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INTRODUCTION

The purpose of this document is to provide guidance to Lead Partners ("LPs"), Project Partners ("PPs"), and Associated Partners ("APs") [collectively known as Partners], on the development of KACE system. In particular, it has been developed a report on a strategic system for transnational knowledge axis (KACE, Knowledge Axis for CENTRAL Europe); modules for the management of knowledge, cooperation & transfer for policy relevant solutions & their broad anchoring, replicable use.

METHODOLOGY

Summarising from the D.T1.3.1, a two-step methodology has been identified for the design and development of Knowledge Axis for CENTRAL Europe System.

- **1st Step: KACE design** – identification of the relevant topics for the KACE System
- **2nd Step: KACE development –** definition of the actions to be implemented for the consolidation and improvement of the system.

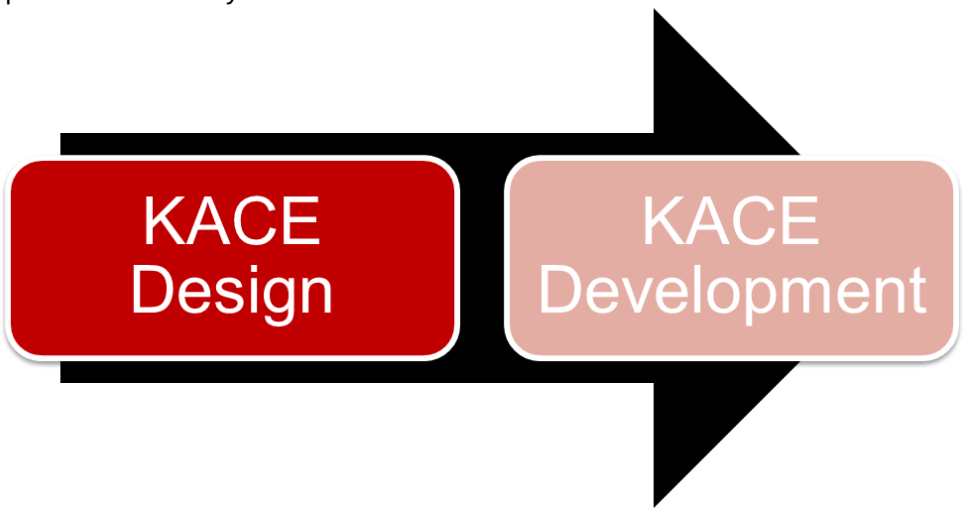

Figure 1. KACE 2-steps methodology

A detailed description of the activities implemented for the implementation of step 1 has been reported in D.T1.3.1, while the following paragraphs are going to focus will provide an exhaustive explanation of the actions envisaged for the development of a modular system of transnational knowledge management, cooperation & transfer. Considering that the usage of this system should be replicable & expandable for other topics, it is necessary to define a framework enabling a quick, practicable and high quality access to & usage of the available European RTD & innovation knowledge backbone tailor-made for CE specific requirements.

Accordingly, this second stage has been further detailed in a series of steps that are going to be presented in details in the following lines to ensure a better understanding and an easier replicability of this complex and articulated phase.

KACE DEVELOPMENT

Once defined the topics to be considered the foundation of the transnational Knowledge System for Central Europe and on which to build the cooperation activities of 3DCentral partner, the focus was transferred to the identification of the key elements for the KACE implementation that are:

- **KACE Leader:** For each topic area, identify a KACE Leader who will manage the activity development together with the contribution of a KACE support.
- **Core Group**: Create core group of subject-matter experts/stakeholders across the development path of a subject area.
- **Transferable Knowledge:** Identification of transferable knowledge within different network of stakeholders.
- **Opportunities for Transfer:** Raise awareness on opportunities for transfer generating a common methodologies and prioritizing such opportunities (Relevant, Long-Term, Resilient)
- **Multiple types of integration**: Development of the transfer actions through multiple integration types (i.e. vertical and horizontal)
- **Awareness of future potential**: Maintain awareness on future collaboration potential and funding opportunities connecting knowledge, expertise and capital.

Accordingly, a multi-step approach was proposed taking into account all the relevant elements identified. The following figure graphically represents this approach considering that besides the application related to the project purposes it is potentially extensible to other topics due to its modular structure.

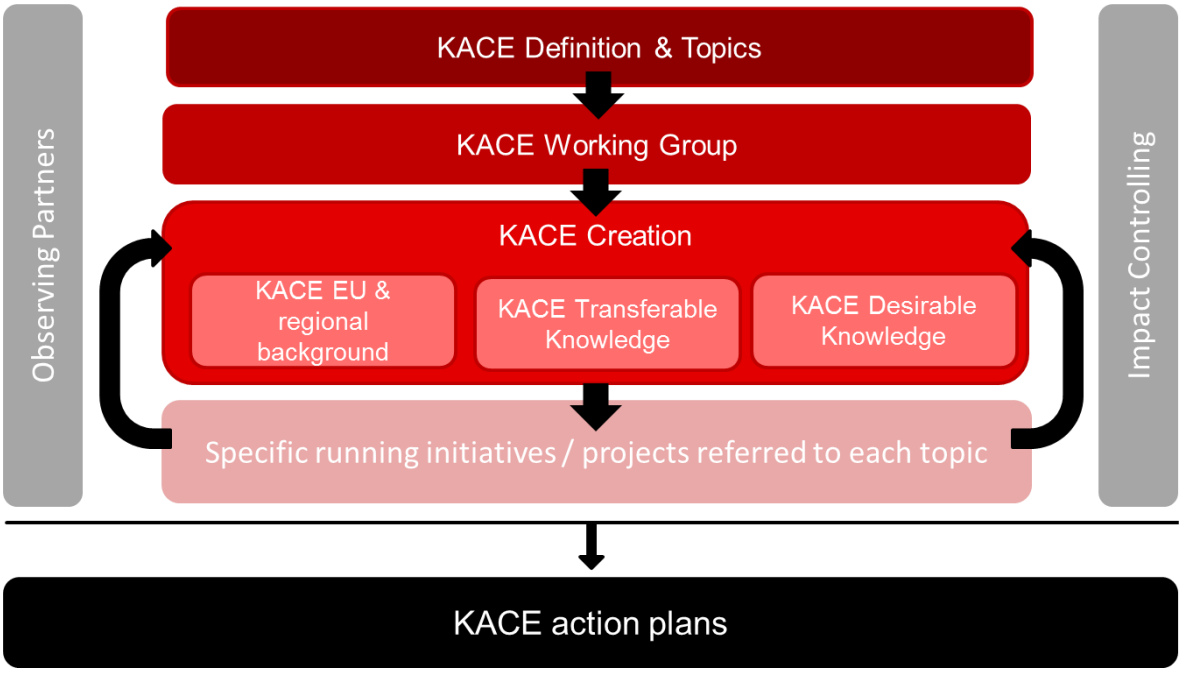

Figure 2. KACE development modules

Basically, the actions that should be implemented for the development of the KACEs are the following:

MAIN ACTIONS	
KACE definition & topics:	assessment of the scope and the boundaries of a specific KACE
KACE working group:	identification of the KACE leader and support that will guide the KACE development with the involvement of relevant stakeholders and the experts.
KACE creation:	definition of KACE European and regional background highlighting the transferable and the desirable knowledge, that is what is already available to transfer and what is missing to do more progress
Specific running initiatives/projects:	list of relevant projects / initiatives (European, National or Regional) be used as a possible playground either to transfer or to acquire knowledge

TRANSVERSAL ACTIONS	
Observing partners	Identification of a group of stakeholders that, although not directly involved in the development of a KACE, it monitors the implementation of the activities gaining potential benefits.
Impact controlling	Monitoring of the development and impacts of a KACE through the establishment of specific measures to ensure the continuous update of the contents proposed in the different KACEs and indicators to measure the impact and the performances of the actions implemented
METHODOLOGY OUTPUT	
Action Plan	At KACE level an action plan will be finally delivered including activities supported/granted by 3DC or other projects/initiatives and actions triggered by private stakeholder interests

A concrete example of the methodology implementation will be presented in D.T1.4.1 “Test Report” with the application of these steps to the KACE “Technologies for sustainable manufacturing” that has been chosen as the first common CE knowledge axis to be tested. This first implementation will serve as guideline for the development of the remaining KACE and for future applications outside the project boundaries.

In the meanwhile, with the aim to initialise the development of the whole system, the starting actions have been implemented to the different KACEs identifying the working groups focused on the topics and the related boundaries.

The following paragraphs provide evidences and results of the implementation of these steps, while the remaining activities that are now ongoing will be reported in the next deliverables.

KACE WORKING GROUP: SELECT STAKEHOLDERS FOR EACH KACE

Another important outcome from the group discussion that led to the definition of the KACE System was the identification of the Leader and the Support partner of each Knowledge axis as reported in the table below. This decision was mainly based on regional interest, competences and topics and it was established that all partners had to contribute as KACE leader and support.

Besides the identification of the responsible for the KACE development, it is clear that all the partners can contribute to the different knowledge axis according to their interest and experiences declaring their commitment in contributing to the concrete development of the KACEs.

In the following table, a preliminary composition of the working groups that could be established in the framework of 3DCentral project has been presented. The information used as input for the creation of this scheme comes directly from the contribution delivered by all the partners about the regional and national position with respect to the KACE topics (D.T.1.5.1). In particular the different symbols used refer to a different level of involvement:

X	Partners that have an advanced/ intermediate knowledge on the topic and can act as supplier or facilitator of knowledge transfer.
■	Partners that have a fundamental/basic knowledge on the topic and can act as receiver of knowledge transfer or in some cases also as facilitator.
	Blank cells indicate that the partner has basic or no operative experience on the topics addressed by the KACE. Anyway the partner could be interested in acquiring these competences. So, the participation to KACE working group needs to be investigated.

Table 1. KACE working groups

KACE Working Groups											
	IDM	AFIL	CAM	EVO	IWU	WRS	TPL	PTP	PBN	KPT	PK
1. Additive Manufacturing	■	X	X	X	Supp	X	X		■	■	Lead
2. 3D Design/ Engineering/ Scanning/ Simulation	Lead	■	X	X	X	X	■	■	Supp	X	■
3. Smart and functional materials	■	X	X	X	Lead	X	■	■		X	Supp
4. Digital life		■	X	Supp	■	■	Lead	X	■	■	■
5. Technologies for sustainable manufacturing	■	Lead	X	X	X	X	Supp	■	■	X	X
6. Virtual and augmented reality for manufacturing	Supp	X	X	X	X	Lead				X	X
7. Value-added virtual supply chains		Supp		■	X	X	X	Lead		X	X
8. Smart Services		■	Supp	X	X	X	■	■	Lead	X	X
9. Robotics (components, machines and intelligent robots)		X	X	X	X	Supp	■	■		Lead	X
10. Mechatronics (sensor, monitoring and control)		X	Lead	X	X	X	X	Supp	X	X	X
11. CE Brain Base		■	X	Lead	X	X	X	X	X	Supp	

KACE DEFINITION &TOPICS: DETERMINE SCOPE & BOUNDARIES

Using the KACE System as the basis for developing a content-focused governance structure, the WP Leader, and associated KACE leaders determined the scope and boundaries of the topics covered in 3DCENTRAL. This activity has been carried out with the support of the template provided below (**Table 2),** which required to the partners an indication as to their competences for their LEAD and SUPPORT topics, and also the competences related to the two mandatory topics: TEST KACE, "*Technologies for Sustainable Manufacturing"*, and "*CE Brain Base*".

At the end of contribution collections, feedback from all the partners was required resulting in the summary proposed at the bottom of this document in ANNEX1: RESULTS.

Table 2. KACE related partners' competences

KACE NAME	Current Status that exists related to the Specific KACE	Core Competences of the Partner	Additional Competences of Partner
1. Additive Manufacturing	(max 500 characters)	Use Key Words	Use Key Words
2. 3D Design / Engineering/ Scanning/ Simulation	(max 500 characters)		
3. Smart and functional materials	(max 500 characters)		
4. Digital life	(max 500 characters)		
5. Technologies for sustainable manufacturing	(max 500 characters)		
6. Virtual and augmented reality for manufacturing	(max 500 characters)		
7. Value-added virtual supply chains	(max 500 characters)		
8. Smart Services	(max 500 characters)		
9. Robotics (components, machines and intelligent robots)	(max 500 characters)		
10. Mechatronics (sensor, monitoring and control)	(max 500 characters)		
11. CE Brain Base	(max 500 characters)		

CONCLUSIONS AND NEXT STEPS

Besides the theoretical presentation of the methodology, a great value added is represented by the reporting of evidences from the implementation of the methodology stage KACE development. Indeed, in this deliverable some outcomes from the application of the initial steps of the methodology are presented concerning the phase of planning and preparing the KACE development. As reported in the following figure, there are several specific activities suggested in each stages and they are going to be reported in the next project deliverables.

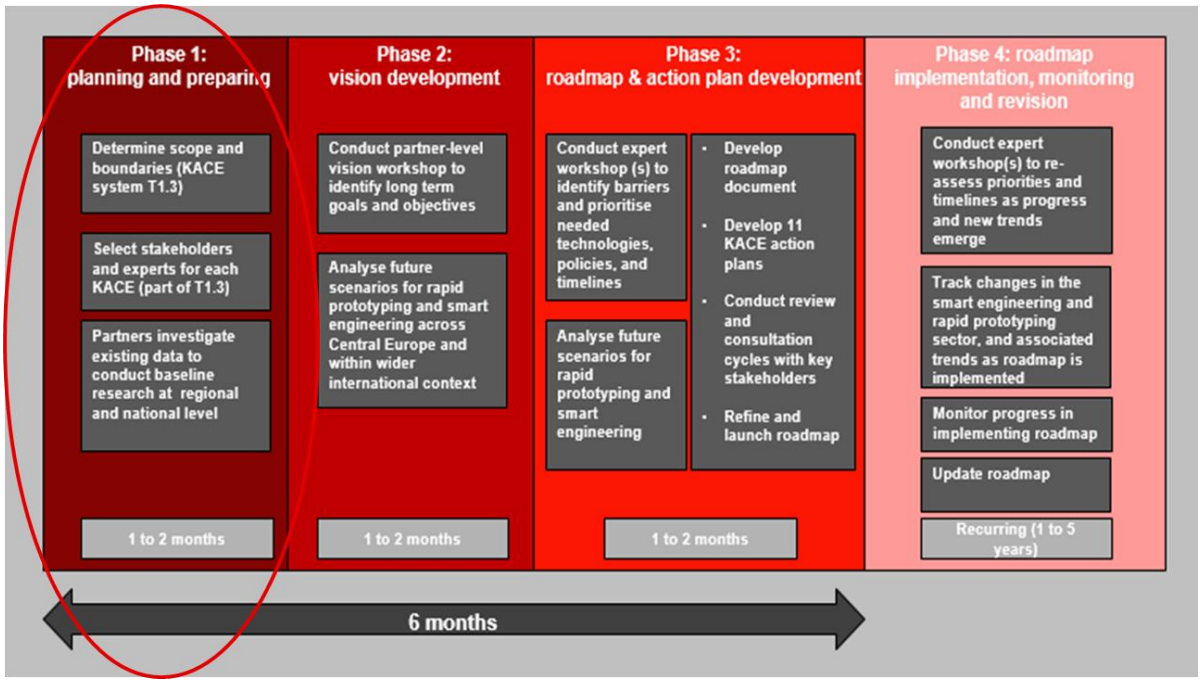

Figure 3. KACE implementation phases

Considering the next activities and their link with project deliverables and WP, partners will then be asked to support the elaboration of D.T 1.5.1- Transnational roadmap for 11 selected CE relevant knowledge axes by:

- Investigating and summarizing the regional and national relevant information necessary to provide essential information to fill the 3DCENTRAL Knowledge Hub
- Summarizing the European Roadmap position that currently exists related to the KACE topic where they are KACE Leader.
- Provide an overview of their regional (if available) or national summary position related to the 11 KACE Topics
- Setting organisation's perspective about the current status of knowledge in the area, and the future outlook.

In the meanwhile, AFIL will guide the development of the Test KACE "Technologies for sustainable manufacturing" providing a final report in D.T1.4.1 with a concrete application of the activities proposed providing a guideline for the other KACE of the System. In particular, this test KACE will focus on the ***vision development*** defining the common goal of the KACE and on the basis of prioritized sub-topics highlighting what its members want to achieve. In line with KACE member expectations, the ***roadmap and action plan development*** will be then addressed planning short, medium and long term activities (pilot & demo cases, transfer & cooperation actions).

For what concern the relation with the other WP, it is clear that besides the application of the methodology proposed for the KACE design and development (T1! BUILD), it is necessary to qualify all relevant target groups (RTD partners, companies, stakeholders) for improving their skills and generating a common understanding. This is the main objective of T2! IMPROVE that will be accomplished with the development and testing of a training toolbox along the identified knowledge axes. Finally in T3! PRACTICE the KACE system (WP1) and the training toolbox (WP2) will be put into practice through the implementation of several different pilot cases and cooperation & transfer opportunities.

ANNEX1: RESULTS

The following pages provides an overview of partners' competences for their LEAD and SUPPORT topics. In particular, each partner outlines current status on regional/national position related to the specific KACE topic, and the main available core and additional competences.

Moreover all the partners contributed to the TEST KACE "Technologies for Sustainable Manufacturing" and "CE Brain Base" with the aim to share available competences/pieces of knowledge with these KACEs Leaders. For the other KACEs there will be the opportunity during the Roadmapping and Action Plan development activity to provide contributions and show interest.

KACE 1 _ Additive Manufacturing			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP11_Politechnika Krakowska (KACE Leader)	Currently, Cracow University of Technology is conducting extensive research related to the use of additive manufacturing methods in medicine, reverse engineering and machine construction. The laboratories are equipped with appropriate software and 3D printing equipment as well as funds are being raised for construction of one's own printer. It also uses the appropriate research facilities for project implementation by using 3D printing technology.	Experience in conducting research, laboratories, 3D Printing, Rapid Prototyping, Rapid Manufacturing, Reverse Engineering, 3D Printers	Reverse Engineering, Rapid Tooling
PP5_Fraunhofer IWU (KACE Support)	- Application and improvement of existing additive manufacturing processes like laser beam melting - Focus on specific opportunities for the design and manufacturing of	- Laser beam melting - Additive manufacturing of plastic components - Fibre plastic composites	- http://www.agent3d.de/

	products, components and parts through additive manufacturing - Lightweight robust design through integration of fibres and other plastics	- Lightweight Design	

KACE 2 _ 3D Design/Engineering/Scanning/Simulation			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
LP1 _ IDM Suedtirol Alto Adige (KACE Leader)		IDM is operating a FabLab since many years and is linked to many companies in the region. Core competences in art design and in 3D CT scanning of wood are available.	
PP9_ Pannon Business Network Association (KACE Support)	With the cooperation of PBN an additive manufacturing center is under establishment, with special attention to 3D design and scanning. Permanent trainings and consultation are in progress.	Expert team in 3D printing, excellent knowledge on EU and regional funds	Advanced knowledge on 3D design and scanning

KACE 3 _ Smart and functional materials			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**

PP5_Fraunhofer IWU (KACE Leader)	- Integration of function and structure/shape through smart materials - Acoustic design and vibration compensation through actuators and sensors made of smart materials - Actuators and sensor integration	Smart Materials such as - Piezoceramics - Thermal Shape Memory Alloys - Magnetic Shape Memory Alloys - Optical Shape Memory Alloys Electro- & Magnetorheological Fluids	- www.smarthoch3.de - www.piesaspan.de http://www.adaptronik.fraunhofer.de/en.html
PP11_ Politechnika Krakowska (KACE Support)	Cracow University of Technology is conducting research on the use of smart materials in an extensive area including engineering, production engineering, medicine, pharmacy and architecture eg. vibration damping, utilization of geopolymers - an innovative material used in the construction industry - CUT patent. The study resulted in developing smart materials used in the construction of low-energy buildings	Polymers, metals, ceramics, Construction and technology of special tools for processing metal alloys and non-metallic materials and composites.	Tuff, composities

KACE 4 _ Digital life			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP7_ Technology Park Ljubljana (KACE Leader)	The main European strategy that is relevant for Digital life topic is the Digital Single Market strategy that could contribute € 415 billion per year to Europe's economy, create	1. **Technology park Ljubljana (TPLJ) is co-initiator and active member of Slovenian Healthday.si Initiative** http://www.healthday.si/ ; Greenbook ;	Technology park Ljubljana is also a contractor of the coaching for Climate KIC Launchpad and the Bootcamp.

	jobs and transform EU public services. The important part of the EC Digital Single Market strategy for the Digital life KACE topic is the **'eHealth Action Plan 2012-2020'** that focuses on the following: - Supporting research, development and innovation; - Promoting international cooperation; - Achieving wider interoperability of ehealth services; - Ensuring wider deployment & facilitating uptake. Promoting good health is an integral part of Europe 2020, the EU's 10-year economic-growth strategy. Slovenian Smart Specialisation Strategy (S4) more specifically two priority areas of S4: “1. Healthy working and living environment” and “3. (S)INDUSTRY 4.0” topic - *Health – Medicine* are supporting the Digital life KACE topic on a national Slovenian level. One of the goals of the first S4 priority area that is supporting the Digital life KACE topic is the promotion and	2. **TPLJ acts as a digital health hub and start-up community.** 3. **TPLJ is a Care4Tech project partner**– this project combines innovative ways of 2020 research agenda technology oriented principles & goals in the field of Smart Living technologies with quadruple helix multilevel policy oriented approach; **Care4Tech main project results are:** - mapping of leading cases and approaches classified in a Knowledge Atlas; - Setting-up a permanent policy and stakeholders platform linked to EU initiatives; -Thematic excellences grouped to cooperate; »Alpine campus – living labs« supported by quadruple helix based teams to jointly learn and innovate through a living lab based learning system.	

	introduction of smart health systems among companies and to help SMEs access global markets with smart health systems and services.		
PP4_EVOLARIS (KACE Support)	(EVO) In the «Economic Strategy for Styria 2020 – Growth through Innovation» are three leading themes (mobility, EcoTech and Health Tech defined wich are strongly linked to the topic of digital life. Moreover the topic has a high relevance for austrian companies, as the digitalization process is especially difficult for SME´s in Austria.	Digital assistance systems Business Modelling (Digitalization processes) Smart production, smart commerce, smart vision;	Plattform Industrie 4.0 Austria Dr. Christian Kittl

KACE 5 _ Technologies for sustainable manufacturing			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP2_AFIL (KACE Leader)	Sustainability has become a central issue on the agendas of politicians and industry with the aim to understand how to respond to environmental, social and economic challenges and transform industrial behaviour.	Competences of AFIL derived from the competences of its members. In particular, in this field the main competence are related to: - de and re manufacturing; - ICT for manufacturing	A new working group will be launched in the field of energy efficiency arising AFIL competences in: • Solutions to increase the efficiency of the processes (resource consumption, energy consumption optimization)

	In line with the EU roadmaps, national level (Italy) and regional level (Lombardy) have identified "*Strategies, methods and tools for industrial sustainability"* as a strategic action line to which address R&I priorities and enabling technologies. AFIL, as cluster for advanced manufacturing in Lombardy is the entity appointed by the Region for the development and promotion of R&I in this fields.	- adaptive manufacturing (mechatronics for instance) In this field AFIL is the coordinator of ESM – Efficient and Sustainable Manufacturing in the Vanguard Initiative.	Additional competences can be gathered from AFIL associates (companies, universities and RTOs) in specific topics or for the implementation of specific solutions.
PP7_ Technology Park Ljubljana (KACE Support)	On the EU level is supported in various ways, one them is for example Advanced Manufacturing - a key sub-area proposed for cooperation in the framework of Industrial Modernisation Platform is. The Specific topic is "Efficient and Sustainable Manufacturing" (ESM). Also the EU has mainstreamed sustainable development policies through the EU Sustainable Development Strategy (SDS), and the Environmental Technologies Action Plan for which sustainable consumption and production (SCP) is a priority, also highlighted in Europe 2020 strategy. SCP is in this context aimed at promoting economic growth and social cohesion without impairing environmental quality.	Technology park Ljubljana (TPLJ) is actively supporting SME in the technologies for sustainable manufacturing area. Some of the main TPLJ activities are: ➢ Development of competitive advantages upon effective integration of TOP3rd party technologies (upon collaborative innovation principles) ➢ Supporting SMEs in the (lean) process of early problem detection ➢ Supporting SMEs in definition of pilot solutions (and scouting solution providers) Technology park Ljubljana core competent project that are similar to the technologies for sustainable manufacturing KACE topic are:	**Technology park Ljubljana is also partner in the project Smart Space (Alpine Space) -** project intends to strengthen the cooperation within the system of innovation to promote smart digital solutions to traditional industrial sectors. SMART-SPACE will identify an Alpine Smart Manufacturing strategy, implement a common action plan to be supported by a Digital Innovation Hub (support services), a competence centre to assist all innovation actors to trigger Alpine growth and wellness.

	Slovenia government supports and funds the development of the KACE topic technologies for sustainable manufacturing. The main Slovenian structural development programme funds that were devoted also to the future development of technologies for sustainable manufacturing are the following; 1: **Building competences and innovation potential of Slovenian companies**, Programme 2: **Support for strategic development Innovation Partnership (SRIP) in priority areas of smart specialization** and Programme 3: **RDI in chains and value networks.** Slovenian Smart Specialisation Strategy (S4) more specifically the third priority area of S4: (S)INDUSTRY 4.0 is supporting the technologies for sustainable manufacturing topic on a national Slovenian level. One of the goals of the third S4 priority area *2.3.4. Development of materials as end products* is to develop materials as end products especially through sustainable production technologies in metallurgy.	**1. 3DCentral (Central) Catalysing Smart Engineering and Rapid Prototyping -** Linking innovation hubs in a stable network of innovative regions with an emphasis on smart engineering and 3D prototyping. The main output is directed to the creation of 11 axes of knowledge, the development of tools to support businesses and the implementation of transnational Innovation and technological training camps with the implementation of pilot demo projects. 2. **Bifocalps (Alpine Space) - Boosting innovation in factory of the future value chain in the Alps.** The main project outputs are: (1) a map of the sector at transnational level, to understand existing and potential good and best practices, technologies and competences along the value chain; (2) a validated methodology for enhancing FoF long-term sustainability through innovation and knowledge transfer among business, academic and policy actors, and (3) guidelines of strategic actions for influencing policy agenda based on an impact indicator system.	
LP1 _ IDM Suedtirol Alto Adige		As green region there are many examples of renewable energy plants and energy efficient buildings.	

PP3_CAMPUS 02		As an institute of higher education, several courses and topics are offered in direction sustainability, and technologies for sustainability; e.g. process optimization lectures, energy engineering lectures, focus on environmental aspects in several courses and lectures.	Several members of the staff and several project partners are involved in a way or another with process optimization projects and energy management projects.
PP4_EVOLARIS		Digital assistance systems for industry 4.0	Hannes Walter (KITTS): smart services
PP5_Fraunhofer IWU	- Continuous improvement of energy- and resource-intensive manufacturing and production processes with a focus on the automotive industry	- REEMAIN: deliver innovative solutions for efficiency in the use of resources and renewable energy within manufacturing - InnoCaT: researching efficient and sustainable production processes for car bodies - eniPROD: energy-efficient product and process innovations in production engineering - E³-Production: energy- and resource-efficient production and factory	- Energy-efficient Product and Process Innovations in Production Engineering (eniPROD): http://www.eniprod.tu-chemnitz.de/index.php.en - Innovation Alliance Green Carbody Technologies (InnoCaT): https://www.greencarbody.de/cgi-bin/click.system?navid=englisch_1204&sid=T4N5FZ1EadbBO7ZoV45QL1OD6Ss0IXHS - E³-Production
PP6_ Wirtschaftsförderung Region Stuttgart	Federal State of Baden-Württemberg: The Government of the Federal state of Baden-Württemberg (BW) defines “resource efficiency” as one of the guiding themes for its actual political agenda. Therefore the government developed a “Resource efficiency strategy”, which pursues several goals: decoupling of economic growth and	WRS has no specific competences in this field of technology	Competences of stakeholders (research institutions, enterprises) in the Stuttgart Region: - Ultraefficient production in urban environment (Fraunhofer IPA): http://www.ipa.fraunhofer.de/ultraeffizienzfabrik.html - Energy Efficiency Index of the German Industry (Stuttgart University): http://www.eep.uni-stuttgart.de/eei/index.en.html

	consumption of resources, doubling of resource productivity (1994 – 2020), BW as lead supplier for resource efficiency technologies; more efficient exploitation of primary raw materials and increase of the share of secondary raw materials; Following this strategy the federal government founded the State Agency Environmental technology BW" (Landesagentur Umwelttechnik BW) which coordinates most of the activities in Baden-Württemberg, for example a competition for resource efficiency solutions in SME, an annual resource efficiency congress, the annual green and innovation investment forum or the network of regional competence centres for energy efficiency. An additional state agency was founded in the field of lightweight technology (Landesagentur Leichtbau BW) .		- Lightweight construction technologies (e.g. for machining and cutting technologies, sawing technologies; Fraunhofer IPA): http://www.ipa.fraunhofer.de/en/lightweightconstructiontechnologies.html - processing technology research in plastics technology (Stuttgart University): http://www.ikt.uni-stuttgart.de/forschung/verarbeitungstechnik/index.en.html - Factory planning and production management (Fraunhofer IPA): http://www.ipa.fraunhofer.de/en/factoryplanning_management.html - ARENA2036 - "Active Research Environment for the Next Generation of Automobiles" (research regarding several production related topics like digital prototyping, lightweight construction with function integration; partners Daimler, Stuttgart University, Bosch, Festo etc.): http://www.arena2036.de/de/
PP8_Pomurski Tech Park	-	Technology transfer intermediate and facilitator; Provider of different funding opportunities, excellent knowledge on EU funds.	- Advanced knowledge of nanotechnologies and manufacturing technologies, support in development of different IoT solutions.
PP10_Krakowski Tech Park	The care for people and environment is present at all stages of production cycle in Małopolska Region, while the priority is to preserve principles of sustainable	Kraków Technology Park (KTP) offers services supporting SMEs in their implementation of sustainable production and innovation processes, among others through advice and consultancy, training,	The administration (Office of the Marshal of Małopolska Region, Office of the Municipality of Kraków, local governments and communes) has at its disposal a broad range of instruments that, from the formal

	production in modern manufacturing processes. Sustainable development is one of the fundamental elements of the Małopolska Region Regional Innovation Strategy 2014–2020, implemented through the involvement in more sustainable methods of production, and solutions and support for producers at all stages of the process. A testimony to this fact is having the sustainability principle acknowledged in the document of key importance for Małopolska Region, namely "The Smart Specialisations of Małopolska Region for 2014–2020". It proves Małopolska Region's special emphasis on the following sectors: agriculture, Energy sector, Chemistry, Production of metals and metal products, Electro technology and machine industry	and assistance in the transfer and commercialisation of new technologies. The KTP supports entrepreneurs in access to information on potential sources of financing for sustainable production and undertakes activities promoting the success of the companies that have used environmental technologies to build their competitive market advantage. The KTP among others: • offers very good R&D facilities and recognises barriers in communication between science/ academia and industry • has experience in the acquisition of funds and project implementation • has easy axis to knowledge about the scientific research conducted and technologies developed (through cooperation with the CCT, EEN, and institutions of higher education) • develops tools for communication between academia and business (technology databases available as part of the Repository) • provides consulting for SMEs • is greatly experienced in the acquisition of funds and implementation of projects addressed to entrepreneurs.	point of view, allow proactive support of entrepreneurship. The services of public administration in support of sustainable production in Poland encompass the instruments that remain in the hands of both state government and local and regional authorities. These tools include among others relief from local taxation, preferred loans and credits, and premiums and awards in competitions. In the case of an enterprise, the relief specified in acts of law for conducting business activity in special economic zone is based on the regulations set in the Act of 2 October 2003 on the amendment of the Act on special economic zones and selected acts of law (Polish Official Journal. No. 188, item 1840 with later amendments). - Enterprise Europe Network (EEN) – offers broadly construed consultancy and advisory services for the SMEs connected to environmental protection. The EEN also runs a project under the name of European Regional Environmental Services Platform (EURESP) aimed at assisting regional micro-, small, and medium-sized enterprises in the protection of natural environment. Businesses receive assistance in the form of consultations, workshops, and seminars on environmental issues which will let them minimise the negative environmental impact and save money in doing so. The project is focused on three sectors: waste management, food industry, and production of construction materials.

			Within the framework of the project, businesses operating in the three selected sectors may receive partial return of costs incurred on energy auditing, environmental consultancy, and expertise is in that area, depending on their needs.
PP11_Politechnika Krakowska	The aspects related to the development and improvement of sustainable development technologies have always been the key studies, which were conducted by Cracow University of Technology staff. As a result the following market products have been launched such as biodegradable gels used in medicine, new environmentally-friendly polymer composites with the use of renewable materials, new composite materials from recycles etc.	production management, production engineering, sustainable development, innovative technologies	environmental Protection,

KACE 6 _ Virtual and augmented reality for manufacturing

Partner	Current Status that exists related to the Specific KACE	Core Competences of the Partner	Additional Competences of Partner
PP6_Wirtschaftsförderung Region Stuttgart (KACE Leader)	There is a number of strategies and strategic activities in the interlinking between manufacturing and IT: • "Digital@BW": digitalization strategy of Baden-Württemberg regional government • "Industry 4.0": industrial digitalization strategy of German federal ministries of research (BMBF) and of economic affairs (BMWi) • "HighTech-Strategie" of German federal government "Forschung für die Produktion von morgen" of German federal ministry of research (BMBF)	WRS has no specific competences in this field of technology	Competences of the Virtual Dimension Center (VDC; network in the field of AR and VR with 90 members (SMEs and research institutions): http://www.vdc-fellbach.de/); competences of network-management: • manufacturing / industrial engineering • virtual and augmented reality software and hardware assessment • VR / AR applications to manufacturing excluding programming • Competences of VDC-members: • VR / AR applications programming • VR / AR hardware installations laser scanning and reverse engineering
LP1 _ IDM Suedtirol Alto Adige (KACE Support)			VR for building simulations and touristic applications aivailable.

KACE 7_ Value-added virtual supply chains

Partner	Current Status that exists related to the Specific KACE	Core Competences of the Partner	Additional Competences of Partner
PP8_Pomurski Tech Park (KACE LEADER)	Slovenian Smart Specialisation Strategy (S4) is supporting the domain of Internet of Things, which is closely connected to this KACE. At the end of previous year, strategic development and innovative partnership on horizontal level has been established, which will support the development of this thematic within areas of smart factories, smart homes and smart cities.	Technology transfer intermediate and facilitator; Provider of different funding opportunities, excellent knowledge on EU funds.	Advanced knowledge on Internet of Things and Big data.
PP2_AFIL (KACE Support)	Digitalization is a key topic addressed both at national (Italy) and regional (Lombardy) level. At the end of 2016, Italy launched the plan “Industry 4.0” aimed at fostering the adoption of digital technologies in all the stages of the production process.	• Digital and Virtual factory demo-case coordinator in the framework of Vanguard ESM Working groups and ongoing projects on: • SMEs digitalization • Cyber physical systems • Smart products • Internet of Things Systems • Cyber Security • Data Analytics	Additional competences can be gathered from AFIL associates (companies, universities and RTOs) in specific topics or for the implementation of specific solutions. AFIL has been recognized as the Regional DIH by I4MS

KACE 8_ Smart Services

Partner	Current Status that exists related to the Specific KACE	Core Competences of the Partner	Additional Competences of Partner
PP9_ Pannon Business Network Association (KACE Support)	Theoretical material is prepared by PBN. S4 strategy and regional development plan are concentrating on innovative services. PBN took part in the development of this document. Thanks to the wide network a permanent knowledge transfer is existing.	Technology transfer facilitator; Knowledge on services and devices. International network	Smart application in production layout optimalization.
PP3_Campus02 (KACE Support)			

KACE 9_ Robotics (components, machines and intelligent robots)			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP10_ Krakow Technology Park (KACE Leader)	Robotics and automation relies more and more on software. Software production, on the other hand, relies less on huge capital investments but more on the creativity; or creative capital. This is an opportunity for the region of Malopolska which is being widely recognized for its substantial IT potential. This potential is identified not so much in the construction of industrial robots, but in necessity of	KTP runs the innovation centre - a hub for development of new ideas and technologies, a cluster of ICT and engineering companies; site for testing ideas of open innovation; and centre for the Smart City of the future. KTP runs an accelerator – ScaleUP KTP - a residential 13-week acceleration programme for start-ups that have reached at least a prototype of a B2B service or product, especially one that belongs to Industry 4.0, Internet of Things (IOT), Industrial Internet of Things (IIoT), and	The success of the accelerator is guaranteed by the participation of mature and experienced businesses from Małopolska in the programme. **EC Group** is one of the most dynamically developing engineering companies in Poland, focused in development in multiple fields. It is active in research and development, and provision of solutions for various sectors of industry. Running highly innovative projects, the company will certainly set the hurdle for project

	programming and reprograming existing robots. The IT potential may be used for the development of the sensor capabilities of the already existed robots. The opportunities for Małopolska and the local, relatively new companies lie in “service Robotics” which mainly refers to robots that can be used in healthcare and rehabilitation, assisted living, logistics, or for operations underwater. In all of the mentioned domains the markets are relatively in early stages of development.	Smart City. The accelerator supports businesses dealing with innovative solutions for industry to streamline processes in production, logistics, warehousing, resource management, and quality control. Two large enterprises are involved in the project: Krakow Airport and EC Grupa. An additional element and a proprietary proposal of the Kraków Technology Park is the use of the potential of the SMEs and large industrial businesses operating on the premises of a special economic zone and economic activity zones. Their representatives are involved not only as experts and mentors but also as participants of the Living Lab process, which the KTP combines with an acceleration programme. Living Lab is a method for co-creation and design of products with involvement of end-users. Implementing this method in the place of the chaotic networking and haphazard actions, the KTP wants to introduce structure and order at a strategic moment in start-up development. KTP’s Seed Fund invests funds in innovative projects at an early stage of development - particularly in technology and engineering projects. The support does not only include capital, but also assistance with respect to core activities as well as advice and business consulting services. KTP Seed Fund's portfolio includes more than 20 businesses, most of which have already secured new investors, both individual and venture capital funds.	participants very high, but it will also share its priceless experience with them. The EC Group is a large Polish company built by a professor of the AGH University of Science and Technology in Kraków, Tadeusz Uhl. The company is in the spearhead of innovative engineering companies selling their products and services worldwide. It is a potential consumer of varied solutions from the broad range of Industry 4.0 IIoT. It has plenty of experience in building product distribution networks for the industry. A factor strongly supporting the selection of the EC Group as a partner is also the fact that, unlike many other large businesses, the group develops through continuous search for innovation outside and frequent incorporation of new companies. This opens an opportunity to partner’s investment, and guarantees the understanding of the culture of operation of small technology- -driven businesses. A highly valuable strategic partner is the **Kraków Airport.** An airport is the highly complex organism, where you can test and implement innovative ideas ranging from sensors, via monitoring and client care support technologies, to advanced systems supporting business processes. It is a small town visited every day by hundreds of staff from different companies and thousands of clients, i.e. passengers. The field for innovative implementations is extensive indeed. Competing for airlines and passengers, airports focus on continuous quality improvement of the services they

			provide. Kraków Airport is an unquestioned leader among Polish regional airports. It is time that apart from infrastructure investments, the company focused on new technologies. John Paul II International Airport in Kraków Balice (MPL), presented a long list of technological needs spanning from regular IoT, via IIoT to Smart City. The staff of the MPL have conducted research concerning technological innovation applied in other airports elsewhere in the world. Thanks to increased safety requirements and reliability of the solutions introduced, a very large number of users assign through the premises and challenges, control of major streams of persons and goods, and monitoring of threats, an airport is an ideal partner for young start-ups eager to prepare their product for sale in demanding international markets. **ASTOR** is a Krakow based company, operating the ecosystem of KTP. The company has been established by scientists from the University of Technology of Krakow and nowadays offers its customers access to state-of-the-art: control systems, industrial software, monitoring systems, robotic systems. The product range is complemented by a number of services (training, consulting, maintenance, etc.). Company's solutions are applied by big plants and small companies alike in virtually every industry. KTP's shareholders competences:

			University of Science and Technology, Faculty of Mechanical Engineering and Robotics is one of the oldest and largest faculties of the AGH University of Science and Technology in Cracow. Thanks to AGH achievements, University rank among the best faculties in mechatronics in Poland and the entire world. AGH has educated thousands of graduates who now hold high posts in industry, higher education or state administration in many countries on all continents. Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering. Being one of the biggest units of AGH-UST, the Faculty of EEACS&BE is historically the third faculty at AGH-UST which has strongly marked its presence in the Polish scientific circles, and which is very highly appreciated and well recognized by candidates, graduates and employers. **Cracow University of Technology** is a state academic college with the 70-years-old tradition (established in 1945r.). Cracow University of Technology is 7 departments with 22 directions about many specialities- one of them is Faculty of Mechanical Engineering. **Jagiellonian University,** Faculty of Mathematics and Computers Science. The faculty's offer includes such academic fields as Theoretical Mathematics, General Mathematics, Applied Mathematics, Mathematics Education, Mathematical

			Finance, Mathematical Economics, Mathematics and Computer Studies, Biomathematics, and Computer Mathematics, as well as Applied Computer Science, Theoretical Computer Science, Analytical Computer Science, Bioinformatics, Software Engineering, 3D Modelling, and Artificial Intelligence and Control.
PP6_Wirtschaftsförderung Region Stuttgart (KACE Support)	High-Tech Strategy (Federal Ministry of Education and Research): Robotics as one important part of the research field «Interactive Technologies»/»Human-Technology-Interaction»: https://www.bmbf.de/pub/Technik_zum_Menschen_bringen_Forschungsprogramm.pdf	WRS has no specific competences in this field of technology	Competences of stakeholders (research institutions, enterprises) in the Stuttgart Region: - Robot and assistive systems (Fraunhofer IPA; http://www.ipa.fraunhofer.de/en/robot_assistivesystems.html - Assembly automation (Fraunhofer IPA; http://www.ipa.fraunhofer.de/en/assembly-automation.html - Robot Safety (Pilz; https://www.pilz.com/en-AU/products-solutions/industry/robotics-assembly) - Laser Tracker in robot calibration (Faro Europe; http://www.faro.com/de-de/messloesungen/anwendungen/roboterkalibrierung - Individual robotic and automation solutions for the packaging sector (Robomotion, www.robomotion.de) - ROBOTT-NET (Robot Technology Transfer Network; Fraunhofer IPA): http://robott-net.eu/open-labs

			- Safe human robot collaboration with assistive robots (Fraunhofer IPA; http://www.ipa.fraunhofer.de/en/human-robot-collaboration.html) - Collaborative robots (Fanuc): http://www.fanuc.eu/uk/en/robots/robot-filter-page/collaborative-robots)

KACE 10_ Mechatronics (sensor, monitoring and control)			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP3_CAMPUS02 (KACE Leader)		Development of mechatronic systems (focus on prototyping), programming, embedded systems, PLCs, mechanics, electronics	Microelectronic sensor systems
PP8_Pomurski Tech Park (KACE Support)	Mechatronics is an important aspect of higher education system in Slovenia for last 10 years, especially in eastern part of Slovenia, which is more industry oriented. This topic is well	Technology transfer intermediate and facilitator; Provider of different funding opportunities, excellent knowledge on EU funds.	Support in development of different IoT solutions for manufacturing processes.

	supported by the different engineers who are either active on company level or within different research departments on higher education institutions.		

KACE 11_ CE Brain Base			
Partner	**Current Status that exists related to the Specific KACE**	**Core Competences of the Partner**	**Additional Competences of Partner**
PP4_EVOLARIS (KACE Leader)	Innovations Management is well anchored in Universities in Austria, but there is still a lack of knowledge in companies, especially in SME´s. Transfer Management is anchored through networking- and cluster organizations, but there is limited access to transnational transfer. Knowledge management is strongly related to transfer management and is a need for SME´s as well as enterprises	Creating digital assistance systems, open innovation;	Platform Industrie 4.0: knowledge transfer in the field of i40
PP10_ Krakow Technology Park (KACE Support)	In the recent years innovation has become one of the "hottest" subjects in management science, both in Poland and globally. This on the one hand can be treated as a particular fashion in management,	The KTP aids SMEs by developing their innovative potential by performing innovation analysis (every company admitted into the incubator/technology park is analysed for innovation).	KTP's stakeholders competences: **Jagiellonian University,** Institute of Economics, Finance and Management, Department of Economy and Innovation. The research approach represented by the Chair emphasises such categories as

	yet it is also a syndrome of the 21st century, a time when these are not only the material resources that decide about the position of states, enterprises, and individuals but this primarily is the knowledge, and even more so its innovative application. In Poland, activity in support of innovation is of especially high importance. According to statistical data (European Commission) published in 2012 Poland belongs to moderate innovators. Experts believe that an opportunity for Poland to come close to the global spearhead is to have the nation's enterprises more strongly involved in research and invention of new products. The number of barriers for the development of innovation includes lack of synergy of activity between institutions of higher education and enterprises, and the subsequent difficulties in translating innovative ideas into solutions to be applied on a mass scale. In businesses innovation means paying particular attention to the processes of creation, dissemination, use, and management of knowledge in the enterprise, as well as proper innovation management. Polish companies find it ever more difficult to compete solely with price in the	Moreover, in 2017, the KTP was accredited by the Ministry of Development as an Innovation Centre providing innovation consultancy services and innovation support services for entrepreneurs.	innovation, innovativeness, the process of innovation, innovation strategies, organisational and institutional structures for innovative activity used to explain the causes and results of phenomena, processes, and mechanisms observed at various levels in economy. **AGH University of Science and Technology** in Kraków, Technology Transfer Office, AGH concludes its tasks through: 1. Initiating and reinforcing cooperation between the academic milieu and the business environment, including tracking down of enterprises interested in the implementation of scientific research results and development work through promotion of the technologies offered and participation in exhibitions and fairs. 2. Preparation of concepts for commercialisation of results of scientific research and development work that in particular contains analyses of the market potential for inventions and of their readiness for implementation, as well as the monetisation of the intellectual property rights. 3. Management of the technology portfolio, including especially but not solely: **Technology Transfer Centre** is an internal unit of Cracow University of Technology. Main fields of TTC operation are: • commercialization of the intellectual property,

	global market, which is why appropriate innovation and knowledge transfer management provide the realistic path of development. Economists believe that knowledge-based economy will intensify rather than alleviate the differences between rich and poor countries. The knowledge gap between rich and poor (Poland included) countries is much greater than that deriving from differences between GDPs. For that reason, to increase investment into knowledge is an urgent task for Poland, otherwise the country could be threatened by exclusion from global economy. https://www.parp.gov.pl/images/PARP_publications/pdf/20509.pdf		• technology transfer, • support within framework programs, services supporting SME development.
PP1_IDM Sudtirol	IDM participated in an open innovation platform together with regional crafting association: www.openinnovation-suedtirol.it		
PP2_AFIL	Innovation and Knowledge management are key factor for the success of SMEs. However there are still barriers that hamper the processes of technology transfers or knowledge sharing mainly related to the companies mindset. In this context, the clusters (i.e. AFIL) act as intermediaries to guide and support companies in these	- Roadmapping activities - Tools to foster knowledge sharing and transfer (community, working groups…)	- Open Innovation Platform - Technology Transfer activities promoted between associates

	activities promoting networking and facilitating the communication between different stakeholders (i.e. companies, RTOs, regional authorities…)		
PP5_Fraunhofer IWU	testing and optimizing in a production-oriented manner at the Fraunhofer IWU in a model factory	- Demonstration and cross-learning	
PP6_Wirtschaftsförderung Region Stuttgart (			- **Virtual Dimension Center:** The Virtual Dimension Center (VDC) is Germany's leading network for Virtual Engineering and Virtual Reality. More than 100 members and partners - among them research institutions, technology suppliers, service providers, users and multipliers - are cooperating in the topics of simulation, visualisation, product lifecycle management (PLM), computer aided engineering (CAE) and virtual reality (VR) along the entire virtual engineering value chain. Engagement of the managing director of the VDC as 3D Central Expert http://www.vdc-fellbach.de/english/about - **Manufuture-BW e.V.** It's main task is to join the forces of one of the biggest manufacturing clusters in the world in order to explore and to exploit synergies within a wide spread community of cluster actors located generally in the Federal State of Baden-Württemberg. Until today Manufuture-

			BW e.V. has nearly 50 core members and more than 150 supporting associates working in the manufacturing branches such as mechanical, software or electrical engineering companies and research facilities. Manufuture-BW e.V. comprises also partners from the public administration, the education sector and some technology networks, thus representing a triple helix organization by its own. Engagement of the Manufuture Office as 3d Central KITTS http://www.manufuture-bw.de/ - Innovation House: important innovation and project support service organisation in the Stuttgart region with closes links to research organisations, higher education institutions and public administration. Services cover: innovation coaching, cluster development, cluster management, policy analysis, policy advice, programme development. Engagement as 3D central experts and KITTS http://www.innovationhouse.eu/index.php?site=home
PP7_Technology Park Ljubljana	-	Technology transfer intermediate and facilitator; Knowledge on different tools and methods – focus on collaborative innovation & innovation ecosystem(s) development (abroad) & support to RDO in development internal processes for	- Market oriented projects and collaborations

		improved commercialisation of research results	
PP8_Pomurski Tech Park		Technology transfer intermediate and facilitator; Knowledge on different tools and methods	-