in the area.

As already mentioned, one of the main successful outcomes was the presence of triple-helix representatives that enable the collaborative exchange of knowledge and needs. Each PP was responsible for selecting and inviting their most important stakeholders. A sum up of participants is reported in Table 4.

**Table 4: involved TTTDMs stakeholders, representatives of triple-helix.**

Participants	TOT	KPT	PRO	PIA	IWU	KIT	AFIL	SIIT	PTP	PBN	HAMAG
<b>Policy Makers</b> Local, regional, and national public authority	28	4	1	-	2	1	2	4	3	5	6
<b>Higher education and research</b>	107	34	5	-	20	14	11	11	7	4	1
<b>Business</b> SME, LE	122	26	7	-	4	5	27	15	26	1	11
<b>Business support organizations</b>	62	18	10	-	-	8	14	3	-	4	5
Others	55	-	25	30	-	-	-	-	-	-	-

TTTDMs contributed to reach the targeted 300 policy-relevant stakeholders mentioned in the Application Form and were divided according to the typology of organization. According to this, the distribution of participants is reported in Figure 5 to better highlight the % of triple-helix representatives.



**Figure 5: TTTDMs distribution of participants according to organizations type.**

Most of participants (>50%) were represented by enterprises, research centres and universities dealing with industrial AI-driven solutions and innovations. This was a positive result considering the objective of TTTDMs, i.e. to build a stable network of interested stakeholders working on the topic. The industrial presence was also strengthened by business support organizations (16%) who will share the outcomes to their associates, increasing the overall impact of TTTDMs also externally to participating stakeholders.



Finally, representatives of local, regional and national institutions participated to each TTTDM in order to improve their knowledge on the topic, collect needs and barriers, explain current availability and start discussing new supporting tools.

In case of PIA, being the conference organized by Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology of Austria, it was not possible having details of the different types of organizations of participants, but during the discussion all triple-helix representatives have been noticed.

#### 4.2.3. Outcomes

Despite most of TTTDMs having been organized in a virtual modality with a less-effective interaction among participating stakeholders, the general feedback was positive and different outcomes have been achieved. The role of PPs was essential in this case, because a fruitful and efficient TTTDM was only possible if stakeholders' involvement was effective in order to create a various and supportive ecosystem dealing with AI topics. Furthermore, interesting outcomes resulted from TTTDMs thanks to the applied methodology, particularly the strong involvement of enterprises to show industrially driven AI solutions and the continuous and specific focus on AI topics.

The main outcomes have been collected and reported in Table 5.

**Table 5: TTTDMs outcomes**

OUTCOMES	BENEFITS
Identification of regional expertise and competences	Thanks to the different technical presentations, interested stakeholders shared best practices, needs and barriers, highlighting all the regional activities and initiatives on the topic. This was extremely useful to derive a clear and updated picture of regional expertise and specialisation and to understand if AI should be a strategic topic in the short- or long-term period. This info could also be exploited for inter-regional collaborations and initiatives, well beyond CEUP2030 project.
Awareness of AI impacts at industrial level	The sharing of best practices specifically focused on industrial ecosystems allows to give concreteness to innovative proposed solutions, attracting SMEs and enterprises to invest on the topic. Furthermore, for academic and research stakeholders, TTTDMs represented the opportunity to understand the real needs of industries and to make innovation adherent with them.
Awareness on current opportunities	The presence of policy makers to TTTDMs allows to show and discuss the current opportunities for AI-developed solutions to understand their effectiveness and how to include and implement new policy tools in future programmes. The awareness and the use of existing supporting instruments are the first steps to build a joint transnational strategy supporting all CAMI4.0 topics.
Creation of active networks and communities	In regions where an active and stable community of stakeholders dealing with AI topics is already present, TTTDMs allowed to strengthen the networking and widening the audience and the participating members of these communities. In case of learner PPS, instead, where the topic is not



	<p>a core competence of the PP, even though the theme might be structured and well-defined within the region, TTTDMs represent the first step to activate a regional community. Thanks to the positive feedbacks of the events, the need of regular conversations and of additional meetings has been highlighted and strongly suggested by the different participants.</p>
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The identified outcomes will be used for the next activities of CEUP2030 project, related to WPT3, as well as the identified lessons learnt.

#### 4.2.4. Lessons learnt

During the organization and the management of TTTDMs, PPs tried to show the current applications and needs of industrial stakeholders, where the development and implementation of AI-driven solutions could bring benefits in terms of improved process efficiency, predictive maintenance of technologies and products, support for operators, improved quality of outputs, etc. Along with this, the main challenges and barriers to be faced were outlined in order to discuss and brainstorm on available and possible tools able to overcome them and support the adoption of AI in Advanced Manufacturing. Through the experts' presentation and the open discussions, different lessons learnt have been collected on all the different identified phases, as reported in Figure 6.

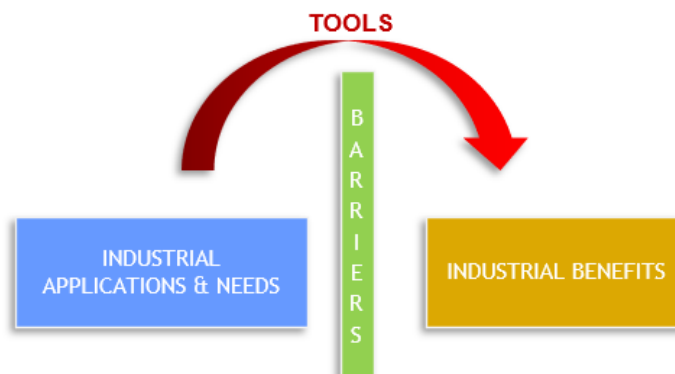


Figure 6: schematic representation of the main discussion points of AI TTTDMs.

The starting point for a fruitful discussion was represented by the **identification of industrial needs and challenges** that could be solved through AI. To do that, the *presence of both technology providers and end-users* resulted as the optimal situation in order to ensure concreteness of the proposed solutions. Generally, technology providers have been represented by academic and research stakeholders, who develop and test innovative AI-based tools and services, increasing the awareness of AI potentialities and offering a pre-competitive analysis of technical and economic feasibility of applicative ideas. On the other side, the end-users represented by enterprises showed the effectiveness of innovation at the industrial scale, matching new developed technologies with existing ecosystems and needs. The interaction of these two players was essential to demonstrate the industrial benefits and to ensure the real implementation of AI-driven solutions.

Furthermore, the TTTDMs outlined the need and the *importance of mutual learning*, through the knowledge and the sharing of ongoing activities on the topic. The possibility to join the efforts and to start from the existing projects and results allow to start from a solid basis and to progress faster towards an efficient and sustainable industrial solution. SMEs are also favoured by the examples of enterprises already implementing AI and



become themselves confident on the feasibility of the proposed solutions for which an initial investment could be required.

The third lesson learnt aimed at ensuring a fruitful discussion is the *presence of triple-helix representatives*. Policy makers could benefit from the TTTDM acquiring awareness and knowledge on the topic, in terms of current challenges and barriers and possible solutions. Furthermore, policy makers were able to show the available opportunities and give concreteness to future actions, supporting and de-risking SMEs for preliminary investments.

The **identification of barriers**, instead, was aimed at understanding what and how policy tools should be implemented for an efficient support to AI-developed solutions. The related lesson learnt was that, despite the presence of different initiatives at regional level on the topic, a *lack of a structured and systematic approach* strongly limits the achievements of foreseen outcomes. At practical level, this led to a diffused reluctance for the implementation of AI in industrial ecosystems, due to a confused knowledge and insufficient training on the topic. Furthermore, the low interoperability of different systems and solutions forces the interested stakeholder to work with the initial supplier, limiting the chance to interact with different technology providers.

According to this, the two main lessons learnt and **proposed tools** to face and overcome these issues were:

- The set-up of a *strong connection among universities or research centres and enterprises*, encouraging industrial-addressed education.
- The *use of different approaches*, such as the comparison with health-care solutions for data protection, to derive and adjust best practices and outcomes to Advanced Manufacturing sector.

Various financial instruments have been discussed (e.g., new focused courses degree, scholarships, industrial trainings, cross-sectorial collaborations and initiatives, etc.) and this will represent the basis for the development of WPT3 activities, particularly the development of a Joint Transnational Strategy for CAMI4.0 for 2021 to 2027.



## 5. Conclusion

The purpose of this document was the reporting of TIN achieved outputs for the creation of a network of interested stakeholders dealing with AI topics. Particularly, the TTDMs organized by PPs have been detailed in terms of methodology, participating stakeholders, outcomes and lesson learned. The document is related to Activity A.T2.2.5, based on the D.T2.2.1 “A guidance document for A.T2.2 on the development and implementation of CAMI4.0 Trend and Innovation Networks”.

Together with Activity A.T2.3 on Policy Intelligent Dashboards, this document supported the development and implementation of WPT3 activities, particularly related to individual and common PPs’ Flagships (Annex 6.2).



## 6. Annex

### AI TTTDM Reports

PP1 - TTTDM Reporting	
Name of the PP	KPT
TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location	CAMI 4.0. - Artificial Intelligence, regional meeting <b>13.04.2021, 10:00 -12:15</b> originally planned on 23.03.2021 (postponed due COVID-19)  Hybrid version (KPT + Zoom platform)
Description of the TTTDM	The meeting was split into different session. <ul style="list-style-type: none"> <li>- During the welcoming part KPT's representatives gave a short speech on CEUP 2030 project including an overview on TINs.</li> <li>- Part 1 - external experts in the AI field presented in an easy way artificial intelligence technology, its status in 2021, technology news and future of AI, and answered the question what the industry benefit from the use of artificial intelligence can</li> <li>- Part 2 - 3 use cases were presented. During the session representatives of companies from different regions of Poland presented their use cases and identified the main challenges in the process of implementation of their products and services in their clients' factories. There was also possibility to discuss and ask questions during the Q&amp;A session</li> <li>- Part 3 - moderated panel discussion "Will artificial intelligence change the industry forever". The representatives of triple - helix institutions (science, business, policy makers) participated in the discussion on AI challenges in the future. The Q&amp;A session closed this part</li> <li>- Summary</li> </ul>



<p><b>Methodologies applied in the TTTDM and description of the methodologies</b></p>	<ol style="list-style-type: none"> <li>1) Presentations of solution providers and their use cases</li> <li>2) moderated panel discussion with representatives of different target groups</li> <li>3) Quiz</li> <li>4) Video</li> <li>5) Q&amp;A session (interactive discussion)</li> </ol>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p><b>Artificial intelligence:</b></p> <ul style="list-style-type: none"> <li>- <b>Logistic and transport</b></li> <li>- <b>Data analytics</b></li> </ul>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>148</p>
<p><b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b></p>	<p>4 policy makers 34 research 26 business 18 Supporting Organisations</p>
<p><b>Key Outcomes of the TTTDM and description</b></p>	<ol style="list-style-type: none"> <li>1. Identification of key experts in the AI area</li> <li>2. Identification and presentation of the best practices/use-cases of AI in Industry</li> <li>3. Raising awareness about the AI and its impact on factories</li> <li>4. start the discussion among different type of stakeholders involved referring to gaps and barriers faced by companies in further developing a technology or a solution</li> </ol>
<p><b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b></p>	<ol style="list-style-type: none"> <li>1. There are a small number of companies in Poland which create, develop, and successfully implemented their services with AI components in industry. It was a challenge for us to identify them.</li> <li>2. to invite not only solution providers but also receivers of the technologies.</li> <li>3. the meeting was very interactive - a lot of different methodologies were used.</li> </ol>



<p><b>Hyperlink to picture and video content of the TTTDM</b></p>	<p><a href="https://www.youtube.com/watch?v=IE_1Wkiiq2w">https://www.youtube.com/watch?v=IE_1Wkiiq2w</a></p>
<p align="center"><b>General Summary of the TTTDM</b></p>	
<p>On 13th of April 2021 Krakow Technology Park organized the first TTTDM which main CAMI 4.0 topic was Artificial Intelligence in industry. The meeting had hybrid format due to COVID-19. The meeting was very popular. 148 number of participants was attended. The different methodologies like presentation of use cases, panel discussion, quiz or video were used. The meeting was very interactive and creative and gave a good background for further discussion on AI and on the policy instruments.</p>	

<p><b>PP2 - TTTDM Reporting</b></p>	
<p><b>Name of the PP</b></p>	<p>PRO</p>
<p><b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b></p>	<p>CAMI4.0: Automation and Robotic 07/07/2021, Constance</p>
<p><b>Description of the TTTDM</b></p>	<p>The day was organized as following:</p> <ol style="list-style-type: none"> <li>1- Greetings and introduction were held by Alexander Pogany, Andreas Pichler &amp; Mathias Brandstötter. It gave the opportunity to emphasize on the importance of robotics, automatization and AI in the CE area.</li> <li>2- After the introduction several presentations were held introduction topics such as disruption in the construction industry, robotics &amp; EU-project CONCERT, AI for human-robot cooperation &amp; digitalization and sustainability.</li> <li>3- After the lunch break two round table and discussion sessions were held. Session A about “Sustainable Production” a exchange of knowledge about cross border projects. Session B about “Democratization of Artificial Intelligence” - discussion between representatives of the industry and research.</li> <li>4- After a coffee break an additional presentation about “Technologies for</li> </ol>





	<p>the most sustainable mode of transport” was held.</p> <p>5- Then a panel discussion about the role of networks for sustainable production was held and finalized with a outdoor performance by Mattro GmbH.</p>
<p><b>Methodologies applied in the TTTDM and description of the methodologies</b></p>	<p>The methodology for this event was planned to be as impactful as possible. The introduction highlighted the present need towards Industrial development, especially for AI, sustainability and robotic in central Europe.</p> <p>The presentation of several technologies focusing on the specific topics were held by several different stakeholder in this field and aimed to introduce the audience into the technical field for the discussion rounds.</p> <p>The opened discussion session about “Sustainable Production” and “Democratization of AI” aimed towards a knowledge exchange and gave the opportunity to figure out important topics for further investigation. As well as the panel discussion about the role of networks for sustainable production.</p> <p>The final physical outdoor performance held by Mattro GmbH shoed the participants possibilities which exists by using technology.</p>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p>Automation and Industry 4.0</p> <ul style="list-style-type: none"> <li>• Robotic</li> <li>• Artificial intelligence</li> <li>• Sustainable production</li> </ul> <p>ICT and monitoring:</p> <ul style="list-style-type: none"> <li>• Machine learning</li> <li>• Digitalization</li> </ul> <p>Logistic and transport:</p> <ul style="list-style-type: none"> <li>• Transportation technologies</li> <li>• Sustainable transport</li> </ul>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>58</p>
<p><b>Which Triple Helix stakeholder group did the participants belong to? (add</b></p>	<p>1 policy 5 research</p>



number of participants)	7 business 10 Supporting Organisations 25 Unknown
Which EU project(s) was synergically involved in the TTTDM, if any?	CEUP 2030, Improve, BOOST4BSO, ECOS4IN
Key Outcomes of the TTTDM and description	The result of the workshop was not only a series of interesting presentations on robotics from the perspective of science and industry, but also the start of a sustainable series of events (the Lake Constance Talks are to be held annually) and the networking of many business support organizations with each other and with the participants.
Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?	a) A Physical Meeting like the “Bodeseegespräche” is much more efficient than a virtual conference, networking need physical meetings  b) There are a number of ways to support industry and research, such events are important to know who is doing what.
Hyperlink to picture and video content of the TTTDM	<a href="https://files.profactor.at/public/382b482fe654">https://files.profactor.at/public/382b482fe654</a>

### General Summary of the TTTDM

An extremely successful event with a well-rounded programme. Among other things, this was also due to the fact that it was possible to hold physical conferences again after a CORONA break of more than a year.

### PP3 - TTTDM Reporting

Name of the PP	PIA
TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location	Artificial Intelligence, regional, 17.06.2021, online
Description of the TTTDM	The TTTDM was framed as a “Tech Trend Dialogue” in which a certain CAMI 4.0 technology is discussed and showcased from different perspectives - in this case, “Artificial Intelligence” (in the context of health care and Industry 4.0)



<b>Methodologies applied in the TTTDM and description of the methodologies</b>	<p>1) Presentation of CEUP 2030</p> <p>2) Keynote by Bela Virag</p> <p>3) Discussion among experts from health care and manufacturing about needs and policy instruments</p>
<b>Which technologies and/or applications were discussed in the TTTDM?</b>	AI in the context of health care and manufacturing, including different perspectives (employers, employees, innovation, data protection...)
<b>How many stakeholders participated in the TTTDM?</b>	30 (according to the organizer)
<b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b>	No data available (see 210617_TTTDM-AI-Participants.xlsx)
<b>Which EU project(s) was synergically involved in the TTTDM, if any?</b>	No other EU project involved
<b>Key Outcomes of the TTTDM and description</b>	See summary below
<b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b>	<p>In general, the TTTDM are a great opportunity to showcase different initiatives, businesses and approaches of the CAMI 4.0 technologies.</p> <p>This TTTDM was different than the others we have organized. It was part of a conference focusing on ICT and it offered participants a different perspective (health care in the context of CAMI 4.0 topics) in order to find out, what the manufacturing sector could learn from healthcare.</p>
<b>Hyperlink to picture and video content of the PLL</b>	<a href="#">Link to Alfresco Folder</a>

### General Summary of the TTTDM

The importance of data for the manufacturing sector is often highlighted in discussions around Industry 4.0. Product and process data are continuously collected and processed in modern machines and industrial plants. As soon as employees and their activities are affected, special caution is required. Handling personal data is not only a challenge in the manufacturing sector. Especially in the health sector, the use of sensitive data has been the focus of discussion not only since COVID-19.

One of the main topics of the Interreg CE project CEUP 2030 is artificial intelligence (AI) and its use in industry. Data protection and security play an essential role in the use of



AI. Therefore, the Plattform Industrie 4.0 (PIA) used the IMAGINE21 conference of the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology to think outside the box and collect inspiration from the health sector for the Austrian industry.

On the question "Use of personal data: Health data as a model for industry?", PIA invited several renowned experts to discuss the topic from different perspectives.

In a keynote speech, Bela Virag (Managing Partner at Arthur D. Little Austria) discussed how data-driven business models influence different economic and social sectors. He placed Austria in an international comparison and addressed the increasing importance of high-performance computing for research. He then used the example of genetic data to explain the technical and economic possibilities of data usage in the health sector.

Building on Mr. Virag's input, a high level panel then discussed the various aspects of data use in the health sector and possible synergies with industry. What needs to be considered and where Austria stands in this context were discussed by:

- Joachim Bogner - Managing Director of Siemens Healthineers Austria.
- Canan Aytekin-Yildirim - Deputy Director General of the Austrian Pension Fund (PVA)
- Thomas Mück - Deputy Director General of the Austrian Workers' Compensation Board (AUVA)
- Bela Virag - Managing Partner at Arthur D. Little Austria
- Pia Zhang - Project Manager at the Viennese Chamber of Labour

<b>PP4 - TTTDM Reporting</b>	
<b>Name of the PP</b>	IWU
<b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b>	Artificial Intelligence, regional, 22 April 2021, online MS Teams
<b>Description of the TTTDM</b>	The workshop was focused on the provision of insights to the technology area of the future "AI in production". The aim of the workshop is in line with research results and policy activities in the region to sensitize, foster cooperation and matchmaking and lower reservation regarding AI use amongst the regional stakeholders. For this purpose, different speakers were invited to present best practice examples, teach basic concepts and discuss the issue critically.



<p><b>Methodologies applied in the TTTDM and description of the methodologies</b></p>	<p>As artificial intelligence is not our main focus area we focus on engaging inspirational and influential presenters and provide a platform for dialogue and exchange to foster mutual learning. This was achieved by</p> <ol style="list-style-type: none"> <li>1) best practice presentations for inspiration in a less familiar topic &amp;</li> <li>2) a discussion round in the last part of the event.</li> </ol>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p>We discussed the basic concepts of artificial intelligence including definitions, examples in production and chances &amp; risk analysis for hands-on information. In the beginning, a study for policy orientation was also provided looking at the knowledge distribution regarding AI in the region and recommended course of action. Furthermore, we tried to look at AI from different angles, also incorporating interdisciplinary views like the design perspective in relation with Berlin AI projects.</p>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>26</p>
<p><b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b></p>	<p>2 policy makers 20 research 4 business 0 Supporting Organisations</p>
<p><b>Which EU project(s) was synergically involved in the TTTDM, if any?</b></p>	<p>Regarding digitalisation and AI, the MAZI project was presented (harvested so to say) due to its content related relevance.</p> <p><a href="https://mazizone.net/mazi-eu/2020/12/11/what-next/">https://mazizone.net/mazi-eu/2020/12/11/what-next/</a></p> <p>MAZI was a Horizon2020 EU project from 2016 to 2018 and developed a toolkit that allows non-technical users to set-up local networks that operate independently of the public Internet.</p> <p>Furthermore, the Interreg project S3HubsinCE was introduced.</p>



<p><b>Key Outcomes of the TTTDM and description</b></p>	<p>Key outcomes were the awareness raising of regional companies for the positive effects and usage opportunities of artificial intelligence in production. On the other hand, a critical view on the different aspects of the technology was provided and gave the companies a realistic view on benefits but also alternatives to AI in the Saxon company's context. Again it could be highlighted how crucial interdisciplinary working methods are for any kind of research proposal.</p>
<p><b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b></p>	<p>As a project partner we were positively overwhelmed by the activities of the German Research Centre for Artificial Intelligence and their interdisciplinary way of working, incorporating user-centred and design disciplines in their daily research activities. It supported our course of action in the last years. The same is true for the participants. Many of them were from higher education and research and could also benefit from learning about the success of such research approaches. Furthermore, the mutual learning aspect in AI was important for the participants.</p>
<p><b>Hyperlink to picture and video content of the PLL</b></p>	<p>Due to content confidentiality, some screenshots / pictures are uploaded in Alfresco. The Welcome presentation is also accessible there.</p>

**General Summary of the TTTDM**

The workshop was focused on the provision of insights to the technology area artificial intelligence with the focus on production. The aim of the workshop is in line with research results and policy activities in the region to sensitize, foster cooperation and matchmaking and lower reservation regarding AI use amongst the regional stakeholders. For this purpose, different speakers were invited to present best practice examples, teach basic concepts and discuss the issue critically. This led the event to be a success and lowered the barriers for AI use in Saxony and the region and helped to connect important players in this technology area. Cross-project links could be demonstrated, and this ultimately pushes research further.

**PP5 - TTTDM Reporting**

<p><b>Name of the PP</b></p>	<p>KIT</p>
<p><b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and</b></p>	<p>Regional - Joint TTTDM on SNM and AI - 30 September - Karlsruhe (Virtual)</p>



<b>Location</b>	
<b>Description of the TTTDM</b>	This TTTDM was conducted by the KIT and incorporated both the TIN 3 and Tin 4 topics into one event, with discussion both on topics of smart materials and on AI. This TTTDM consisted of expert presentations and a virtual panel discussion on the topic of promoting new topics of Artificial intelligence, smart vision devices made possible by deep learning, development of new materials for 3D Printing. Introductions were also created to new platforms that focus on digital materials. Both from the perspective of SMEs, large industry and academia.
<b>Methodologies applied in the TTTDM and description of the methodologies</b>	1) Expert Presentation 2)Polling 3)Interactive discussions
<b>Which technologies and/or applications were discussed in the TTTDM?</b>	The technologies discussed include 1. Smart vision devices enabled by deep learning 2. New perspectives in machine learning
<b>How many stakeholders participated in the TTTDM?</b>	26 (+4 KIT internal)
<b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b>	1 policy 14 research 5 business 8 Supporting Organisations
<b>Which EU project(s) was synergically involved in the TTTDM, if any?</b>	Synergy
<b>Key Outcomes of the TTTDM and description</b>	The TTTDM brought together different people belonging to the region as well as from outside and from different sectors, presenting various points of view on the challenges on development of Deep Learning based smart vision devices. A fundamental discussion on new perspectives and developments made in the field of machine learning were also provided. The topic of how SMEs can also benefit from CAMI 4.0 topics was also discussed. Additionally, a brainstorming on this topic was also discussed.



<p><b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b></p>	<p>(a) As a project partner, it was encouraging to see that this topic remains very relevant and that coming developments have only increased enthusiasm within topics of AI and Machine Learning.</p> <p>(b) Participants were also able to meet likeminded individuals who might participate in projects related to smart and new materials.</p> <p>(c) The current state of the art in Machine Learning was presented to participants with limited background on this topic which helps increase awareness.</p>
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<p><b>Hyperlink to picture and video content of the TTTDM</b></p>	<p><a href="#">Alfresco</a></p>
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**General Summary of the TTTDM**

The KIT TTTDM of topic AI was conducted on the 30<sup>th</sup> of September and consisted of participants and audience from the triple helix stakeholder group (Research, Industry and Policy). Expert presentations were made on 2 AI related topics, one focussed on the development of new smart vision devices enabled by deep learning for image capture and evaluations and the other one focused on giving an overview of various perspectives within machine learning and application opportunities. The expert presentations were followed by a panel type discussion where each expert was asked to give comments on certain topics followed by discussions on each topic with the audience. All considered the event was a massive success, response was positive and participants as well as organisers are looking forward to conducting the follow up events.

**PP6 - TTTDM Reporting**

<p><b>Name of the PP</b></p>	<p>AFIL</p>
<p><b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b></p>	<p>AI TTTDM, interregional 09/12/2020, Virtual - GoToMeeting</p>
<p><b>Description of the TTTDM</b></p>	<p>Several are the opportunities and advantages that the manufacturing industry can achieve with the introduction of Artificial Intelligence, which is also considered as a technology that can help companies facing the huge challenges caused by the difficult current crisis.</p> <p>How can companies concretely adopt Artificial Intelligence? What are their priorities?</p> <p>These are the topics that will be discussed during the event, co-organized by AFIL and</p>





	Politecnico of Milan in the field of BOOST4.0 and CEUP2030 projects.
<b>Methodologies applied in the TTTDM and description of the methodologies</b>	<p>1) INTRODUCTION</p> <p>Lombardy Region welcome and explanation of projects hosting the event, CEUP2030 and BOOST4.0, by AFIL and Politecnico di Milano respectively.</p> <p>2) INDUSTRIAL CASES</p> <p>Different industrial partners showed their best practices, pointing out current challenges and barrier and showing the benefits that AI could provide to enterprises. Presentations were held by Whirlpool - SAS, CRF - PRIMAindustrie - Siemens and Piacenza Cashmere - Domina - Politecnico di Milano.</p> <p>3) RESEARCH INNOVATION</p> <p>Observatory Artificial Intelligence as research centre and MADE Competence Centre Industry 4.0 provide an overview on the trends and potentialities of AI-driven solutions.</p> <p>4) OPEN DISCUSSION</p> <p>Q&amp;A session was organized to leave space for discussion among participants.</p>
<b>Which technologies and/or applications were discussed in the TTTDM?</b>	<p>The main technologies and applications presented during the TTTDM were:</p> <ul style="list-style-type: none"> <li>- Optimization of white goods spare parts</li> <li>- Autonomous and flexible production system</li> <li>- Platform integration</li> <li>- Tracking of the cashmere value chain</li> <li>- Blockchain technologies</li> <li>- Energy monitoring</li> <li>- Real time and remote control</li> <li>- Industrial Cyber-Security AI</li> <li>- Big Data Analytics</li> </ul>
<b>How many stakeholders participated in the TTTDM?</b>	54
<b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b>	<p>2 policy makers</p> <p>11 research</p>



	27 business 14 Supporting Organisations
<b>Which EU project(s) was synergically involved in the TTTDM, if any?</b>	The TTTDM was co-organized with BOOST4.0 project, led by Politecnico di Milano.
<b>Key Outcomes of the TTTDM and description</b>	The possibility to strengthen the collaborations and promote networking allow to progress in the development of AI-driven solutions. This is the most added value of the event. Furthermore, future perspectives on possible activities and flagships projects provide concreteness to the developed results.
<b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b>	a) Industrial use-cases presentations were well-appreciated, giving a clear overview of the ongoing activities and AI potentialities. b) Different activities are already running at industrial level on AI topics, that means that innovative solutions are real and possible opportunities to be taken.
<b>Hyperlink to picture and video content of the TTTDM</b>	<a href="#">Alfresco</a>
<b>General Summary of the TTTDM</b>	
The TTTDM was very successful with a good participation of all triple-helix representatives. The event was held in cooperation with BOOST4.0 project and attracts relevant interregional stakeholders in order to discuss current challenges and best practices of Lombardy AI-driven developed solutions.	

<b>PP7 - TTTDM Reporting</b>	
<b>Name of the PP</b>	SIIT
<b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b>	“Intelligenza Artificiale e sue applicazioni” 05/10/2021, Genoa (on-line)
<b>Description of the TTTDM</b>	The morning was organized in 5 different timeslots:  6- Artificial Intelligence: historical framework and future perspectives (Armando Tacchella - UNIGE)  7- The industrial revolution on the high-performance computer cluster (Roberto Morelli - Leonardo Labs)



	<p>8- The Safe 4.0 Project: artificial intelligence applied to worker safety - (Stefano Bosco - Novigo Technology)</p> <p>9- Artificial Intelligence in Ligurian SMEs:</p> <ul style="list-style-type: none"> <li>➤ Ennio Ottaviani - OnAir</li> <li>➤ Enrico Ferrari - Rulex innovation laboratories</li> <li>➤ Matteo Santoro - Camelot Biomedical Systems</li> <li>➤ Carlo Dambra - ZenaByte</li> <li>➤ Luca Calabrese - Liguria Consulting Solutions</li> <li>➤ Gianluca Rossi - Firedesktop</li> <li>➤ Davide Anghinolfi - IROI</li> </ul> <p>10- Discussion and Conclusions</p>
<p><b>Methodologies applied in the TTTDM and description of the methodologies</b></p>	<p>The introduction highlighted the present situation of Liguria Region in the field of AI, historical framework, and future perspectives. There was a focus on artificial intelligence applied to worker safety.</p> <p>Then SMEs presented their later applications in the field, keeping the event very industrial and practical, since it was shown from previous events that this topics are the most relevant for the TTTDMs public.</p>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p>Artificial intelligence applied to worker safety SMEs AI applications</p>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>33</p>
<p><b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b></p>	<p>4 policy makers 11 research 15 business 3 Supporting Organisations</p>
<p><b>Which EU project(s) was synergically involved in the TTTDM, if any?</b></p>	<p>SAFE 4.0 project co-hosted the event.</p>



<b>Key Outcomes of the TTTDM and description</b>	Once again it was demonstrated the importance of involving highly technological SMEs. Keeping the event 2 clean hours long allowed enough time for relevant presentation and discussion and allowed a constant focus on the AI topic.
<b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b>	As a project partner, SIIT nailed the length and number of contents for this TTTDM. The participants shown appreciation for the time and content management.
<b>Hyperlink to picture and video content of the TTTDM</b>	<a href="#">Alfresco</a>

### General Summary of the TTTDM

The session, held on-line, was very interactive, allowing the SMEs to speak for themselves and presenting their perspective and approach toward AI. The introduction covered the technological bases and history of AI, introducing the session dedicated to companies.

### PP8 - TTTDM Reporting

<b>Name of the PP</b>	PTP
<b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b>	Regional - TTTDM on AI 23th November 2021, Online.
<b>Description of the TTTDM</b>	Pomurje Technology Park (from this point on PTP) and SPOT successfully conducted an "online" event.
<b>Methodologies applied in the TTTDM and description of the methodologies</b>	<p>The workshop was conducted online, via the Zoom application and it was held on the principle of presentations with the possibility of asking questions both via "Slido" and "live" between and after the end of all presentations.</p> <p>Among speakers on event, we have had Marjetka Jakob from Pomurje Technology Park, presenting PTP mission and Jožek Špilak (PTP) presented the outcomes from CEUP2030 project, related to Industry 4.0 and Artificial intelligence.</p> <p>During the presentation, the participants actively participated, where we used the Slido tool to look for examples of good practices in the region and ask what the problems are, as</p>



	well as opportunities, in the region in the field of industry 4.0.
<b>Which technologies and/or applications were discussed in the TTTDM?</b>	There was talk about companies in the region using artificial intelligence in their productions and plants. We talked about the following companies that have the beginnings of Industry 4.0: Castoola, Robotics Kogler, Cleangrad, Hakl IT, Codex, Medicop, Virs, Roto.
<b>How many stakeholders participated in the TTTDM?</b>	36
<b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b>	3 policy makers 7 research 26 business 0 Supporting Organisations
<b>Which EU project(s) was synergically involved in the TTTDM, if any?</b>	DIH2 (H2020)
<b>Key Outcomes of the TTTDM and description</b>	At the workshop, it was established that in order to speed up the implementation of artificial intelligence in the economy, it would be necessary to present examples of good practice to the economy in the region, companies would need capital and suitably educated staff and education.  The problem of implementing artificial intelligence in companies was seen by participants in Brain Drain and in the education system.
<b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b>	The Pomurje region is still lagging behind in the field of artificial intelligence. There are beginnings in companies that already include artificial intelligence in their processes, but much remains to be done in this area in terms of promoting AI, harmonizing legislation and in the field of security of AI implementation in companies.
<b>Hyperlink to picture and video content of the TTTDM</b>	<a href="#">Alfresco</a>
<b>General Summary of the TTTDM</b>	
The TTTDM workshop was made with the help of support organizations, where we looked for solutions for digitization and implementation of artificial intelligence solutions in the Pomurje region.	



<b>PP9 - TTTDM Reporting</b>	
<b>Name of the PP</b>	PBN
<b>TTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b>	CAMI4.0: Artificial Intelligence 29/03/2021, On-line (MT TEAMS)
<b>Description of the TTTDM</b>	<p>11- The already achieved and envisaged activities of the CEUP project were presented, focusing on the activities in the CAMI4.0 topics. Since it was a joint event with the S3HubsinCE (CE project in the similar topic), a short introduction about that project was also introduced.</p> <p>12- An introduction about the territory and the possibilities it offers, with few presentations from am-LAB (PBN's DIH) and its competencies, good practices, and future plans (use cases, collected in D.T1.3.3 Action Plan)</p> <p>13- Short needs assessment of the stakeholders in relation with the CAMI4.0 topics and their possible involvement in CEUP project activities.</p> <p>14- To create in the attending stakeholders a sense of continuity and belonging, in view of involvement in future project activities.</p> <p>15- Conclusions</p>
<b>Methodologies applied in the TTTDM and description of the methodologies</b>	<p>The methodology for this event was planned to be as fruitful as possible. The introduction highlighted the present need of local and regional level towards Industrial development; The current activities of the city in relation with digitalization were led by policy makers (representatives of Municipality of Szombathely). On the other hand, the other participants (universities, companies) also shared their activities and plans about digitalisation, and their needs. Every stakeholder was expressing their cooperation in digitalization activities, and the use cases of am-LAB (PBN's DIH) appealed to them. Participants agreed that regular conversation</p>



	<p>shall be held about the updates of the use cases described.</p>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p>3D technologies:</p> <ul style="list-style-type: none"> <li>• Product development and prototyping</li> <li>• Business animation creation IoT</li> <li>• 3D scanning and reverse engineering</li> </ul> <p>Extended Reality</p> <ul style="list-style-type: none"> <li>• Real-time display of manufacturing data series on the shopfloor</li> <li>• AR gamification application development</li> <li>• AR applications supporting machine maintenance and component visualization</li> <li>• AR content applications for printed materials</li> <li>• DATA SCIENCE</li> <li>• web store traffic analysis</li> <li>• analysis of production data of manufacturing companies</li> <li>• large amount of free text processing</li> <li>• Robotics: <ul style="list-style-type: none"> <li>• design and manufacture tailor-made grippers and accessories to collaborative robot workflows using 3D technology</li> <li>• integration of various branded robots into a single operational management platform</li> <li>• industrial, collaborative and mobile robot coordination and complex task development</li> </ul> </li> <li>• support in application of robots into conventional production lines</li> </ul>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>16</p>



<p><b>Which Triple Helix stakeholder group did the participants belong to? (add number of participants)</b></p>	<p>Policy: 5 participants from City of Szombathely Research: 4 participants from 3 universities Business: 1 Supporting Organisations: 4 participants from 3 organisations + /PBN am-LAB representatives as DIH</p>
<p><b>Which EU project(s) was synergically involved in the TTTDM, if any?</b></p>	<p>S3HubsinCE</p>
<p><b>Key Outcomes of the TTTDM and description</b></p>	<p>The main outcome was the exchange among different stakeholder groups. The main guidelines that emerged were:</p> <ul style="list-style-type: none"> <li>- Participants could be informed about the most relevant activities of the project and cooperation possibilities were also presented</li> <li>- Needs analysis is essential to know how regions could better benefit by DIHs, and vice versa how DIHs can thrive in their regional context;</li> <li>- Participants can be informed about the services and competencies of a local DIH (am-LAB)</li> </ul>
<p><b>Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?</b></p>	<p>c) Involving the triple helix actors in one conversation made possible a deeper conversation and more fruitful. (cooperation activities might be enhanced)</p> <p>d) The need to develop an offer for improving digital competence</p>
<p><b>Hyperlink to picture and video content of the TTTDM</b></p>	<p>Alfresco D.T2.2.5</p>
<p><b>General Summary of the TTTDM</b></p>	
<p>Participants could be informed about CAMI4.0 topics, they expressed their interest in future cooperation, and involvement in the project.</p>	

**PP10 - TTTDM Reporting**

<p><b>Name of the PP</b></p>	<p>HAMAG</p>
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<p><b>TTTTDM Type (CAMI4.0 topic, regional/interregional), Date and Location</b></p>	<p>AI TTDM; regional, Zagreb, 14 April 2021; 10 - 12 am Online via GoToMeeting platform</p>
<p><b>Description of the TTTDM</b></p>	<p>Our two-hour TTTDM hosted some of the most successful Croatian AI stakeholders, covering all triple helix groups. They gathered to present the current state of their affairs, to exchange best practices and foresight in AI and its impact on manufacturing, the global and national economy and science.</p> <p>The meeting was divided into two parts. In the first part, we had Technical Panel where industrial application of AI was presented by the Infobip Ltd, Croatian internationally successful SME. After the Infobip the Head of the University Centre for AI at Faculty of electrical engineering University of Zagreb presented their achievements and the area of expertise.</p> <p>In the second part, the Round Table was held and besides two representatives that held presentations in the first part of event, the representative for the innovation policies of the Ministry of the economy and sustainable growth joined the table together with representative of the Croatian Artificial Intelligence Association and representative of one AI SME.</p> <p>The representative of Ministry gave an overview of the previous calls and initiatives (2016 -2020) that had targeted innovative SMEs and were launched by the Ministry with an aim to support innovative start-ups and SMEs within RI3 sector.</p> <p>Discussion revolved around importance of AI in the manufacturing landscape, opportunities that start-ups and SMEs have had and what can be done in the future to improve and to make a stronger bond among all national stakeholders in accordance to the EU and global trends and strategies.</p>
<p><b>Methodologies applied in the TTTDM and description of the methodologies</b></p>	<p><b>1) Technical Panel</b> <i>lasted 45 minutes</i></p> <p>Infobip presented their solutions for automatization of the telecommunication, i.e. their application of AI within industry 4.0.</p>



	<p>Perfect synergy: Machines, applications and people. Infobip solutions for Industry 4.0</p> <p>Then prof Sven Lončarević, the head of Centre for AI at FER Zagreb presented AI from research to implementation.</p> <p><b>2) Round Table</b></p> <p><i>lasted 60 minutes</i></p> <p>All participants, including SMEs, university and Ministry of economy and sustainable development and CEO of CroAI Association had been involved into discussion. The SMEs said that they had a good cooperation with University of Zagreb, FER, and that majority of their employees had studied at FER. Prof Lončarević said that FER had over 120 projects and excellent cooperation with SMEs in Croatia and with European universities. He said that their students and teams quickly applied theoretical knowledge and research into industry. Mr Mislav Malenica, the CEO of CroAI Association said that association was important to all AI SMEs, especially for starts up as it acted as a point where companies can get help to meet other partners and exchange best practices. He said that national challenge was to improve connection among all stakeholders in ecosystem in Industry 4.0. Bruno Radojica from the Ministry of economy provide an overview on all calls that Ministry launched for innovative SMEs and startu-ps and said that new national strategy 2030 was about to release but still had no more details about upcoming calls for AI SMEs.</p>
<p><b>Which technologies and/or applications were discussed in the TTTDM?</b></p>	<p>Mr Mirza Hadžić, the Head of sales for Eu at Infobip, discussed digital technologies in telecommunication. Also, he presented development of Industry 4.0 and its importance in upcoming years.</p>
<p><b>How many stakeholders participated in the TTTDM?</b></p>	<p>There were seven stakeholders covering all triple helix actors: SMEs, governmental bodies, university and national AI association. Namely the participants were:</p> <ol style="list-style-type: none"> <li>1. Infobip Ltd <a href="https://www.infobip.com/">https://www.infobip.com/</a></li> <li>2. University of Zagreb, Faculty of electrical engineering, Centre for AI</li> </ol>



	<p><a href="https://cai.fer.hr/en/cai">https://cai.fer.hr/en/cai</a></p> <p>3. Croatian AI Association <a href="https://www.croai.org/">https://www.croai.org/</a></p> <p>4. Ministry of economy and sustainable development <a href="https://mingor.gov.hr/">https://mingor.gov.hr/</a></p> <p>5. HAMAGBICRO <a href="http://www.hamagbicro.hr">www.hamagbicro.hr</a></p>
Which Triple Helix stakeholder group did the participants belong to? (add number of participants)	<p>6 policy makers</p> <p>1 research</p> <p>11 business</p> <p>5 Supporting Organisations</p>
Which EU project(s) was synergically involved in the TTTDM, if any?	N/A
Key Outcomes of the TTTDM and description	<ul style="list-style-type: none"> <li>- Industry 4.0 and AI are leading industries by 2030</li> <li>- In Croatia there are several SMEs which have gained international success</li> <li>- The collaboration between SMEs and university is fair good.</li> <li>- - The main challenge is to involve all stakeholders to create supportive ecosystem for start-ups and SMEs</li> </ul>
Which lessons learned do you have as a project partner (a) and which lessons learned emerged for participants (b)?	<p>Lesson learned: AI is implemented more and more in all industries and by 2030 our daily life will be significantly impact due to AI.</p> <p>It is opportunity for new jobs and for new companies so it should be recognised on all levels, particular on the level of policy makers.</p> <p>At the moment we have good practices in Croatia but still have no developed system. So, the main challenge is to take systematic approach in this area.</p>
Hyperlink to picture and video content of the TTTDM	<a href="https://hamagbicro.hr/hamag-bicro-okupio-strucnjake-za-umjetnu-inteligenciju-na-radionici-projekta-ceup-2030/">https://hamagbicro.hr/hamag-bicro-okupio-strucnjake-za-umjetnu-inteligenciju-na-radionici-projekta-ceup-2030/</a>
<b>General Summary of the TTTDM</b>	
<p>The technical presentation and round table discussion were informative and gave a good overview on the current state of the affairs in AI in Croatia. It was great to have an opportunity to talk with successful entrepreneurs and researchers. The main disadvantage was that was held online instead so we could not meet face to face.</p> <p>Discussion at the Round Table developed around questions:</p>	



- How could innovation around the topic Artificial Intelligence be fostered in Croatia?
- Which are the main barriers who are impeding the adoption and integration of advanced solutions?
- What are the existing policy instruments implemented with the aim to increase the leading position of Croatia regarding AI topic?

Some of conclusions were:

- It is certainly necessary to develop skills / knowledge in the field of AI, adapt them to needs, provide sources of funding to encourage and implement innovations in this field. It would also be desirable to allow access to as much data as possible, while respecting data privacy.
- Access to finance, knowledge, and skills to adopt and integrate advanced solutions. Encourage education and lifelong learning and provide favourable sources of funding.
- There are various financial instruments where advanced solutions in the industry are acceptable (loans, grants). In the coming period, there will be more opportunities through the new Operational Program Competitiveness and Cohesion and the National Recovery and Resilience Plan.



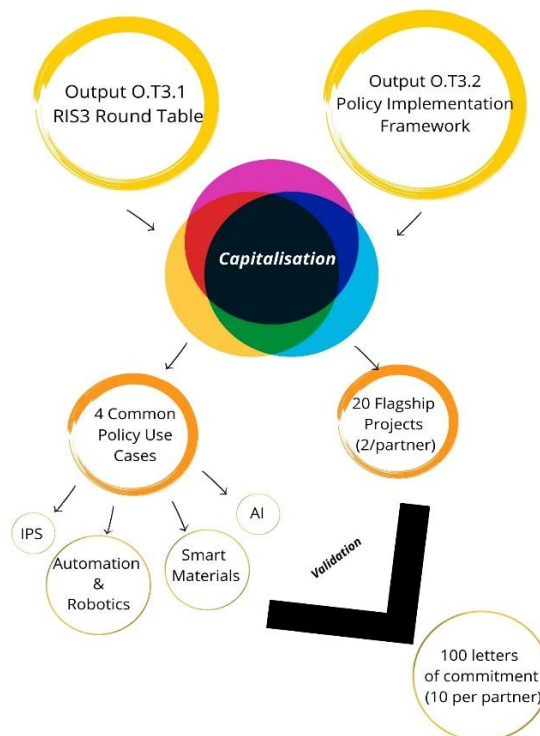
## AI individual Flagships of PPs

During the TIN Afternoon, particularly approaching WPT3 activities, PPs discussed the choice of their flagships to have a balance among all the four TINs. According to this, 5 PPs selected a flagship on AI, that is reported and briefly detailed in Table 6.

6.2. **Table 6: AI flagships selected by 5 PPs.**

PP	AI Flagship
AFIL	<b>AI Roadmap:</b> development of a strategic document collecting regional needs and priorities to be adopted by Regione Lombardia for future strategic programmes.
SIIT	<b>FORGING project (H2020):</b> creation of a Forum (i.e. group of experts) for Emerging Enabling Technologies in Support to the Digital and Green Transitions through Value Sensitive Innovations.
PTP	<b>National Demo Center initiative for advanced technologies in Agrofood processing industry:</b> use OF (E-)DIH ecosystems' funding to develop a range of services to support SMEs development towards industry 4.0 standards, testing and transferring knowledge from the education and research sphere towards SMEs and policymakers.
PBN	<b>Establishment and development of a smart senior room:</b> development and implementation of a lab to conduct qualitative and quantitative research on smart AI-driven devices for health care applications.
HAMAG	<b>CROBOHAT++ project:</b> development of Hub in North part of Croatia acting as one-shop-stop centre where small companies could test AI-driven prototypes and innovative ideas, receive support for IPR issues and exploit different related services.

The TTTDMs together with the definition & implementation of the flagship projects have provided the partners with great insights into how to build their Common Policy Use Case on AI as shown in the figure below.



**Figure 7: Overview of WPT3 (Source: DT.3.3.1, CEUP2030, 2021)**



All the additional activities related to Flagships are connected to WPT3, such as detailed description of actions and impact, stakeholders' interviews, organization of RIS3 Round Table and the definition of common TIN Flagships.