KA2: Cooperation for innovation and the exchange of good practices - Knowledge Alliances

Application Form

Call: EAC/A02/2019

Deadline: 26.02.2020 (17:00 CET, Brussels time)

Erasmus+

Knowledge Alliances

DETAILED PROJECT DESCRIPTION

(To be attached to the eForm)

EN Version 2019

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PART 0. Project summary and involvement in previous relevant projects

0.1. Please provide a short summary of the main features and outputs of your project *(Recommended limit 2000 characters***) –** *Please bear in mind that your short summary may be published on EC or/and EACEA websites and dissemination tools. – 3918 characters*

Systematic Innovation Methodologies (SIM) are an important tool for structuring complex, contradictory requirement situations, which are becoming increasingly important in a high-tech world. Thus the "art of inventing" becomes an everyday task not only in engineering and technical professions, but increasingly also for the middle management. The ability to quickly analyse socio-technical systems with sufficient depth in interdisciplinary teams is particularly important, which requires coordinated methodological *and* technical knowledge and skills. The broad formation of such knowledge and skills is the subject of SIM training. They are considered to be important cross-cutting skills with significant influence on the cultural-technical development potential of companies. Thus such trainings require broad anchoring in various training structures in the EU area.

The further development of appropriate training structures that meet these requirements can only take place in close contact between experienced training institutions and industrial "consumers". The project team consists of four HEI experienced in SIM training, Leipzig University as a further HEI with the aim of establishing appropriate training structures, Schaeffler AG as a large industrial partner with long-term experience with SIM-skilled employees for the company's own development, two further SMEs with own SIM experience and Jantschgi C&R as a SIM consulting company. The team is completed by the partner *Target Invention* Minsk, whose team has been active in this field since the 1970s and brings important experience from own international activities, especially in the Asian region.

Our analysis shows that SIM are used successfully in large companies around the world (Samsung, Posco, Siemens, Schaeffler and others). Its anchoring in academic teaching and research as well as its application in SME in the EU area is still weak compared to Asian industrialized nations as South Korea, China, Japan.

Hence this Knowledge Alliance **aims at**

1. **build up** a strong networking structure of already successful teaching and training SIM in HEI at different EU locations and in different forms of HEI (**focus A**),

2. **set up and develop** a consulting and participation structure for this training infrastructure by companies from within the EU that are aware of the potential of SIM for their strategic development (**focus B**),

3. **organise interoperation** between these two networks, to get practical input for the development of corresponding curricula on the one hand and on the other hand, to offer challenging operational tasks for training and further development of the students,

4. **include experience** in inter-company training of selected Eastern European partners, which are particularly strongly acting in the Asian region,

5. **further expand** these networks with *additional partners*, and

6. **support other HEI's** in setting up appropriate training and further education offers.

In addition to the expansion of existing training structures, the joint use of materials, digital tools and platforms of the partners, we rely

- on the identification and activation of further SIM stakeholders as *additional partners*, who are involved in the work of the network at an early stage,
- the development of a *SIM-SSN*, a *SIM Semantic Social Network* as a digitally supported communication and search infrastructure in a *SIM Cloud*, and
- the establishment of stable exchange between SIM training and SIM application structures, both at individual and organisational level, with close cooperation at organisational level, in particular with the Chambers of Commerce and Industry (CCI) structures.

We assume that our project contributes to strengthen the innovative power of EU companies by establishing and expanding structures of training and further education in close and sustainable cooperation with entrepreneurial structures and inter-industrial organisations.

0.2. Involvement in previous relevant projects

If your proposal is based on the results of one or more previous projects/networks, please provide precise references to this/these project(s)/network(s) in the table below.

Please add tables as necessary.

Reference number	586081-EPP-1-2017-1-FI- Finland EPPKA2-CBHE-JP		
Project / network dates *(year started and completed)*	2017-2020	**Programme or initiative**	Erasmus+ Capacity Building in Higher Education Call 2017 EAC/A03/2016
Title of the project / network	Cooperative e-learning platform for higher education in industrial innovation		
Coordinating organisation	Lappeenranta-Lahti University of Technology		
Website	https://www.cephei.eu/		
Password / login if necessary for website			

Please summarise the project/network outcomes and describe (a) how the new proposal seeks to build on them and, (b) how ownership / copyright issues are to be dealt with (limit 500 characters)

The project aims to increase the digitalization, internationalization and visibility of Industrial Innovation education in the world scope with blended learning approaches both in Partner country universities and EU. Dissemination of the best practices enables the participation of industry in Industrial Innovation education. The main project outputs include development of the teaching recommendation in the form of the Handbook, set up of video laboratories and the CEPHEI platform set up. The platform already operates as a course placement and source of the learning analytics.

PART I. Project relevance

I.1. Why has the consortium decided to undertake this project?

I.1.1 Please outline the purpose behind your project, clearly analysing the specific needs or problems/challenges, which the project intends to address. (Recommended limit 3000 characters) – 3528 characters

The imparting of knowledge and skills in the field of SIM has a growing importance as a cross-sectional qualification, not only in engineering and computer science studies, in order to develop the skill for systematic analysis of complex contradictory situations in everyday professional life and to develop innovative solutions. Growing up from engineering approaches as TRIZ SIM are nowadays applied in different domains (requirements engineering, business planning, sustainability management, change management, technology forecasting, …) and were further enhanced during the last 30 years in several directions.

The systematic dissemination of such methodologies already plays an important role in training in Asia (China, South Korea, Japan), for example in the framework of the MEOTM program (Tan 2017) of nationwide coordinated training of engineers in these methodologies in China. Such activities are coordinated worldwide by the international TRIZ organization MATRIZ and in Europe by ETRIA.

The situation analysis in the preparation of this application has shown once more that European industrial companies do still insufficiently recognise the strategic importance of SIM skills, in particular for engineering and technical staff and in the middle management. Since such "investments in education" are equally difficult to represent in return-on-investment accounts, considerable efforts are required to make structural progress here. The need for corresponding engagements is more recognised at the level of comprehensive industrial organization structures (such as the CCI) – see (Heilbronn 2020) – rather than at the level of individual companies. At the corporate level, the need for action is also recognised more in large companies than in SMEs.

Our project aims to take the networking of these teaching and research activities at different European locations as well as its recognition and support by industrial companies to a new level. It addresses the existing deficits acting in the following directions:

(1) Coordinate the activities in SIM teaching as cross-sectional skills in different HEI forms and at different HEI locations within Europe.

(2) Start a concerted action to increase the recognition of both the needs and the potentials of SIM skilled personnel for the strategic development of industrial companies.

(3) Join the efforts of (1) and (2) within a digitally backed SIM Semantic Social Network (SIM-SSN).

(4) Boost the development, piloting, publishing and promotion of teaching concepts, offers and OER teaching materials using and enhancing modern digitally backed infrastructures.

References:

- Runhua Tan (2017). TRIZ, the development and dissemination in industries in China. Proceedings TRIZCON 2017.
- IHK Heilbronn (2020). Letter of Intent. https://wumm-project.github.io/Erasmus/LOI-IHK-Heilbronn.pdf

I.1.2 Please explain how the project proposal fits into the objectives of the participating organisations and European policies in the fields of education and training. (Recommended limit 3000 characters) – 3306 characters

The full partners are both HEI and industrial companies in which the strategic importance of SIM has already been recognised and structurally anchored. They *expect a significant boost* to their own activities through the strengthening of appropriate structures by leveraging synergies and consolidating overarching structures at European level, in particular *attracting additional partners* to the network.

A special role is played by Leipzig University, at which it is planned to set up and further expand yet rudimentary existing SIM training structures, not only at the university itself, but also at other HEI locations in the region. With a *Central German SIM Competence Centre*, the structural foundation for these plans does already exist. Even if this regional development project cannot be a focal point of this application, cross-fertilisation is to be expected, especially if its experiences are fixed as best practices and made available throughout Europe as part of our dissemination strategy (see Story 7.3).

Our project contributes to the modernisation of Europe's higher education systems "*tackling future skills mismatches and promoting excellence in skills development*" as already explained in section 1.1.1.

One of the project partners (LUT) has already initiated an ERASMUS+ CBHE project (duration 2017–2020), in which partners outside the EU are supported in building up SIM training capacities. The common infrastructure of teaching materials and digital tools, which is currently being developed within that project, will also be integrated

into our project structures. A close cooperation with ETRIA is also planned, especially since three project members – Denis Cavallucci, Pavel Livotov and Stelian Brad – have been elected to the current ETRIA Executive Board. Thus our KA project is a further building block in the development, expansion and networking of European SIM training structures. This shows that additional emphasis is placed on making use of existing initiatives, and on the intelligent use of digital tools as recommended in the 2013 EU Communication on Opening Up Education .

Our project intends to achieve the following KA aims:

- stimulate entrepreneurship and entrepreneurial skills of higher education teaching staff and company staff;
- facilitate the exchange, flow and co-creation of knowledge

and acts towards developing SIM skills as part of modern *entrepreneurial mind-set and skills.*

- SIM skills are transversal skills whose training for application in our approach should be achieved through higher education programmes developed in cooperation with enterprises aiming at strengthening employability, creativity and new professional paths.
- SIM skills provide students, researchers, staff and educators with the knowledge, skills and motivation to engage in entrepreneurial activities in a variety of settings.
- Our tools, concepts and interrelations to enterprise structures open up new learning opportunities through the practical application of entrepreneurial skills. There is a large number of success stories of our partners in which the further development of modern SIM approaches has not only led to successful graduations, but also to start-ups in which these new approaches have been further developed into successful industrially viable concepts.

I.1.3 Please explain how the expected results, outputs and outcomes will meet the identified needs. (Recommended limit 1500 characters)

Main output:

(1) Digital map of European SIM offers with clear semantic RDF-descriptions based on a coordinated ontology of educational offers.
(2) Establishment of a SIM-SSN with local nodes to accompany the further operational development of the SIM service structures as well as the networking of the SIM actors within and beyond the project partners.
(3) Development, piloting, publishing and promotion of teaching concepts, offers and OER teaching materials using and enhancing modern digitally backed infrastructures.

Outcome:

An important role for the success of the project plays the category of *additional partners* both from HEI and industry

(1) to use and disseminate the results of the project,
(2) to generate additional input and
(3) to focus on sustainability of the network beyond the end of the project starting from the first day.

This are core areas and key practices to advance the practical dissemination of SIM skills in Europe.

(986 characters)

I.2. Analysis of the subject area (current state of the art) and innovative character

Please explain how the needs analysis has been carried out. Please indicate what the project is offering that is new and different. Please also indicate what the main innovative elements of the method(s), result(s), approach(es), etc. are. (Recommended limit 3000 characters)

The **needs analysis** is based on a number of studies and analyses

- The survey (Belski et al. 2018) where 9 authors (including full partners Livotov and Cavallucci) explain the situation of academic curricula in the area under consideration.
- The survey (Bušov 2016) where the authors explain TRIZ teaching needs and experience at several technical universities in the Czech Republic since 1996 (Brno, Prague, Liberec, Pilsen, Ostrava, Zilina, Kosice). See also (Bušov 2019)
- The analysis (Cavallucci 2017) that provides a comprehensive overview of various TRIZ-related research efforts in France, covers various areas from research, education, and industry and answers questions about both the successes and failures of TRIZ over the past 20 years.
- The worldwide attention that SIM also receives in the management area, e.g., (Peace 2012), (WEF 2016).
- Recent talks with experts at the international conferences TRIZ Developer Summit (June 2019, Minsk), TRIZ-Fest (September 2019, Heilbronn), TRIZ Future (October 2019, Marrakesh).

In an analysis in preparation for this application, Schaeffler AG emphasizes: “Systematic innovation methodologies

are applied in industrial practice to support and drive innovation both in problem understanding and analysis as well as creative development of innovative solutions. As such these methods are crucial for the innovativeness and long-term competitiveness of European companies. The employees and their knowledge are the most significant resource of a company and systematic innovation methodologies can help to make most effective and efficient use of these resources for innovation, in particular in times, when technology life-cycles become shorter and shorter."

The project focuses on building an infrastructure supported by **new digital and semantic tools** to further increase the visibility of the topic.

At the same time, this is an **essential innovative approach**, which is practically supported by concrete methodical approaches of innovative teaching (MOOCs, training according to the flipped classroom method, training with practical parts in simulation structures) as well as the SIM-SSN.

References:

- Igor Belski et al. (2018) Sustainable Education in Inventive Problem Solving with TRIZ and Knowledge-Based Innovation at Universities. Proceedings of the 8th International TRIZ Future Conference, TFC 2018, Strasbourg, France. TFC Professional Papers, https://tfc2018.fr/professional-papers.
- Bohuslav Bušov (2016). TRIZ already 35 years in the Czech Republic. Proceedings of the 8th International TRIZ Future Conference, TFC 2015, Strasbourg, France. Elsevier B.V. Procedia CIRP 39 (2016), 216–220. DOI: 10.1016/j.procir.2016.01.191.
- Bohuslav Bušov (2019). Result of interviewing about 2000 students at BUT. https://wumm-project.github.io/Erasmus/Busov-20191218-Survey.pdf
- Denis Cavallucci et al. (2017). TRIZ – The Theory of Inventive Problem Solving. Current Research and Trends in French Academic Institutions. Springer International Publishing. DOI 10.1007/978-3-319-56593-4.
- Natalie Peace (2012). Why Most Brainstorming Sessions Are Useless. forbes.com, 2012-04-09.
- World Economic Forum (2016). The Future of Jobs. Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution. January 2016

(1994 characters)

I.3. Aims and objectives

I.3.1 Please define the specific aims and objectives of the project and how these will address the problems and challenges identified in sections I.1 and I.2. Also indicate how the project will contribute to achieve the objectives of the Knowledge Alliances action. (Recommended limit 3000 characters)

The **aims of the project** formulated in the Summary 0.1 require efforts in two basic directions.

Focus A. A first focus of the project is the establishment of a reliable structural and processual organization of the network of the participating HEI (full and additional partners) on a conceptual, content and organizational level supported by modern semantic technology.

Focus B. A second focus of the project is on raising the awareness of more EU companies of the potential of SIM for their strategic development, particularly those in the manufacturing sector, to win them to join the network of companies as additional partners, and to set up a strong cooperation with the HEI network in focus A.

Thus the project has **two main orientations**, a structural and a content related one.

Structurally, the two networks are to be established or further strengthened and interconnected building up the supporting digital infrastructure. In particular, this relates to aims and work of ETRIA, the European TRIZ organization, in whose foundation and development representatives of project partners (Cavallucci, Livotov, Brad) were and are significantly involved.

In **terms of content**, the main objectives of the project are

(a) exchange, joint development and further elaboration of relevant teaching materials as Open Educational Resources,

(b) development and expansion of online-based training structures based on existing case collections in the form of online courses and in transregional platforms,

(c) close integration of student training with practical challenges in this area by establishing appropriate stable contacts with industrial companies and

(d) establishment and expansion of academically anchored further education structures, through which this innovation potential can also be effective in the SME area.

The relation to the problems and challenges identified in sections I.1 and I.2 is obvious.

The project **supports the objective**

- Developing entrepreneurial mind-set and skills

of the Knowledge Alliances action in the three dimensions listed in the Programme Guide p. 133-34.

(1941 characters)

I.3.2 Please explain the contribution of higher education institutions to the project and how they will benefit from the project in the short and long term. (Recommended limit 1500 characters)

The HEI full partners (the special role of the University of Leipzig has already been explained in point 1.1.2) already bring extensive, but also differing experience in the field of SIM teaching, since different teaching strategies and concepts have to be used in the various HEI forms. The **short-term benefits** result from the intensive theoretical (WP 3) and practical (WP 4) exchange on concepts and teaching methods. The **long-term benefits** result from the gradual development of a common infrastructure of teaching and learning materials (especially good use case examples) as well as the shared use of learning platforms.

While among the full partners the mutual learning from each other is in the foreground, the **additional partners** to be acquired in the course of the project already have access to a partially developed infrastructure in which they can participate not only as users, but also as contributors.

(918 characters)

I.3.3 Please explain the contribution of enterprises to the project and how they will benefit from the project in the short and long term. Please refer to the nature/ field of their economic activity. (Recommended limit 1500 characters)

There are two types of business partners contributing to the project – industrial companies with intra company organized training of engineers in the targeted skills (Schaeffler, Arxia) and consulting companies (Jantschgi C&R, Target Invention) that organize inter company consultancy and trainings in order to cover the broadest possible range of industrial applications of these methodologies and to focus on the most important areas of application both in the practical application of such methodologies and in company training.

The enterprises will

- contribute in shaping the curricula,
- provide useful use cases
- and in the large run also provide practices and support in graduation in their companies.

Their benefits are:

- Premium access to graduates skilled in that area.
- Leading position in an ongoing process of shaping soft skills in human resources important for the future of companies at large.

A special role in this context play experts from partner countries with their extensive experience in the Asian market and profound knowledge of the TRIZ roots of today's more comprehensive SIM approaches, see point 7. Engaging these high-certified TRIZ experts with the project opens an additional perspective to the heterogeneous international developments in the field of SIM, in particular to the processes around the international TRIZ association MATRIZ.

(1367 characters)

With ETRIA, a Europe-wide forum already exists, which is mainly focused on the coordination of top-class SIM research. Several of the leading heads of our project are also intensively involved with ETRIA. ETRIA is thus an important platform for expanding the network, especially into the academic field. This is a first component of an expansion strategy. A second component of an expansion strategy is aimed at companies in the HEI partner environment. All HEI partners have their own industry contacts and also own small companies around. A third component of an expansion strategy relies on multiplier effects between industrial companies themselves or the inclusion of chamber structures in the dissemination, as offered by the CCI Heilbronn in its LoI.

The focus of the expansion strategy is on contacts in the industrial sector, whereby a further distinction must be made between companies from the manufacturing sector as *users of SIM*, which are more interested in the direct qualification of personnel, and companies from the consulting and training sector as *providers of SIM as a service*, that benefit more from "train the trainers" concepts.

Appropriate concepts for reaching the target groups would first have to be developed within the project and then rolled out.

I.4. European added value

Please describe the benefits of, and need for, European cooperation. Please also describe why the results cannot be achieved through cooperation at national, regional or local level. (Recommended limit 3000 characters)

The added value for the EU lies in the consolidation of training activities and capacities in the area of cross-sectional skills, which are becoming more and more important in an increasingly technological world. SIM encompasses skills

- in the field of modelling complex issues,
- in the field of analysing contradictory requirements ("the tea should be hot so that it tastes good, and at the same time cold so that you don't burn your fingers"),
- in the field of resolving contradictory requirements (not "lukewarm tea", but the implementation of a separation principle – the invention of the tea glass with handle),

using established methodological principles and a wealth of experience from inventive activities in a systematic way.

To understand the European dimension, the motto *think globally, act locally* has to be applied. The *practical* establishment of such structures *must* take place at local level, as it is planned for the Leipzig region within the project. However, the analysis, consolidation and use of experience should definitely include the diversity of cultural, linguistic and political contexts in the European Economic Area. An essential principle of the SIM is the identification of unity in diversity in the course of analysis and the reconstruction of diversity from this unity in practical action.

(1289 characters)

PART II. Quality of the project design and implementation

II.1. Methodology

Please explain the strategy that will be adopted by the consortium to address the needs identified; also describe the methodology proposed for implementing the proposed Work Packages/activities and for achieving the expected objectives (including major milestones and contributors, how the different Work Packages and produced outputs will be inter-connected/articulated, measurable indicators, etc.). (Recommended limit 3000 characters)

The project organization follows the **SCRUM methodology** for agile approaches. Since the activity-centered design of the work packages (WP) requested in the call is helpful to keep the project activities in view in their entire breadth, but at the same time does not sufficiently reflect the cross-activity character of important project goals, we use the instrument of **SRCUM Epics** to transform the central goals of the project into practical action. The project centers around the following epics:

Epic E1: SIM-SSN. Plan, design, implement, run and improve a semantically supported decentralized digital infrastructure, the **SIM Semantic Social Network**.

Epic E2: Development of courses and teaching materials. We define three course projects be different HEI partners that will be developed, piloted, published, evaluated and promoted within the project.

Epic E3: Extend existing digital tools. This epic addresses digital tools for application and teaching SIM that are used and developed by three HEI partners and Target Invention. The epic centers around use, collect requirements, redesign, evaluate, promote these tools and cooperation between partners.

Epic E4: Development of a semantically based use case collection as OER. Use cases is the core of almost all concepts teaching SIM to give not only theoretical advice but also practical insight. Hence use case collections of different quality exist at all locations where SIM is taught. The aim of this epic is to compile a common use case database as a first class OER to be maintained cooperatively.

Epic E5: Enlarging the Network. The partners currently involved in the project as full partners are only a small part of the potential that already exists or can be activated to spread SIM skills around Europe. The KA initiative is mainly based on HEI structures and brings together a number of HEI where longer traditions in SIM teaching already exist. A strong emphasis of the KA is to activate *additional partners* and integrate them into the network pursuing different strategies and approaches, which are bundled in this epic.

In the SCRUM methodology, such epics determine the basic direction of the project, which will then be refined step by step in the *Project Backlog* into *Stories*, which in turn will be prioritized and transferred to the respective *Sprint Backlog*. The epics are cross-WP objectives for which interconnected stories are defined in the individual WPs, in which content aspects are linked to the activity-centered orientation of the WP to form a uniform project logic. We use the term *SCRUM Story* for what is referred to as a *task* in the call, to avoid terminological confusion here, as *SCRUM Tasks* are more detailed structuring units.

A 18-page document entitled *Work Packages and Budget Allocation* was produced in preparation for the project application in order to elaborate this project logic in detail and break it down to the specific requirements of the call

for proposals. This document will be updated as *Project Plan* during the implementation of the project in accordance with the agile process methodology.

The project is led by the HEI partners, who also took the initiative for this application. Accordingly, the WP leads are divided between these partners and Jantschgi C&R as an important link to the industrial partners. For each WP, outputs and outcomes are defined to measure the success of the project.

Priority A of the project is the establishment of a reliable structural and processual organization of the network of the participating HEI (full and additional partners) on a conceptual, content and organizational level.

This is the content of the WP 1–4. WP 1 and 2 are concerned with the analysis of the current situation, that has to be structured and consolidated using RDF based semantic technologies as a first result. This data serves as basis for a decentralised open web infrastructure SIM-SSN that has to be designed as a second outcome of WP 2. This web infrastructure is easy extendible and serves as basis for a permanent vivid update process of the data as a core rquirement for a sustainable and inventive digitally backed infrastructure for the project and beyond it.

The work is prepared by WP 1 in the pre-application phase, which will be mainly worked out until 11/2020 and discussed on the planning meeting P1. The deliverable of this WP 1 will be consolidated afterwards until P2. The continuation of this work and the further consolidation of the results from WP 1 is planned in WP 2.

WP 3 and 4 concentrate on curricular development and harmonisation and development, piloting, publishing and promotion of teaching concepts, offers and OER teaching materials. WP 3 is the **core activity for priority A**. Since focus points and methodology seriously differ from location to location, the main part of WP 4 is planned as *mobility activity* "teach the teacher" to train the partners in 6 training units at 6 different HEI locations by one of the partners as trainer according to the teaching methods used on that site.

Note the strong interplay with the dissemination package WP 7 for both setting up the SIM-SSN tools and the curricular development activities.

Priority B. The full partner companies participate with own tasks both in the qualification of teaching activities and materials in WP 3 and 4 (provision of use cases and internship opportunities) and in QA measures in WP 8 (assessment of concepts). WP 5 centers on establishing further contacts in the business world, with particular emphasis on best practice experiences and the design of contractual relationships between HEI and companies thus establishing **a dedicated subnetwork for companies** to address their specific issues.

As explained already in section 1.1.1 it has shown that, unlike in Asia, European industrial companies do still insufficiently recognise the strategic importance of skills in SIM, in particular for engineering and technical staff and in the middle management. The **core activity** of this part of the project is on raising the awareness of other EU companies, particularly those in the manufacturing sector, and to convince them to join the network as *additional partners*.

The project is designed in such a way that the full partners form the core of a network that is to be expanded in the course of the project by *additional partners* from both the HEI area and the area of industrial companies. These partners are both involved in the operational work and invited to the project meetings and milestones. Participation in these measures is to be secured by these additional partners by own resources, which means that the transition from project financing to self-financing of network activities starts already during the project period. This is an essential moment to ensure the sustainability of the network and its work beyond the end of the project.

Both networks meet in the evaluation process of the teaching activities within the Project Meetings that combine every 6 months a WP 4 activity with Sprint Review and Sprint Retrospective. The accompanying QA activities at the PM are prepared within WP 8.

(3717 characters)

II.2. Overall project management

Please explain how the consortium will be coordinated and indicate the overall project management arrangements. You should also describe the division of tasks between the partners and the allocation of resources for each activity. (Recommended limit 5000 characters)

The project organization is based on the **SCRUM methodology** as an agile process model. The work is divided into **6 sprints of about 6 months each**. Sprint Planning, Sprint Review and Sprint Retrospective will take place at multi-day project meetings P1 to P7 according to the SCRUM methodology that are combined with a WP 4 mobility activity.

Project meetings with an even number have the character of a review, where the operational status of the work is analysed in more detail and deliverables in advanced stage are presented and discussed. Project meetings with an odd number are planned as milestones at which essential deliverables are finally confirmed.

The different WP are led by different HEI partners that are also responsible for the project management of that WP.

The WP definitions correspond to SCRUM Epics, which are broken down into Stories and those into Tasks. The **Project Plan** defines an initial tailoring of Tasks, including an associated distribution of funds among the partners. Required project adjustments, which are more likely to be necessary in view of the applied agile methodology, are coordinated at the Project Meetings according to the SCRUM methodology and the Project Plan is updated accordingly.

The Project Plan is the coordinated management instrument, where also the relevant deliverables including responsibilities are fixed. **The leaders of the individual WP form the closer project management.**

(1428 characters)

II.3. Quality assurance, evaluation and monitoring

Please define the specific quality measures to be put in place, as well as indicators foreseen to verify the outcomes of the project. Explain which mechanisms you intend to use to ensure the monitoring and evaluation of the project, its deliverables, results and outcomes. (Recommended limit 3000 characters)

The central management instruments are the Project Plan to be decided at the beginning of the project and the responsibility by the leads of the packages. In the Project Plan also measures are defined to monitor the success of the project.

The QA follows SCRUM principles, the evaluation and alignment of the work status is done on the project meetings, the corresponding analytical preparations are specified as tasks in WP 8.

(427 characters)

II.4. Recognition and validation

If appropriate to the type of project activities, please explain the approaches that are or will be used for the validation and recognition of learning outcomes, in line with the European transparency and recognition tools and principles. (Recommended limit 1500 characters)

In our project learning outcomes play a role at most within the activity “teach the teachers” in WP 4. However, since the concept follows academic principles and rather amounts to an evaluation of the respective teaching concepts, which is already part of other project activities, a direct analysis of learning outcomes in the project is not required.

II.5. Budget and cost-effectiveness

Please describe the measures adopted to ensure that the proposed results and objectives will be achieved in the most cost-effective way and in time. Explain the principles of budget allocation between the partners. Indicate the arrangements adopted for financial management. (Recommended limit 3000 characters)

The allocation of the budgets was initially based on a percentage key according to the importance of the individual work packages as Epics of the project.

In a second step, stories and tasks were determined, the tasks were assigned to individual partners, and the resources of the individual packages were distributed to these tasks. This also resulted in the allocation of project resources to the individual partners.

PART III. Quality of the partnership, the team and the cooperation arrangements

III.1. Knowledge Alliances: composition of the consortium

Please mark the type of organisations which make up the consortium (please make sure that associated partners are also indicated). Please choose the right category for each partner and ensure that the composition fulfils the eligibility criteria. Please use the same numbering both in the eForm and in the Excel budget table. **IMPORTANT:** *If your consortium includes any affiliated entities, the total requested grant of the partner and its Affiliated Entity should be reported in the section B.4 (Grant request) of the eForm*

NB: Please note that ticking one of the 3 columns under the key category 'Enterprises' means that, in line with the Erasmus+ Programme Guide, the organisation(s) concerned is/are undertakings actually engaged ***in an economic activity*** *and* ***contributing as such*** *to the proposed project.*

Organisations (please use the same numbering both in the eForm and in the Excel budget table)			**Higher Education Institution (HEI)**	**Enterprises**			**Other organisation types**									
Nr	**Partner Acronym**	**APP (applicant) or PAR (partner) or AE (Affiliated Entity) or AssPAR (associated partner)**	HEI (tertiary level - ECHE holder if in a Pro-gramme Country)	Small and medium sized enterprise	Large enter-prise	Social enter-prise	EU-wide network	Social partner or other represen-tative of working life[1]	Research Institute / Centre	Non-govern-mental organisa-tion/ asso-ciation	School/ Institute/ Educatio -nal centre – Vocatio-nal training	School/ Institute/ Educatio -nal centre – Adult educa-tion	National, regional, local public body	Accredi-tation, certifica-tion or qualifica-tion body	Counsel-ling body	Interna-tional organi-sation under public law
1	**ULEI**	**APP**	**HEI**													
2	**INSA**	**PAR**	**HEI**													
3	**HSO**	**PAR**	**HEI**													
4	**UTC**	**PAR**	**HEI**													
5	**LUT**	**PAR**	**HEI**													
6	**Schaeffler**	**PAR**			**X**											
7	**Arxia**	**PAR**		**X**												

1 E.g. chambers of commerce, trade union, intermediary, sectorial representation, etc.

Organisations (please use the same numbering both in the eForm and in the Excel budget table)			Higher Education Institution (HEI)	Enterprises			Other organisation types									
Nr	**Partner Acronym**	**APP (applicant) or PAR (partner) or AE (Affiliated Entity) or AssPAR (associated partner)**	HEI (tertiary level - ECHE holder if in a Pro-gramme Country)	Small and medium sized enterprise	Large enter-prise	Social enter-prise	EU-wide network	Social partner or other represen-tative of working life	Research Institute / Centre	Non-govern-mental organisa-tion/ asso-ciation	School/ Institute/ Educatio -nal centre – Vocatio-nal training	School/ Institute/ Educatio -nal centre – Adult educa-tion	National, regional, local public body	Accredi-tation, certifica-tion or qualifica-tion body	Counsel-ling body	Interna-tional organi-sation under public law
8	**TPlast**	**PAR**		**X**												
9	**Jantschgi**	**PAR**		**X**												
10	**TI Minsk**	**PAR**		**X**												

Does your consortium include any affiliated entities (please choose YES or NO)? If yes, please fill the information in the Annex of this document.

In accordance with Art. 122 of the Financial Regulation. The following can be considered affiliated entities:

- legal entities having a legal or capital link with beneficiaries; this link is neither limited to the action nor established for the sole purpose of its implementation.
- several entities which satisfy the criteria for being awarded a grant and together form one entity which may be treated as the sole beneficiary, including where the entity is specifically established for the purpose of implementing the action.

The affiliated entities must comply with the eligibility and non-exclusion criteria, and where applicable also with the selection criteria applying to applicants.

☐ **YES**
☒ **NO**

III.2. Rationale for setting-up the partnership

Please explain why the partners are best suited to participate in this European project. Describe skills, expertise and competences within the partnership directly relating to the planned project activities. (Recommended limit 3000 characters)

The HEI partners INSA Strasbourg, HS Offenburg, LUT Lappeenranta and UTC Cluj-Napoca are of involved in the field of SIM training already for many years. The partners represent different types of HEI – INSA Strasbourg is a member of the French INSA university network and is a strong research institution with focus on the education of young French engineers, HSO as a University of Applied Studies is an HEI with a strong teaching component, LUT a technology university with a high international focus and UTC a young technical university founded in 2011 from various predecessor institutions yet elaborating its profile.

Leipzig University as applicant plays a special role. Founded in 1409, the university is one of the oldest continuously active universities in Germany. Today it is a research-strong university of general orientation with a clear claim to leadership among the regional HEI. It thus offers the opportunity to combine engineering and business management education with a network of interdisciplinary connections, also in non-technical areas, and thus to add its own touch to SIM training. On the other hand, the university is still in the process of establishing SIM training. The initiative for this comes from an interdisciplinary team of institutions at three faculties – Medical Engineering, Computer Science and Environmental Engineering – which not only wants to promote the establishment and expansion of appropriate educational structures at the Leipzig University, but also to provide corresponding impulses for other regional HEI.

The project proposal has three priorities

(A) Establishment of networking structures among the HEI partners,
(B) Establishment of networking structures among the industirial company partners,
(C) Crosslinking the networking structures (A) and (B).

(A) Partners are HEIs of different orientations and with different experiences in the field of SIM teaching.

Leipzig University as applicant plays a special role – it plans to strengthen its curricular structures and yet little experience in teaching in this area. Moreover a *Competence Center SIM* is being set up in order to establish appropriate training structures in the region "Mitteldeutschland", not only at Leipzig University.

In addition to the coordination and systematization of corresponding teaching experiences of the HEI partners, these experiences are basic for the *practical* development of corresponding regional structures and should be developed as a *best practice example* for other HEI locations (additional partners), which also plan to develop corresponding teaching capacities.

(B) In the project preparation the perception of the importance of corresponding skills for the strategic development of companies showed a clear east-west divide in Europe. The East European HEI partners in Brno and Cluj have significantly better relationships with companies with a corresponding focus. We also see potential in the legacy of the GDR inventor schools as a research focus at Leipzig University. With Schaeffler AG, a large European industrial partner joined the project, who has already recognized the importance of SIM skills for its strategic development.

The industrial structures in that area consist of companies that use SIM skills, as well as consulting and training companies that offer consultancy services and teach SIM skills. The partners from Belarus and Russia are representatives of this second group. In core Europe, these services are partly provided by the HEI partners (Brno, Strasbourg, Offenburg, Cluj) and partly by SMEs in the consulting area. In the latter area, greater efforts are required to convince such companies as additional partners, at least in the course of the project.

(C) More precise forms of such crosslinking can only be developed in the course of the project implementation. With our agile approach based on SCRUM methodology, the necessary organizational requirements using proven principles are set up.

(2604 characters)

III.3. Description of the consortium members

This section III.3 must be completed for each organisation participating in the project (applicant, partners and affiliated entities). Please use the same numbering as in the application e Form. Please note that the applicant should be P1.

III.3.1. Partner number – P1 – (Leipzig University – ULEI*)*

Organisation name	Country
Leipzig University	**Germany**

III.3.1.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

Leipzig University (UL) was founded in 1409 and has built up on a "tradition of crossing boundaries" – by no coincidence its declared leitmotif – ever since. With 14 Faculties and a wide variety of subjects, UL is home to more than 30.000 students. It is engaged in academic cooperation worldwide, sending out and welcoming altogether over 1.500 exchange students each year. 3.500 students with foreign nationality have chosen Leipzig University as the place to achieve their degree. UL has its roots in the cosmopolitan city of Leipzig and is actively involved in the international academic community. One of the primary tasks for the future is further strategic development of internationalisation of UL at all levels. To this, the University has fully and explicitly committed in its University Development Plan 2025. Achieving internationally recognised excellence in its diverse subjects requires supportive structures. Here, too, UL is pursuing the goal of "crossing" even more boundaries (https://www.uni-leipzig.de/en/).

UL is a **member of the German U15**, an association of fifteen large research-strong and medically leading universities in Germany with a full range of subjects and without profiling engineering sciences. The aim of the network is "to ensure that the research-strong full universities present their interests in a way that reflects their importance for the science system". The association has been a member of the Global Network of Research Universities since November 2014.

The strengthening of SIM training at the university is being promoted from an interdisciplinary context by three divisions (IIRM, ICCAS, Software Systems) in three different faculties. For these actors, the commitment to increased training efforts in this field results from their manifold industrial contacts in joint projects promoted by various project sponsors.

The **Institute for Infrastructure and Resources Management (IIRM)** was established in early 2005. Founding Members were the Chairs for Environmental Technologies and Environmental Management, of Traffic Systems Management, of Brownfield Remediation and Management, and of Urban Water Management. Its focus of IIRM is directed to an integrated approach for sustainable planning, operating and managing technical infrastructure systems for energy, for water, waste water and waste services. Specific issues are mutual effects of infrastructure provision and of the economic as well as the demographic evolutions, the development of planning and management instruments as well as technology developments in selected cases.

The **Innovation Center Computer Assisted Surgery (ICCAS)** develops digital technologies for future clinical use. It is the interface between research and application, promoting interdisciplinary collaboration between medical professionals, computer scientists, and engineers. Inside the institute's own research operating theater, translations of novel medical technologies and therapeutic procedures are evaluated, based on the needs of clinicians. The research center is a well-established and ISO 13485-certified partner for medical device companies. The research results facilitate the work of clinical personnel, increase treatment safety and lead to more economical work processes in the operating theater. ICCAS presents its new technologies to the public and specialist audiences at annual events.

Since 2002 until the retirement of its former chair Klaus-Peter Fähnrich 2016 the **Division of Software Systems** hosted several strong research groups with at times more than 50 project members and close industry contacts. One of these research groups – the AKSW group (Agile Knowledge Management and Semantic Web) set up by young scientists – became one of the strongest research groups with Europe-wide visibility at the Institute of Computer Science. Over the years it has developed into one of the leading groups in Europe in the field of Semantic Web technologies. Today, members of this group hold leading positions at the TIB Hannover (Sören Auer), at a Fraunhofer Center in Dresden (Jens Lehmann) or are professors in Bonn and Paderborn. This still available expertise is an essential basis for the implementation work on a SIM-SSN planned in the project.

III.3.1.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

Unlike the other HEI partners, UL is only at the beginning of a comprehensive implementation of SIM training structures. Apart from conceptual questions, for which we expect strong support from the KA structures to be

established, structural questions also need to be clarified. Experience shows that this is difficult in a university with a discipline-specific structure from the interdisciplinary context of the key partners involved. Here, too, we expect that the European authority of the KA to be set up will help.

In a wider context, we can build on the interplay between the university and the InfAI (Institute for Applied Computer Science) as an affiliated university institute. Since mid-2018, we started the WUMM project to establish regional SIM structures. These efforts are currently being bundled in a *Central German SIM Competence Centre* at InfAI.

In addition to our experience in managing European projects, the Leipzig team's main contribution is in the information technology area of setting up and operating the SIM-SSN as a distributed socio-technical, semantically based digital project infrastructure to support the KA's key activities, which are described in more detail in the epics E2 to E5.

III.3.1.3. Operational/Technical capacity: Skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

NB: Please note that the first key staff to be listed under **P1** should be the Project coordinator (also called 'Project manager' and 'Contact person' in section A.2 of the eForm). The coordinator will have the responsibility to ensure that the project is implemented in accordance with the selected application. Its coordination will include the following duties:
- be the single point of contact of the Agency for all communications on the project;
- coordinate the work of the consortium in line with the work plan;
- monitor that the action is implemented in accordance with the EU grant agreement.

Therefore, this person must have all the necessary professional experience and competencies to carry out the coordination of the project. Please provide detailed information for this person.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Thomas Neumuth	Prof. Thomas Neumuth is engineer and computer scientist. His research interests are focused on the fields of model-based medicine, smart biomedical technology, and situation-aware medical information systems. He is deputy executive director of the Innovation Center Computer Assisted Surgery (ICCAS) at the medical school of the UL and manages technology developments of the ICCAS research groups in the field of model-based medicine: Model-based Automation and Integration (MAI), Digital Patient and Process Models (DPM), Life Support Systems (LSS) and Intraoperative Multimodal Imaging (IMI). He is PI of large national flagship projects such as MOMENTUM (Mobile Medical Technology for Emergency Response, project volume 6.9 Mio €, 2019–2022) or MPM (Models for Personalized Medicine, project volume 5.2 Mio €, 2020–2023). He finished studies in Electrical Engineering Management (2001), Automation Engineering (2005), doctorate in Medical Engineering (2009), and habilitation in Medical Informatics (2012). Prof. Neumuth holds a MATRIZ Level 3 degree and teaches systematic innovation methods since 2012 for engineering and computer science students in Leipzig. **Selected Publications** Thurnes CM, …, Neumuth T. One Day at the Museum – Using a Museum as Resource for Teaching and Learning TRIZ. The TRIZ Journal, 2015, 1–8. Maier-Hein L, …, Neumuth T, et al. Surgical Data Science: Enabling Next-Generation Surgery. Nature Biomedical Engineering 1 (2017): 691–696. Neumuth T, Franke S. Clear oxygen-level forecasts during anaesthesia – Machine learning can predict and help interpret the risk of hypoxemia. Nature Biomedical Engineering 2 (2018): 715–716. Full publication list https://scholar.google.de/citations?user=g0rM9IkAAAAJ
Hans-Gert Gräbe	Prof. Hans-Gert Gräbe is an adjunct professor of computer science at the chair of Software Systems, Faculty of Mathematics and Computer Science at UL. He earned a Diploma on mathematics (1979), was assistant and senior assistant at the University of Halle/S. and at the Pedagogical University Erfurt, obtained his doctorate

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	(1983) and habilitated (1988) on algebra, computer algebra and combinatorics. Since 1990 he is a staff member at the Institute of Computer Science at UL, since 2003 as adjunct professor. The chair of Software Systems was formerly (until 1996) a chair of Computer Algebra and later (2002–2016) a chair of Enterprise Information Systems. These changes in the name of the chair had a major impact on his research interests, which during the last 20 years increasingly shifted away from mathematical issues to management problems of complex software systems (software management, software quality management, component software), to theoretical and practical questions of the Semantic Web, and to interdisciplinary issues in the context of digital change, especially in teaching. Over 20 years he was leading the SymbolicData project directed towards building up and running a semantically based research data infrastructure for Computer Algebra. Within that project since 2013 a strong focus was on the development of concepts and tools of a CASN – a Computer Algebra Social Network – on a distributed semantically driven basis. In the field of interdisciplinary commitment, particular reference should be made to a teaching project that he and Ken Kleemann (philosophy) have been developing since 2011 in an environment that has been strongly influenced in a different direction by the Bologna Process. This teaching project offers an interdisciplinary academic discourse in the spirit of the old Philosophical Faculty (before the schism in Science and Humanities) and teaching at eye level already in bachelor courses. The material of the different years are openly available on the net in the spirit of open culture and have meanwhile developed into a collection of best practices where critical academic work and academic publishing on a lightweight basis can already be practised in bachelor courses. These experiences together with the emerging educational deficits at the institute in the direction of software technical and engineering skills of computer science students during the several years of vacancy of the chair led to a refocusing of his interests on the topic SIM. He organized a LIFIS conference on this topic in 2016 that reached the German TRIZ community. Since then, he concentrated his research on the legacy of the GDR schools of invention that is relevant to the SIM topic. In 2019, he started the WUMM project to transfer modern organizational experiences of open culture and Semantic Web technologies (in particular 20 years of experience within the SymbolicData Project, a semantic web project for the Computer Algebra Community) to the SIM community. With the establishment of a *Central German SIM Competence Center*, which has been pursued since the end of 2019, it was possible to generate regional attention for the SIM topic in other civil society structures within a short time. He has worked in the Oekonux project and the Rohrbacher Kreis and is a member of the board of the Leibniz Institute for Interdisciplinary Studies (LIFIS). The **Leibniz Institute for Interdisciplinary Studies (LIFIS)**, founded in 2002, initiates, organises and actively promotes – *nomen est omen* – the multidisciplinary dialogue not only within science, but also between science, economy and politics. The *Leibniz Conferences* and the online journal *LIFIS Online* are the two main means to turn the goal into production. With the *Leibniz Conferences* LIFIS tries to build bridges between science, economy and politics – on areas that are of essential importance for the future of our society. Leibniz Conferences aim at building a forum of mutual understanding, bridging between different disciplines and areas and stimulating productive cooperation. The Online Journal *LIFIS Online* addresses new ideas and problem solutions, that are initiated and advised within the Leibniz Conferences and other LIFIS activities, require further elaboration in forthcoming activities. *LIFIS Online* provides a forum for public information and discussion – without the time lag of conventional media. **Publications (selection):** Du, Y.; Gräbe, H.-G.; Kleemann K.P. Interdisziplinarität. Die Mühsal der Verständigung. (Interdisciplinarity. The difficulty of understanding) To appear in Proceedings DFG-Symposium „Digitalität in den Geisteswissenschaften“ 13.-15.02.2019 in Bayreuth. Gräbe, H.-G. 20 years SymbolicData. ACM Commun. Comput. Algebra 52, No. 3, 45-54

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	(2019). Gräbe, H.-G. The Contribution to TRIZ by the Inventor Schools in the GDR. Proceedings TRIZFest 2019 Heilbronn. Gräbe, H.-G. Наследие Движения Школ Изобретателей в ГДР и Развитие ТРИЗ. (Heritage of the Inventor School Movement in the GDR and TRIZ Development) Published in the Online Proceedings of the TRIZ Summit 2019 in Minsk. Gräbe, H.-G. The SymbolicData Project – Maturing the Computer Algebra Social Network Perspective. In: Computeralgebra-Rundbrief 59 (October 2016) Gräbe, H.-G. Semantic-aware fingerprints of symbolic research data. In: Greuel, Gert-Martin (ed.) et al., Mathematical software – ICMS 2016. Proceedings. Lecture Notes in Computer Science 9725, 411-418 (2016). See also https://scholar.google.de/citations?user=ynC3CsUAAAAJ
Sabine Lautenschläger	She earned a Dipl.-Ing. degree on Studies of Land Management and Use and Environmental Protection from Rostock University, Germany (2004), another graduation on Studies of Industrial Management at PrivateFernFachHochschule Darmstadt, Germany (2005) and a PhD (Dr.-Ing.) degree from Universität Leipzig, Germany (2015) She is a Senior Researcher at IIRM since 2005 and Managing Director of the InfraRes GmbH since 2017. **InfraRes GmbH** is a science-based consultancy in the areas of circular economy, energy and resources management. It is a spin-off from IIRM at Leipzig university, situated in Leipzig and Berlin and works with public and private actors on developing concepts within its areas of expertise. Additionally, it is closely working with governmental bodies on legal impact assessment with regards to those areas. **Participation in scientific research projects (selection):** Awaregio – Modular wastewater treatment processes for the reuse of wastewater, nutrients and energy as an opportunity for small and medium-sized enterprises (SME) – subproject: sustainability and economic efficiency 10/2016-09/2019, (Federal Ministry of Education and Research) Watermanagement 4.0 – Opportunities and challenges of the links between systems in water management (Wasser 4.0), 08/2017-03/2019, Federal Environment Agency E-Klär – Towards the energy-optimized wastewater treatment plant of the future – Development and model-based integration of innovative treatment technologies for transformation processes; sub-project 9. May 2015-Oct. 2017 (Federal Ministry of Education and Research) Analysis and Assessment of sustainibility and Eco-Efficiency of Small Treatment Plants and derived Improvement profiles and control instruments, 09/2013-03/2015, German Federal Environmental Foundation **Publications (selection):** Geyler, Stefan, Lautenschläger, Sabine, Seiler, Romy, Holländer, Robert (2018): Im Stufenkonzept integrierte Ansätze zur Berücksichtigung von Robustheit bei der Entscheidung (Integration of robustness criteria into the multi-stage-decision concept for transforming sewage treatment). In: Palmowski, L., Pinnekamp, J. (Ed.): Entwicklung und Integration innovativer Kläranlagentechnologien für den Transformationsprozess in Richtung Technikwende – E-Klär (Development and model-based integration of innovative treatment technologies for transformation processes). Abschlussbericht (final report). Lautenschläger, S., Laforet, L., Schimpke, J., Holländer, R., Töws, I., Böttger, S., Stich, G., Lange, A. (2016): Analyse und Bewertung der Nachhaltigkeit und Ökoeffizienz von Kleinkläranlagen mit Ableitung von Produktverbesserungen. Abschlussbericht über ein Forschungsprojekt, gefördert unter dem Az: 30289 von der Deutschen Bundesstiftung Umwelt. In: Studien zu Infrastruktur und Ressourcenmanagement, Band 7, Logos Verlag, Berlin. https://www.zenodo.org/record/228162. Geyler, S., Lautenschläger, S. (2015): Technische Konzepte und Optionen für die Wasserver- und Abwasserentsorgung, in: Gawel, E. (Hrsg.): Die Governance der Wasserinfrastruktur – Rahmenbedingungen, Herausforderungen und Optionen, Berlin:

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	Duncker & Humblot (im Erscheinen). Holländer, R; Lautenschläger, S.; Rüger, J.; Fälsch, M. (2013): Abwasserentgelte in Deutschland – Wie beeinflussen unterschiedliche Rahmenbedingungen die Kosten- und Entgeltstruktur der Abwasserbeseitigung?. Gutachten im Auftrag des Verbands kommunaler Unternehmen e.V. (VKU) (Hg.). Berlin: 2013. Fälsch, M.; Geyler, S.; Lautenschläger, S.; Holländer, R. (2010): Abbildung regionaler Unterschiede bei der Trinkwasserbereitstellung. In: InfrastrukturRecht. Energie-Verkehr-Abfall-Wasser. Nr. 11/12; November 2010. München und Frankfurt am Main: Verlag C.H.Beck. S. 284-287. Hillenbrand, T. et al. (2010): Demografischer Wandel als Herausforderung für die Sicherung und Entwicklung einer kosten- und ressourceneffizienten Abwasserinfrastruktur. Abschlussbericht zum Forschungsvorhaben im Auftrag des Umweltbundesamtes, UBA-Texte 36/2010.
Ken Pierre Kleemann	He was born in 1983. After he completed military service and an Internship as primary teacher in India, he studied Archeology, History of Byzantine Art and Theology at the Martin-Luther University Halle-Wittenberg. In 2006 he switched to the new Bachelorprograms and earned a degree in Social Science with a focus on Political Science. A Master degree in Philosophy and a current PhD Research followed at the University Leipzig. Since 2011 he works in an interdisciplinary research and teaching program of the department of computer science at Leipzig University and conducted numerous cooperation-project as AGIL-Couch with a focus on SCRUM methodology and Design Thinking. Besides this he managed projects for a computer service company and a record label and is active in various academic and civil-society organisations.

III.3.2. Partner number – P2 – (INSA Strasbourg – INSA*)*

Organisation name	Country
INSA Strasbourg	**France**

III.3.2.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

INSA Strasbourg is a public scientific, cultural and professional establishment (EPSCP). The School, whose origins go back to 1875, joined the INSA Group in 2003. A "Grande École" specializing in engineering and architecture under the control of the Ministry in charge of Higher Education and Research, its engineering courses are accredited by the engineering qualifications accreditation committee (CTI) while the architecture course is accredited by the cultural, scientific and technical committee of the Ministry of Culture.

INSA Strasbourg has a total of 2,015 students studying at its site on the Esplanade university campus, a stone's throw from the city center and at the heart of the European capital. Every year INSA Strasbourg awards diplomas to 320 engineers in different specialist fields as well as 50 architects.

Staff numbers counts 112 full-time teacher-researchers or lecturers and over 300 part-time or non-tenured staff, In constant contact with the industrial world they provide quality teaching that enables future graduates to quickly find jobs that correspond to their skills.

INSA Strasbourg has nearly a quarter of a century of experience in the development of tools for engineers within the framework of inventive activities. After initiating research, obtaining scientific results and transforming these into innovative approaches tested in companies, INSA has embarked on the computer development of collaborative platforms for inventive activity practices, both in terms of learning and expert practices for industry. The result today is an ecosystem of several complementary tools adapted to various inventive situations and various levels of mastery. Four tools are now put forward in this ecosystem: PICC (now owned by ExelOp); FINDER, PhysiSolve and SimplySolve.

III.3.2.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

INSA Strasbourg is acknowledged in Europe and moreover in France as one of the leading universities teaching TRIZ and researching aside TRIZ at the academical level. We have build back in 2002 our Advanced Master in Innovative Design which was a certified Advanced Master under the label „Conference des Grandes Ecoles". This master ran until 2012 successfully. We have also conducted several teaching the teachers sessions for high school teachers on the request of the French „Education Nationale". INSA has also built throughout the past 23 years trainings at all levels, from junior college to post-doctorate (and within life-long learning systems in France) related to TRIZ.

Within this Knowledge Alliance INSA's role will be focused primarily on providing means like computer platforms to teaching sessions. We started 3 years ago building the IDEAS Platform (Inventive Design lEArning System). We founded a start-up company „Time to Innovate" which now belongs to ExelOp, a Swiss company reselling a computer solution born in our research lab namely STEPS (Systematic Tool for Efficient Problem Solving). We built within our research decades an ontology (therefore a corpus architecture for our databases) useful to operate TRIZ tools, store and retrieve studies. Our researches conducted us to use AI (mostly Machine Learning, Deep Learning, Semantic web, Natural Language Processing, Case based Reasoning) and build intelligent tools (to scrap web-news, patent contents, Wikipedia website) for assisting Inventive Activities. This resulted in an ecosystem of tools (PICC, FINDER, PhysiSolve, SimplySolve, IDEAS) interoperable based on the same ontology.

Within this Knowledge Alliance we would like to:

1) Make INSA's ecosystem of SIM tools (PICC, FINDER, PhysiSolve, SimplySolve) operational throughout Europe.
2) Develop online course (tuto-like) for learning TRIZ using PICC, FINDER, PhysiSolve and SimplySolve.
3) Teach the teachers, teach to companies, run distant and multicultural teaching sessions using our web-platforms to disseminate them.

Within the framework of the project, we will develop, for each tool, an associated e-learning material allowing anyone to learn in autonomy how to use our tools. These elements of self-training should help us to integrate the courses developed within the framework of the Alliance and thus allow to share their use in our network in Europe.

III.3.2.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Denis Cavallucci	Prof. Cavallucci is currently leading a research team on Inventive Design, aiming at computing inventive activity using Artificial Intelligence and Design Theories Methods & Tools. The goal is to produce a new set of methods and tools for enterprises' R&D to switch over from quality era to innovation era. He was awarded by Japan TRIZ Society in 2012 for his research achievements, got an Innovation Award in 2011 by MBDA company for "noise reduction in missile systems at launching" and was nominated in 2017 as Honorary Professor of University of Jinan, China. He got an best paper award from IFIP in 2011 for the paper *Structuring knowledge use in Inventive Design* and is the author of the recent book *TRIZ – The Theory of Inventive Problem Solving. Current Research and Trends in French Academic Institutions* published at Springer 2017. He was a teacher in BS section in Plastic manufacturing and engineering (1989–1996), Associate Professor in Mechanical engineering (1996–2001) and is now a full professor in Engineering of Innovation at INSA (since 2001). With his original background in Industrial engineering and mechanics he teached at all levels from graduate to post graduate students in various engineering fields (mechanics, mechatronics, civil engineering, plastic manufacturing, computer science, electronics) over the past 30 years. **Selected publications** (from a total of 136 publications and 17 patents) Yan, Wei; Liu, H; Zanni-Merk, Cecilia; Cavallucci, Denis. IngeniousTRIZ: an automatic ontology-based system for solving inventive problems. Knowledge-Based Systems, 52–65, 2015, Elsevier. Souili, Achille; Cavallucci, Denis; Rousselot, François. Identifying and reformulating knowledge items to fit with the Inventive Design Method (IDM) model for a semantically-based patent mining. Procedia Engineering, 1130–1139, 2015, Elsevier. Fischer, Stéphanie; Oget, David; Cavallucci, Denis. The evaluation of creativity from the perspective of subject matter and training in higher education: Issues, constraints and limitations, Thinking Skills and Creativity, 123–135, 2016, Elsevier. Souili, Achille; Cavallucci, Denis; Rousselot, François. Natural Language Processing (NLP) – A Solution for Knowledge Extraction from Patent Unstructured Data. Procedia Engineering, 635–643, 2015, Elsevier. Millet, Charlyne; Oget, David; Cavallucci, Denis. Open the 'black box' creativity and innovation: a study of activities in R&D departments. Some prospects for engineering education. European Journal of Engineering Education, 1–25, 2016, Taylor & Francis. Zhang, Pei; Zanni-Merk, Cecilia; Cavallucci, Denis. Latent Semantic Indexing for Capitalizing Experience in Inventive Design. International Conference on Sustainable Design and Manufacturing, 37–47, 2017, Springer. Cavallucci, Denis; Weill, Roland D. Integrating Altshuller's development laws for technical systems into the design process. CIRP Annals on Manufacturing Technology, 115–120, 2001, Elsevier. Cavallucci, Denis; Khomenko, Nikolai. From TRIZ to OTSM-TRIZ: addressing complexity challenges in inventive design. International Journal of Product Development 4/1-2, 4–21, 2006, Interscience Publishers. Zanni-Merk, Cecilia; Cavallucci, Denis; Rousselot, François. An ontological basis for computer aided innovation. Computers in Industry, 563–574, 2009, Elsevier. Zanni-Merk, Cecilia; Cavallucci, Denis; Rousselot, François. Use of formal ontologies as

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	a foundation for inventive design studies", Computers in Industry, 323–336, 2011, Elsevier.
Amadou Coulibaly	
Sebastien Dubois	
Hicham Chibane	
Pei Zhang	

III.3.3. Partner number – P3 – (HS Offenburg – HSO*)*

Organisation name	Country
HS Offenburg	**Germany**

III.3.3.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

HOCHSCHULE OFFENBURG is an educational and research institution with a strong practical orientation. Today, the University forms a thriving community with over 4,500 students and 415 staff members (heads) on two campuses and offers Bachelor's and Master's degrees in four departments in the fields of Technology, Engineering, Business and Media. Close collaboration with the industrial companies, especially with the medium-size enterprises in the region, an international focus and contacts with numerous partner universities worldwide allowing application-oriented research, technology transfer, up-to-date laboratories and interdisciplinary expertise in various technological fields. Since 2013 the Faculty of Mechanical and Process Engineering as one of the largest departments of HSO offers courses in Innovative Design, New Product Development, and Systematic Inventive Problem Solving with the theory of inventive problem solving TRIZ in nine undergraduate Bachelor programs and six Master programs. Within the European Project IbD 'Intensified by Design' (2015-2018) within international consortium of 22 universities, research institutes and industrial companies, the HSO researchers of the Lab for Product and Process Innovation have developed the Advanced Innovation Design Approach (AIDA) for process engineering.

Design Approach (AIDA) is a holistic approach for enhancing innovative and competitive capability of industrial companies. In the research project "Innovation Process 4.0" run at the HSO Offenburg in co-operation with 10 German industrial companies in 2015-2019 a holistic approach for enhancing innovative and competitive capability of companies and the AIDA best practice innovation toolbox have been developed and applied in numerous industrial case studies. Additionally, HSO is an active member of the international academic fellowship "Educating the Edisons of the 21st Century - Embedding tools of the Theory of Inventive Problem Solving (TRIZ) into the engineering curriculum".

Website: www.hs-offenburg.de

III.3.3.2. Role of the organisation in the project

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

HSO's role will be focused primarily on

1) Further development and implementation of agile (rapid and efficient) systematic innovation tools for eco-innovation and eco-design especially in process engineering, combining the advantages of Knowledge-Based Engineering (KBE) methodology (e.g. Process Intensification), inventive tools of Knowledge-Based Innovation (KBI) and TRIZ theory, and main principles and best-practices of Eco-Design and Sustainable Manufacturing. The work will be focused on a) Definition of the eco-innovation process in the domain of process engineering, b) Adaptation of the Process Intensification databases for eco-innovation, c) Further development, optimization and computerization of the toolbox for the eco-innovation process, d) Application of the Eco-innovative tools for their validation through the industrial case studies.

2) Development of learning resources in systematic eco-innovation for dissemination of major outcomes to the current and next generation of engineers. Using its new developed method for enhancing innovative and competitive capability of companies, HSO will perform an industrial survey to identify and prioritize industry requirements and specifications on innovations competences and tools, especially in the early phase

III.3.3.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Pavel Livotov	He is a Professor at the Faculty of Mechanical and Process Engineering at Hochschule Offenburg (HSO), a seasoned inventor, scientist and innovation consultant. He is the Head of the Laboratory for Product and Process Innovation, author of more than 80 patented inventions and more than 90 articles. He has worked with inventive TRIZ methodology since 1980, received his PhD in 1988 in St. Petersburg, Russia on the field of aerospace robotics. From 1989 to 1993 he continued his research work at the University of Hanover, Germany as a senior scientist of Institute for Production Engineering and Machine Tools. From 1993 till 1999 he was the head of R&D department robotics at Focke & Co, Germany. In 1999 he founded the TriSolver Consulting and later the TriSolver Innovation Software GmbH in Germany. He is founder and head of the TriS Europe Innovation Academy. Since 2010 he is a professor for design in process engineering at the Beuth University Berlin, and since 2013 a professor for product development at HSO. **Relevant Publications in the field of Systematic Innovation Methodologies and their Education** Belski, I., Livotov, P., Vaneker, T. (2016), Structured Innovation with TRIZ in Science and Industry - Creating Value for Customers and Society, Procedia CIRP, Volume 39, 2016, Pages 1-2. Livotov, P., Mas'udah, Chandra Sekaran, A.P. (2018), On the Efficiency of TRIZ Application for Process Intensification in Process Engineering. in: Cavallucci D., De Guio R., Koziołek S. (eds) Automated Invention for Smart Industries, TFC 2018, IFIP Advances in Information and Communication Technology, Vol 541., pp.126-140, available at: dx.doi.org/10.1007/978-3-030-02456-7_11 Livotov P., Mas'udah, Sarsenova A., Chandra Sekaran A.P. (2019), Identification of Secondary Problems of New Technologies in Process Engineering by Patent Analysis, In: Chechurin L., Collan M. (eds) Advances in Systematic Creativity, Palgrave Macmillan, Cham. available at: doi.org/10.1007/978-3-319-78075-7_10 Livotov, P., Chandra Sekaran, A.P., Mas'udah, Law, R., Reay, D., Sarsenova, A. and Sayyareh, S. (2019), Eco-innovation in Process Engineering: Contradictions, Inventive Principles and Methods, Thermal Science and Engineering Progress, Vol. 9, pp. 52-65, doi.org/10.1016/j.tsep.2018.10.012. Livotov P., Chandra Sekaran A.P., Law R., Mas'udah, Reay D. (2019), Systematic Innovation in Process Engineering: Linking TRIZ and Process Intensification. In: Chechurin L., Collan M. (eds) Advances in Systematic Creativity. Palgrave Macmillan, Cham, doi.org/10.1007/978-3-319-78075-7_3 Livotov, P. (2018), Competitive capability assessment of industrial companies within the framework of advanced innovation design approach. In: Marjanović D., Štorga M., Škec S., Bojčetić N., Pavković N. (Eds) DS 92: Proceedings of the DESIGN 2018 15th International Design Conference, Section: Design Innovation, pp 1903-1914, DOI: doi.org/10.21278/idc.2018.0267. Livotov, P., Mas'udah, M., Chandra Sekaran, A.P., Law, R., & Reay, D. (2019), Ecological Advanced Innovation Design Approach for Efficient Integrated Upstream and Downstream Processes. Proceedings of the Design Society: International Conference on Engineering Design, 1(1), 3291-3300. doi:10.1017/dsi.2019.336 Chandra Sekaran, A.P., Livotov, P., Mas'udah. (2019), Classification of TRIZ Inventive Principles and Sub-Principles for Process Engineering Problems. TFC 2019, IFIP

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	Advances in Information and Communication Technology, Vol. 572, Springer, Cham, pp. 314-327. doi:10.1007/978-3-030-32497-1_26 Livotov, P., Petrov, V. (2013), TRIZ Innovation Technology. Product Development and Inventive Problem Solving. Handbook, 288 p., TriS Europe, Berlin. Livotov, P. (2015), Web-Based Asynchronous Distance Education in New Product Development and Inventive Problem Solving for Industrial Companies, Procedia Engineering, Volume 131, 2015, Pages 123-139 Livotov, P. (2015), Measuring Motivation and Innovation Skills in Advanced Course in New Product Development and Inventive Problem Solving with TRIZ for Mechanical Engineering Students. Procedia Engineering, Volume 131, pp 767-775. Belski, I., Livotov, P. and Mayer, O. (2016), Eight Fields of MATCEMIB Help Students to Generate More Ideas. Procedia CIRP, 39, 85-90., DOI:10.1016/j.procir.2016.01.170. Livotov, P. (2017), Modelling Innovation Process in Multidisciplinary Course in New Product Development and Inventive Problem Solving. In: Huda, N., Inglis, D., Tse, N, Town, G. (eds.) Proceedings of the 28th Annual Conference of the Australasian Association for Engineering Education AAEE 2017. pp. 287-294. Sydney, NSW, Australia: School of Engineering, Macquarie University . Livotov, P. (2018), Enhancing Innovation and Entrepreneurial Competences of Engineering Students through a Systematic Cross-Industry Innovation Learning Course. Paper presented at the 29th Annual Conf. of the Australasian Association for Engineering Education, Hamilton, New Zealand. Belski, I., Cavallucci, D., Livotov, P. et al. (2018), Sustainable Education in Inventive Problem Solving with TRIZ and Knowledge-Based Innovation at Universities. Paper presented at the 18th Int. TRIZ Future Conference TFC 2018, Automated Invention for Smart Industries, pp. 51-73, Strasbourg, France. Livotov, P., Chandra Sekaran, A.P., Mas'udah. (2019), Lower Abstraction Level of TRIZ Inventive Principles Improves Ideation Productivity of Engineering Students. TFC 2019, IFIP Advances in Information and Communication Technology, Vol. 572, Springer, Cham, pp. 526-538. https://doi.org/10.1007/978-3-030-32497-1_41 Livotov, P., Mas'udah, Chandra Sekaran, A.P., Law, R., & Reay, D. (2019), Education in Systematic Eco-Innovation in Environmental and Process Engineering. In S. Goh (Ed.), Proceedings of the 30th Annual Conference of the Australasian Association for Engineering Education - AAEE2019 (pp. 1-7). Brisbane, Australia: AAEE.
Mas'udah	She is an Academic Researcher at the Laboratory for Product and Process Innovation (PPI), at the Department of Mechanical and Process Engineering HSO. She holds an MSc degree in Process Engineering from HSO, and a degree in Environmental Protection and Biotechnology from University of Warmia and Mazury in Olsztyn (UWM), Poland. She is a specialist in process innovation, process intensification, inventive problem solving and secondary impact analysis of product innovation. Between 2015 – 2019, she worked as a research assistant in the European Project, IbD Intensified by Design®, and has been the moderator for several workshops of TRIZ application for process intensification in different industrial domains such as chemical, pharmaceutical and ceramic industries. She also has acted as co-author and principal author of several scientific and practitioner publications.
Arun Prasad Chandra	He is an Academic Researcher at HSO in the field of systematic innovation in manufacturing industries. He holds a BTech degree in Chemical Engineering from Anna University, India and a MSc degree in Process Engineering from HSO. From 2011-2014, he worked in the field of quality control of automotive adhesives & sealers and industrial environmental impact assessment studies in India. Since 2016, he is a researcher at HSO. He was also involved in the European research project IbD "Intensified by Design" where he assisted European Industrial partners and University researchers for Process Intensification using TRIZ methodology. His activities include process & environmental analysis of industrial operations, systematic problem solving, development of TRIZ tools for Process Engineering. He is a co-author and principal author of scientific publications.

III.3.4. Partner number – P4 – (UTC Cluj-Napoca – UTC)

Organisation name	Country
UTC Cluj-Napoca	Romania

III.3.4.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

The Technical University of Cluj-Napoca, an "Advanced Research and Education University" as awarded with the Order of the Ministry of National Education no 5262/September 5th 2011, is today a tertiary educational institution having both tradition and national and international recognition.

The Technical University of Cluj-Napoca comprises twelve faculties in the two academic centres, Cluj-Napoca and Baia Mare, as well as in locations, such as Alba-Iulia, Bistrita, Satu Mare and Zalau. The educational offer, aligned to the Bologna system, includes bachelor's, master's and doctoral programs, as well as continuous training programs.

The fields of study have a wide range, from engineering to architecture, fundamental sciences, socio-human sciences and arts. Also, within the Technical University, the Department for Continuing Education, Distance Learning and with Reduced Frequency organizes and conducts continuous education activities and programs, postgraduate courses, continuous professional development programs or courses or based on occupational standards.

The Technical University of Cluj-Napoca is concerned with the international exchange of scientific values, and this trend is found in the over 400 inter-university collaboration agreements or in the large number of student mobilities. Opening up towards the European and world space of education and research through a steady process of internationalization is one of the major objectives of the university.

The systematic innovation methodologies have been introduced in the educational programs at UTC from 2000, in the Department of Design Engineering and Robotics. Several specializations (both BSc and MSc) have benefited in this line, such as Industrial Design (BSc and MSc), Digital Production Systems (BSc), Robotics (BSc and MSc), Computer Aided Design of Manufacturing Systems (MSc) and Quality Engineering and Management (MSc).

Researches in the field have been done within the Research Center for Engineering and Management of Innovation (RESIN), leading to various methods, methodologies and software solutions for systematic innovation. Market-It is one of the software solutions (now owned by Innovation Engineering, an Italian company), or innDrive eXXplorer (now owned by Arxia), as well as Innovex (open innovation platform), etc. Other tools to support the innovation of complex technical and non-technical systems developed in RESIN are CSDT, CMFD, SAVE, sigma-TRIZ, Enhanced-AIDA, AAM, CALDET, Blue-TRIZ, MaPE, Lean Disruptive TRIZ, Green-RESIN, FAIN, Value-MFD, Enhanced-SWOT-RS, Emotional-PSS, etc. (all being published and available in international scientific data bases).

These tools are in relation with various stages of system innovation process, from analysis, planning, conceptualization, evaluation, development, deployment. Several other tools for systematic innovation have been developed and experimented for process and business model innovation, too.

III.3.4.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

UTC's role will be focused primarily on

1) Make UTC's ecosystem of SIM tools (especially CSDT, CMFD, SAVE, innDRIVE, Blue-TRIZ, CALDET and sigma-TRIZ) operational throughout Europe.

2) Develop online course (MOOC-like) for learning and using SIM tools for robotic system design and software product design and optimization. Within the framework of this project, we will develop, for each tool, an associated e-learning material allowing anyone to learn in autonomy how to use our tools. These elements of self-training should help us to integrate the courses developed within the framework of this project and thus allow to share their use in our network in Europe.

3) Dissemination and testing of results (e.g. in relation with production and software companies)

4) Smart integration into standards of innovation management (e.g. CEN TS 16555)

III.3.4.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Stelian Brad	Prof. Dr.-Ing. Stelian Brad is a full professor for Robot Programming and Intelligent Robotics, Engineering and Management of Innovation. He is the director of the Research Center for Engineering and Management of Innovation RESIN. His research interests are within the domains of SIM tools, competitive engineering, engineering design in robotics, programming languages, AI (machine learning, deep learning, expert systems, ontologies) **Publications (selection):** Brad, S., Brad, E., Mocan, B., Fulea, M., *Tools and Methods of Competitive Design in Robotics*, Editura UT Press, ISBN 978-606-737-067-6, 183 pg., Cluj-Napoca, 2015. (C) Brad, S., Chapter 11 *TRIZ to Support Creation of Innovative Shared Value Business Initiatives,* in: Advances and Impacts of the Theory of Inventive Problem Solving (ed. S. Koziołek, L. Chechurin, M. Collan), 101–112, Springer, DOI: 10.1007/978-3-319-96532-1, 2018. Brad, S., Brad, E., Chapter 6 *Quantifying and Leading Innovation with TRIZ within Competitiveness Strategies*, in: Advances and Impacts of the Theory of Inventive Problem Solving (ed. S. Koziołek, L. Chechurin, M. Collan), 65–74, Springer, DOI: 10.1007/978-3-319-96532-1, 2018. Brad, S., Chapter 2: *Aggregated Analysis Matrix: An Effective Tool for Defining Improvement Priorities in Complex Business Processes*, 14–31, in: Six Sigma Quality, Academy Publish, SUA, ISBN: 978-0-9835850-4-6, 2014. Brad, S., Murar, M., Brad, E., *Design of Smart Connected Manufacturing Resources to Enable Changeability, Reconfigurability and Total-Cost-of-Ownership Models in the Factory-of-the-Future,* International Journal of Production Research, 56 (6), 2018, 2269–2291, DOI: 10.1080/00207543. 2017.1400705. Brad, S., *Structured Activation of Vertex Entropy (SAVE): Another Way around Creative Problem Solving for Non-technical Applications*, INNOVATOR Journal of the European TRIZ Association, ISSN 1866-4180, 01/2017(03), 76–81, 2017. Brad, S., Mocan, B., Brad, E., Fulea, M., *TRIZ to Support Blue-design of Products,* Procedia CIRP, 39 (2016), 125–131, 2016, Brad, S., Brad, E., Homorodean, D., CALDET: A TRIZ-Driven Integrated Software Development Methodology, TFC 2019: New Opportunities for Innovation Break-throughs for Developing Countries and Emerging Economies, 400–416, 2019.
Sanda Timoftei	Engineering design, programming languages, robotics, TRIZ
Dragoş Bartoş	Engineering design, VR, AR, programming languages, robotics, TRIZ
Mircea Murar	IoT, programming languages, robotics, TRIZ **Publications:** Murar, M., Brad, S., Fulea, M., *Dual Arm Robot Grippers' Teach-in and Control Architecture for Handling of Small Objects with Complex Shapes towards Elder Care Services*, Acta Technica Napocensis, Series: Applied Mathematics, Mechanics, and Engineering, 59(1), 127–134, 2016. Brad, S., Murar, M., Brad, E., *Methodology for Lean Design of Disruptive Innovations*, Procedia CIRP, Elsevier, 50(2016), 153–159, 2016. Brad, S., Murar, M., *Employing Smart Units and Servitization towards Reconfigurability of Manufacturing Processes*, Procedia CIRP, Elsevier, 30 (2015), 498–503, 2015 Murar, M., Brad, S., *Monitoring and Control of Dual-arm Industrial Robot Tasks Using IoT Application and Services*, Applied Mechanics and Materials: Mechatronics and Robotics, Vol. 762, pp. 255–260, SCOPUS, 2014.
Anca Stan-Sarb	Innovation management, project management, TRIZ **Publications:**

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	Sarb, A., Brad, S., Stan, O., Timoftei, S., *Life-Cycle Building Costs Based on Particle Swarm Optimization*, Acta Technica Napocensis: Civil Engineering & Architecture, 59(2), 2016.

III.3.5. Partner number – P5– (Lappeenranta-Lahti University of Technology – LUT)

Organisation name	Country
Lappeenranta-Lahti University of Technology	**Finland**

III.3.5.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

Lappeenranta-Lahti University of Technology LUT (established in 1969) is a Finnish university that since 1969 has brought together technology and economics in a pioneering spirit. LUT's strategy is Trailblazer. Show the way. Never follow. At the core of the strategy are four global questions to which LUT is seeking answers. Are we burning everything out? Are we leaving humanity to suffer from the water it has spoiled? Will we bury our future with our waste? Will we let Europe degenerate to the status of the world's backyard?

Our international scientific community consists of approximately 6000 students and experts. LUT's operation is solution-focused and characterised by "open your mind" thinking: crossing boundaries open-mindedly, together. LUT is an international university and has more than 200 partner universities and there are over 67 nationalities at the university. Approximately 30% of the first year student come from other countries. LUT is a Finnish and Nordic pioneer in the international accreditation. LUT has extensive experience in curriculum development as all the LUT study programs have been accredited.

LUT comprehends the School Energy Systems, the School of Scientific Engineering and the School of Business and Management. The School of Business and Management comprehends four Competence Areas, one of which being Industrial Engineering and Management. LUT has been active on several projects taking place on both national and international levels. Master's Degree Program in Industrial Management is an ASIIN-accredited degree program. The quality label is a certificate of high-quality engineering education, international recognition of the degrees and a guarantee of continuous development of education.

https://www.lut.fi/

III.3.5.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

III.3.5.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Leonid Chechurin	Leonid Chechurin is a (tenured) Professor of Industrial Management Department of En-

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	gineering science school. He is also the Head of the System Engineering group at LUT, visiting professor at St. Petersburg State Polytechnical University (Russia). He received his Candidate of Science Degree in 1998 with the dissertation on Robust System Control and his Doctor of Science Degree in 2010 with a dissertation on Mathematical Modelling and Analysis of Dynamic Systems. His research interests focus on the analysis of system's dynamics based on mathematical modeling, stability analysis, control, systematic approach for inventive thinking, innovation automation tools as well as problems of innovative growth of companies, regions and economies. His work has been published in journals and conferences in the fields of control and system theory and automation, mathematical modeling, creativity and innovations. He has more than 50 publications to his name in these fields and has been involved in the supervision of about 50 M.Sc. theses and dissertations. He has an outstanding industrial experience and was employed by leading innovating technology companies like Samsung Electronics or LG Electronics as a consultant for engineering design group (5 years in total). He has been consulting or teaching at General Electric Global Research Center (USA, Germany, India and Shanghai), Wrigley (USA), British American Tobacco (UK-USA), FMC (USA) and others (in total more than 50 seminars and consulting sessions and several research projects on inventive engineering design). He serves as an expert in technology innovation and reengineering for a number of Russian authorities in the public and private sector. He was a visiting professor at KumOh National University of Technology (South Korea, 1998–1999), a Fellowship professor at Politechnico di Milano (Italy, 2011) and awarded with Finnish Distinguished Professor (FiDiPro) grant by Finnish Academy of Science to work at LUT 2014–2017. He was responsible for scientific organization of a number of local and international conferences. In particular he brought the first time international TRIZ conferences TRIZfest (2014) and TRIZfuture (2017) to Finland. **Recent Publications on the topic of the project** Seledtsova I.A., Chechurin L. (2020). Blending Traditional and Modern Approaches to Teaching Control Theory. In: Arseniev D., Overmeyer L., Kälviäinen H., Katalinić B. (eds). Cyber-Physical Systems and Control. CPS&C 2019. Lecture Notes in Networks and Systems, vol 95. Springer, Cham. Khan A.I., Kaliteevskii V., Shnai I., Chechurin L. (2020). Analysis of Students' Performance in an Online Discussion Forum: A Social Network Approach. In: Arseniev D., Overmeyer L., Kälviäinen H., Katalinić B. (eds). Cyber-Physical Systems and Control. CPS&C 2019. Lecture Notes in Networks and Systems, vol 95. Springer, Cham. Shnai I., Chechurin L. (2020). Flipped Classroom Design: Systems Engineering Approach. In: Arseniev D., Overmeyer L., Kälviäinen H., Katalinić B. (eds). Cyber-Physical Systems and Control. CPS&C 2019. Lecture Notes in Networks and Systems, vol 95. Springer, Cham. Advances in Systematic Creativity. Creating and Managing Innovations. L. Chechurin and M. Collan (ed.). McMillan, 2019, 369p Chechurin L. (editor). Research and Practice on the Theory of Inventive Problem Solving (TRIZ): Linking Creativity, Engineering and Innovation. Springer, 2016.
Vasilii Kaliteevskii	Vasilii Kaliteevskii is a Junior Researcher at the Lappeenranta University of Technology. He received his bachelor's degree in Software Engineering and master's degree in Software and Administration of Information Systems from St. Petersburg State University. Vasilii works under the Marie Skłodowska-Curie project INDEED (Innovative Nanowire Device Design) and conducts the research on conceptual design of products and technologies based on nanoelements. Vasilii has an interest in patents, particularly he participated in the development of a tool for patents analysis in a semi-automatic way. Also he has an experience in mobile applications development with reaches more than a million users. More generally, his current research interests include Nanowires Design and Applications, Innovative Design methods, Software Engineering, Algorithms and Automation. **Publications related to the subject** Khan A.I., Kaliteevskii V., Shnai I., Chechurin L. (2020). Analysis of Students' Performance in an Online Discussion Forum: A Social Network Approach. In: Arseniev D.,

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	Overmeyer L., Kälviäinen H., Katalinić B. (eds). Cyber-Physical Systems and Control. CPS&C 2019. Lecture Notes in Networks and Systems, vol 95. Springer, Cham.
Iuliia Shnai	Iuliia Shnai is a PhD Candidate in LUT School of Engineering in Industrial Engineering and Management. She is a project manager of CEPHEI project (Erasmus+ Capacity Building 2017). Her research is devoted to educational technologies focusing on Flipped classroom. Practical activities include participation in the development and implementation of blended learning courses, set up of digital learning experiments. She will take part in organising activities and support the collaboration between Elegida and CEPHEI. **Recent Publications related to the subject** Buskes G., Shnai I. (2019). Transitioning an engineering classroom from traditional lectures to a partially-flipped format. European Society for Engineering Education. SEFI conference. pp. 176–186. Shnai I. (2018). Digital learning design: from ideation via TRIZ to implementation, Advances and Impacts of the Theory of Inventive Problem Solving, pp. 1–16. Shnai I., Chechurin L. (2017). Teaching creativity creatively. 28th Australian Association for Engineering Education Conference (AAEE). pp.188–197.
Anastasia Chakir	Anastasia Chakir is a Junior Researcher at LUT University. She holds a master's degree in Industrial Engineering and Management from LUT University and in Economics from St. Petersburg Mining University. She works as a project assistant on Cooperative eLearning Platform for Higher Education in Industrial Innovation (CEPHEI). She is responsible for the technical side of the platform. Her research interests include systematic creativity and ways to measure it.

III.3.6. Partner number – P6 – (Schaeffler AG – Schaeffler)

Organisation name	Country
Schaeffler AG	**Germany**

III.3.6.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

III.3.6.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

III.3.6.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Armin Lau	
Thomas Fuhrmann	

III.3.7. Partner number – P7 – (Arxia SRL – Arxia)

Organisation name	Country
Arxia SRL	**Romania**

III.3.7.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

Arxia (www.arxia.com) is a software development and consultancy agency. Its activities comprise software development services for clients from various countries, IT product development and their commercial operation, having a portfolio of innovative products in various domains (public procurement www.processplayer.ro), electronic invoicing, management of grants, design and visualization of furnished spaces www.planningwiz.com). As consultant, Arxia is offering services in business process analysis and optimisation, standardization and public policy development, training and technical coaching. Arxia is supporting the development of communities of practice and on technical domains and organizes national and international conferences each year in its own town Cluj-Napoca.

Arxia is an active member of the Romanian IT associations (Cluj IT Cluster, ANIS, ARIES), of the international IT "TYPO3 Association" promoting the open-source CMS TYPO3, and its CEO Daniel Homorodean is a member in several technical committees of the national standardization association ASRO and the European Committee for Standardization CEN.

III.3.7.2. Role of the organisation in the project

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

Arxia is constantly pursuing innovative approaches, both for the development of its own portfolio of projects as well as for its clients through the consultancy activity.

Arxia will put to direct use, internally and as part of its services, the results of the project and will disseminate them. It will also provide feedback on each relevant stage of the project and for each deliverable that has the potential to impact its activity and that can be used for its clients.

As active participant in several technical communities, Arxia will foster the adoption of the results of the projects in the collaboration with its peers.

III.3.7.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Daniel Homorodean	Daniel Homorodean is a PhD Candidate of the Technical University of Cluj-Napoca. He is also coordinating the activity of Arxia and is participating to the development of standards at national level in Romania and at European level in several technical committees. He has strong technical and management skills, with 15+ years as IT project manager and 13+ year as IT product manager.

III.3.8. Partner number – P8 – (Tehnoprod Plast SRL – TPlast)

Organisation name	Country
Tehnoprod Plast SRL	**Romania**

III.3.8.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

S.C. Tehnoprod Plast SRL (https://www.tehnoprodplast.ro) is a private company, set up in 1994 with romanian-german capital. Its main object of activity is the production and marketing of low tension equipment (sockets, lengtheners, adaptors, power cords, injected plug etc.). Also the German company GB Gebro Steckvorrich-tungen GmbH (www.gb-gebro.de) is with Romanian-German capital.

The company carries on its activity in two production halls having a number of 92 employees. The company's policy is insuring each time and with no exception a high value for its clients which means a high quality performance, in time delivery of orders and competitive price. In this respect, since 2004, S.C. Tehnoprod Plast SRL has implemented by the certification organism DQS – Romania the quality management system in accordance with the DIN EN ISO 9001:2015 Standard.

The products made by our company are exported under the GB GEBRO sign, in countries like Germany, Netherlands, Sweden, Greece, Spain, Saudi Arabia, Indonesia and are certified by the specific low tension equipment quality norms, of these countries (VDE, ÖVE).

The main compartments within the company are:

Injection compartment: the injecting is made on 40 – 150 ToF automatic injecting machines and the raw material used during the manufacturing process is:

- Injected plugs (PVC)
- Thermoplastic materials (PP, PA6, PA 6.6, PS, PE, with fibreglass)
- Hard plastic materials

Pressing compartment: the pressing is made on automatic pressing machines of 60–150 tons force and the raw material used is urea formaldehyde resin.

Punching compartment: over 50 details for all the brass and steel components used in the manufacturing process, on the Raster 30 ToF made in Germany pressing machines with a frequency of 500 punchings/minute

Lathing compartment: different specific brass details on EUBAMA made in Germany autolathes.

Assembly compartment: it is made automatically and semi-automatically for the whole range of products.

III.3.8.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

III.3.8.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Lucian Moraru	

III.3.9. Partner number – P9 – (Jantschgi C&R – Jantschgi)

Organisation name	Country
Jantschgi C&R	**Austria**

III.3.9.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

The consulting company, DI Jürgen Jantschgi (Jantschgi C&R, Play Innovation – TRIZ and more), works since 2008 in the field of systematic innovation methodologies. The main offers are trainings, workshops and project assistances in the field of systematic innovation methodologies, mainly in strong correlation with TRIZ.

Jantschgi C&R offers TRIZ certification trainings in cooperation with the International TRIZ association (MATRIZ) since 2008 on a regular basis. The certification training courses include a 3-level training scheme that builds on one another. In total 18 training-days and three certification tests have to be absolved to get the Level 3 certificate of MATRIZ. More than 300 participants have attended part or all of these certification trainings in the last years.

Furthermore also basic TRIZ-trainings with a duration of 1 or 2 days are offered regularly.

Beside TRIZ other innovation and creativity methodologies like Business Model Canvas for the development of business models or Blue Ocean for market development options are in the consultancy portfolio of Jantschgi C&R.

III.3.9.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

DI Jürgen Jantschgi and his team will bring in the following experiences and know-how:

- teaching and applying TRIZ tools in workshops and/or in trainings
- development of innovation- / TRIZ tools for applications at technical colleges and/or universities
- business and educational network
- international TRIZ contacts
- project management of international projects

Jantschgi C&R and its team offer the following contributions to the project:

- Personal contacts to the following Austrian universities and TRIZ associations: University of Technology Graz, University of Technology Leoben (Lecture for Technology & Innovation management), University for Applied Science Campus02 Graz, University for Applied Science Villach, University of Klagenfurt, Austrian TRIZ Association (TRIZ Kompetenzzentrum Österreich), TRIZ Campus
- Personal Contacts to other educational institutions: Federal Ministry of Education, International Society for Engineering Pedagogy, Network of Colleges for Engineering
- Teaching Curricula of MATRIZ and of Colleges for Engineering in Austria
- Teach the Teachers – TRIZ basic and MATRIZ certification training
- Business network based on 7 years Industrial Liasion department and 10 years consultancy
- Organizing dissemination event

III.3.9.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Jürgen Jantschgi	He was born in 1965, is the owner and founder of Jantschgi C&R (started in January 2008). He holds a MATRIZ Level 3 certificate since 2005 and got the MA TRIZ "TRIZ Champion" Nr. 08 (13.09.2018) – for worldwide dissemination activities. He has 6 years experience in technology transfer activities as member of staff of the

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	Industrial Liasion Department of the University of Technology Leoben (2001 – 2007) and was involved in the organization of several regional, national and international conferences in the field of TRIZ. Headmaster of the Higher College for Engineering in Wolfsberg (HTL Wolfsberg), Austria, since January 2017. Head of the Federal Working Group "Entrepreneurship Education for Engineers" for Higher Colleges of Engineering of the Austrian Federal Ministry of Education. Co-Chair of the of IGIP (International Society for Engineering Pedagogy) working group "Entrepreneurship in Engineering Education".
Peter Jantschgi	He was born in 1996, works as Junior consultant in the company and gives TRIZ lectures and workshops. He is enrolled in a Bachelor course on Innovation Management from the University of Applied Science "FH Campus02" in Graz, Austria, holds a MATRIZ Level 3 certificate (2018) and is currently accredited by the MATRIZ Council on expertise and methodology to conduct MATRIZ Level 1 tests and grants.
Philipp Jantschgi	He was born in 1993, works as Junior consultant in the company and assists at TRIZ lectures and workshops. He finished a Bachelor of Mechanical Engineering, University of Technology Graz and holds a MATRIZ Level 3 certificate (2018).
Lydia Jantschgi	She was born in 1967 and will be involved in the project with secretary office activities.

III.3.10. Partner number – P10 – (Target Invention LLC Minsk – TI Minsk)

Organisation name	Country
Target Invention LLC Minsk	**Belarus**

III.3.10.1. Aims and activities of the organisation

Please provide a short presentation of the organisation (key activities, affiliations, size of the organisation, etc.) relating to the area covered by the project. Please provide also a link to the website of the organisation, if available. (Recommended limit 1500 characters)

Target Invention renders innovation consulting services. Goal-oriented invention technologies are designated to address production issues at the invention level. Efficient techniques developed on the basis of the theory of inventive problem-solving (TRIZ) and proven by practical work of many years at the leading companies (Samsung, POSCO, Skoda etc.) are used for work.
The company was founded by Mikalai Shpakouski, a Candidate of Engineering Sciences and TRIZ Master.
The company's key competences are:

- inventive problem-solving;
- generation of alternative solutions to create patent-package and invention-idea protection;
- prediction of engineering-system development;
- training in inventive problem-solving and prediction;
- preparation of training and practical problem-solving software.

The company has eight employees: consultants, teaching staff, and software developers.
Website: http://target-invention.com

III.3.10.2. Role of the organisation <u>in the project</u>

Please describe the role of the organisation in the project and how the organisation will actually contribute to the project success. (Recommended limit 1500 characters)

The company offers training and practical application of the OTSM-TRIZ* method for inventive problem-solving. The key feature of the training is the practice-oriented method. Emphasis is laid on inventive problem-solving from the start.
The company has created the TRIZ Trainer distance-learning course. The programmatic and theoretical parts of the course as well as support of the teaching staff enable to teach practical inventive problem-solving in large numbers and effectively.
The key features of the course are:

- the student's problem-solving is guided with the situation addressing algorithm. Upon solving several dozens of problems, the student masters an efficient tool in practice and is prepared to solve inventing production problems;
- each step of solving is supported with information prompts and theory;
- the teacher controls accuracy of students' chain of thought, corrects it, and answers their questions.

As part of the SIM project, the company will:

- teach teaching staff the OTSM-TRIZ method as applied in practical addressing of companies' issues;
- provide the TRIZ Trainer course for training sessions in practical inventive problem-solving;
- provide industrial partners with the Solving Mill software to support the invention process.

* OTSM-TRIZ is a method combining the approaches of the general theory of powerful thinking (N. N. Khomenko) and of the theory of inventive problem-solving (G. S. Altshuller).

III.3.10.3. Operational/Technical capacity: skills and expertise of key staff involved in the project

Please fill in the table below for each key staff member and add lines as necessary.

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
Mikalai Shpakouski	TRIZ consultant; Candidate of Engineering Sciences; TRIZ Master qualification A consultant and teacher of inventive problem-solving, particularly • prevention of process disruptions;

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	• increase in equipment operation quality and reliability; • product production cost efficiency; • circumvention of competing companies' patents; • predicting development of technical systems. 2011 – present: Target Invention, expert. 2014 – present: independent TRIZ consultant and trainer. 2008 – 2014: POSCO, Republic of Korea. TRIZ consultant. 2005 – 2008: TRIZ Profi Autonomous Non-Profit Organisation, Moscow, senior expert. 2003 – 2004: SAMSUNG SDI, Republic of Korea. TRIZ consultant. 2000 – 2003: Samsung Advanced Institute of Technology (SAIT), Republic of Korea. TRIZ consultant. 1995 – 2000: Invention Machine project. Prediction group manager. Trainer's practice: 25 years of teaching TRIZ based on a uniquely-designed approach resulting from generalisation of experience of work with actual projects. He has to his credit studies at Samsung, POSCO, and Skoda JS, at the following universities: KTA, Adjou University, KUTE, at a number of Chinese companies etc. He was awarded a SAMSUNG Group's prize for organising TRIZ at the company and the economic benefit of 92 million US dollars. **Publications (selection):** Processing of the technical and patent information with use of Evolution Trees, e-book, published together with Mitsubishi Research Institute in Japanese, Note the different spelling of the author in different languages. N. A. Shpakovsky. Деревья эволюции. Анализ технической информации и генерация новых идей. (Evolution Trees. Analysis of Technical Information and General of New Ideas). Moscow: Puls, 2006. 240 p. M. A. Shpakouski. Evolution Trees. Analysis of the technical information and generation of new ideas, IWINT, (in Chinese). N. A. Shpakovsky. ТРИЗ. Анализ технической информации и генерация новых идей. (TRIZ. Analysis of Technical Information and Generation of New Ideas). Moscow: Forum, 2010. 264 p. N.A. Shpakovsky, Y. L. Novitskaya. ТРИЗ. Практика целевого изобретательства. (TRIZ. Practice of Goal-Oriented Invention). Moscow: Forum, 2011. 336 p. M. A. Shpakouski, Y. L. Novitskaya. TRIZ. Practice of Goal-Oriented Invention. Republic of Korea, 2011 (in Korean). N.A. Shpakovsky. Tree of technological evolution. Ways to new business opportunities. Amazon Publishing, 2015. N. A. Shpakovsky. ОТСМ-ТРИЗ. Подходы и практика применения. (OTSM-TRIZ. Approaches and Practical Use). Moscow: Infra, 2018. A. G. Karlov, N. A. Shpakovsky. Идеи, изобретения, инновации в сфере автоматизации технологий и технических систем. (Ideas, Inventions. Innovation in Automation of Technologies and Technical Systems). University Textbook series. Moscow: Tsentrkatalog, 2019. He is the owner and author of the Generator inventors' website at http://www.gnrtr.com, http://www.gnrtr.ru
Peter Chuksin	Candidate of Technical Sciences, 4th-level TRIZ consultant. Expert in inventive problem-solving, implementing sophisticated projects, and training in systemic invention with the following methods applied: OTSM-TRIZ, prediction of technical-systems development, cost-benefit analysis (CBA), development of patent-package protection and circumvention of competing patents. He has many years of experience in consulting and training. He cooperated with LG Group's companies (LG Electronics, LG Electronics Institute of Technology, LG Cable, LG Industrial Systems, LG Innotek, LG-Philips), POSCO, Hyundai, Rotem (Republic of Korea) for a long time. He completed a number of consulting projects in cooperation with Belarusian, EU, and Russian companies. He is an active participant of the Invention Machine project (IMLab, IMCorp), a senior

Names of the staff members	*Summary of relevant skills and experience, including where relevant a list of recent publications related to the domain of the project.*
	researcher of Minsk branch of IMCorp (USA). For his publication list please refer to https://www.trizland.ru/authors/159
Anton Ivanou	Design engineering, head of the cost-benefit analysis bureau TRIZ consultant, TRIZ trainer, seven years of experience Participant of the developing team of the TRIZ Trainer and Solving Mill projects
Kirill Domkin	Kirill Domkin is a TRIZ expert, TRIZ developer and TRIZ consultant with more than 10 years of experience using TRIZ. He participated in 20 TRIZ projects, 5 of them as senior project executive. Held more than 60 TRIZ workshops. Author of over 40 publications. Author of 4 patents for inventions. Participated in 5 research scientific works as senior project executive. He earned a PhD in physics, began to study TRIZ in 1999. Studied with Yu.V. Gorin, V.M. Petrov, M.S. Rubin, Yu.S. Murashkovsky, N.A. Shpakovsky, A.V. Kudryavtsev. Since 2017, TRIZ application and consulting has been the main activity.

III.4. Cooperation arrangements across the partnership

Please describe arrangements and responsibilities for decision-making, conflict resolution, reporting, monitoring, communication and other relevant issues. (Recommended limit 2500 characters)

III.5. Partner Country participation[2] (where applicable)

This section should be completed, if the application involves organisations from Erasmus+ Partner Countries.
Please explain how Partner Country organisation(s) participating in the project are giving an essential added value to the project. (Recommended limit 1500 characters)

*NB: please note that the involvement of a participating organisation from a Partner Country must bring **an essential added value** to the project. As a result, organisations from Partner Countries must bring specific skills, experiences or expertise that organisations from Programme Countries cannot bring and that prove to be essential for the achievement of the project's objectives and/or to ensure a significantly higher quality of the project outputs.*

2 See list in the Erasmus+ Programme Guide, part A 'Who can participate in the Erasmus+ Programme?'

PART IV. Impact, dissemination, exploitation, and sustainability

IV.1. Target groups

IV.1.1 Please explain which target groups (e.g. participating organisations as well as other stakeholders such as higher education institutions, companies/SMEs/businesses, students, professionals, the wider public) will benefit from the project results/outcomes. Indicate how the project outputs will be used by these target groups and will lead to expected outcomes and change. (Recommended limit 3000 characters)

1. Actors for the exemplary establishment of a corresponding training structure in Mitteldeutschland (Leipzig region).
2. HEI who want to develop and implement similar programs to build up appropriate training capacities in these cross cutting skills.
3. Industrial companies that want to build up an appropriate base of skilled people in their own company.
4. Consulting companies, in whose profile consulting, application and training of SIM are core competencies.

IV.1.2 Please describe how the target groups will be reached and involved during the project lifetime and how the project will be beneficial for these target groups at local, regional, national and or European level. What is the change your project will make? (Recommended limit 3000 characters)

*IV.1.3 Please describe how the target groups will be reached **after the project is finished**. (Recommended limit 3000 characters).*

IV.2. Sustainability and impact

IV.2.1 How will the activities and the partnership be sustained beyond the project lifetime? Please explain which results of your project will be maintained after EU funding, and how you intend to maintain them, including the necessary financial and human resources. (Recommended limit 3000 characters)

IV.2.2 Please indicate what is the expected short term and long term impact on the target groups (including participating institutions and stakeholders); what is the desired impact of the project at local, regional, national, European and/or international level? What activities do you envisage to ensure that the expected and desired impact is achieved? (Recommended limit 3000 characters)

IV.2.3 Please specify whether/how existing undertakings, schemes, projects, platforms, ventures etc. will be linked to/integrated into the project. Also demonstrate that the project outputs and results will be transferable and accessible to a broader audience. (Recommended limit 3000 characters)

IV.2.4 Describe the dissemination and promotion measures that will ensure the best project visibility, including project advocacy and pro-active public relations activities. In this context, indicate the main project website features that will ensure that the produced outputs/deliverables are accessible to end users and properly promoted. Also explain your strategy on social media. (Recommended limit 3000 characters)

IV.2.5 Overview of short term results and long term outcome indicators
Please highlight the main results (outputs and outcomes) for stakeholders (individuals, organisations, etc…..) sectors or systems that your project intends to generate;

Please add lines as necessary according to the number of indicators

Short term results	**Target groups/potential beneficiaries**	**Quantitative indicators**	**Qualitative indicators**

Long term outcomes	**Target groups/potential beneficiaries**	**Quantitative indicators**	**Qualitative indicators**

IV.3. Dissemination and exploitation strategy

How will the dissemination activities be structured so as to ensure that the results will reach the relevant target groups? How will the exploitation activities be structured so as to use the results both within the project's lifetime and after? How will the results be mainstreamed and multiplied? (cfr: Annex II of the Programme Guide - sections 1 & 2 pages 312-317)
If appropriate, to which existing initiative(s) you intend to link? (Recommended limit 3000 characters)

IV.4. Open access to the educational resources

Please describe how the materials, documents and media produced will be made available to the wider public through new technologies. Please explain also if you consider that this part is not applicable to your project. (Recommended limit 3000 characters)

In this direction the project follows the principles of Open Culture and in particular presents the experience gathered on a public platform for subsequent use. We build on the experience and structures of the Leipzig WUMM Project, in which a corresponding open infrastructure has been built around a github organizational account since the beginning of 2019. In this context, the multilingual potential of RDF-based technologies for the presentation of methodological concepts has already been prototypically demonstrated. This approach of making relevant materials available under the Apache 2.0 License is to be pursued and expanded further in the project.

PART V. Specific arrangements regarding learning mobility (if applicable)

Knowledge Alliances may organise learning mobility activities of students, researchers and staff in so far as they support/complement the main activities of the Alliance and bring added value in the realisation of the project's objectives. Kick-off and project meetings are not considered as learning mobility activities. Mobility days for which travel and subsistence unit costs are charged to the project, cannot be charged as working days for implementation support to the main activities. **Mobility activities / Learning mobility do not constitute the main activities of a Knowledge Alliance**; extending and scaling-up these activities would need to be supported via the Key Action 1 of this Programme or other funding instruments.

V.1. Added value

Please describe how the mobility activities of students, researchers and staff support/complement the other activities of the Alliance and bring added value in the realisation of the project's objectives. (Recommended limit 3000 characters).

V.2. Implementation of the learning mobility

Please describe the selection of participants, the quality measures set up in the sending and receiving organisations for monitoring the mobility activity, how the project intends to recognise and validate the learning outcomes of the participants (ECTS-DS ...), and follow up of the mobility activities. **Please refer to the information provided in Section C.1 of the eForm.** *(Recommended limit 3000 characters)*
*NB: If learning mobility activities are planned, they should be embedded in the project activities. Please also note that the budget for learning mobility can**not** be used to finance costs for travels & subsistence of staff that are not directly related to the learning mobility activities (e.g. attendance costs to events, costs linked to partnership meetings, etc). Only learning mobility costs can be put in the sheet 'Learning mobility' of the budget annex.*

PART VI. Additional project information (if applicable)

This section allows you to provide any additional project specific information, which is not covered in other parts of the application form. Please refrain from any repetition of previous statements and earlier mentioned aspects. (Recommended limit 1500 characters).

In line with the call requirements, higher education institutions (HEIs) established in a Programme Country must hold a valid Erasmus Charter for Higher Education (ECHE). Should the charter code not display automatically or be incorrect in the eForm (Part A section A1 – field 'accreditation number'), please use this section to indicate it and explain how it applies to your HEI.

The charter code is composed of the country code (letters) – city acronym – number (2 digits). You can consult the Erasmus Charter holders' list published on the following link:
https://eacea.ec.europa.eu/erasmus-plus/actions/erasmus-charter_en.

PART VII. Work Plan and Work Packages

VII.0. Work Plan and Work Packages (WPs) list

Please enter the different project activities you intend to carry out in your project.

WP number	WP title
WP1	**Project Initialisation**
WP2	**Networking the Knowledge Alliance**
WP3	**Development of Curricula and Teaching Material**
WP4	**Train the Trainers**
WP5	**Involving Industry**
WP6	**Project Management**
WP 7	**Dissemination and Transfer**
WP 8	**Quality Control**
WP 9	**Evaluation**
WP 10	**Digital Tools**

For each WP, please fill in the following WP description, WP results and WP explanation of expenditures (add more WPs if necessary)

VII.1. Work Package 1 – *(Project Initialisation)*

WP1 description

WP No.1	
Work Package/ Activity type	X Preparation ☐ Management ☐ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Project Initialisation
Description *(Recommended limit 1500 characters)*	**Story 1.1:** At the very beginning of the project we conduct a more detailed analysis of the teaching offers of the individual partners. This analysis already begins in the phase prior to project approval and is in principle completed in the first two months of the project. In the preproject phase, it will already be agreed how this work is to be structured exactly. The partners provide the lead of the WP with the corresponding work, who then compiles a first document for P1 and prepares a more detailes deliverable for P2 that serves also as input for WP 2. This relates to epic E1. **Story 1.2.:** This is mainly due to ULEI that hosts the digital infrastructure and focuses on developing the appropriate tools for project-internal cooperation. The HEI partners are the key partners since they operate the core of the digital infrastructure (see WP 2) and have to organise the roll out of the infrastructure in their local area of responsibility. The other partners have to set up access to the infrastructure for their staff. The output of this WP is supplementary for the core aims of the project.
Tasks *(Recommended limit 3000 characters)*	**1.1:** A more detailed analysis of the teaching offers of the partners **1.2:** Bootstrapping the (digital) cooperation structure and infrastructure
Estimated start date	M1
Estimated end date	M8
Lead organisation	ULEI
Participating organisations	1.1: All HEI partners 1.2: All partners

WP1 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP1	Project Initialisation
	Title	A more detailed analysis of the teaching offers of the partners

	Type	Text document
	Description *(Recommended limit 1500 characters)*	Output: a pdf text document. Outcome: A better common understanding what the HEI partners really are doing. Input for WP 2 and WP 5, Story 5.2.
	Due date	M8
	Language(s)	English
	Media(s)	PDF
Dissemination level	**X** Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

Expected result (output or outcome)	WP1	Project Initialisation
	Title	Bootstrapping the (digital) cooperation structure and infrastructure
	Type	Web infrastructure
	Description *(Recommended limit 1500 characters)*	Output: Project share at github, web presentation, web tools to deliver content. Another part of the digital infrastructure is project-internal. Outcome: A smoothly running project infrastructure.
	Due date	M3
	Language(s)	English
	Media(s)	Web
Dissemination level	**X** Public ☐ Restricted to other programme participants (including Commission services and project reviewers) **X** Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP1 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs". (Recommended limit 3000 characters)

VII.2. Work Package 2 – *(Networking the Knowledge Alliance)*

WP2 description

WP No.2	
Work Package/ Activity type	☐ Preparation ☐ Management ☒ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Networking the Knowledge Alliance
Description *(Recommended limit 1500 characters)*	This part requires many soft contributions, which cannot be cast in concrete stories, but rather have an atmospheric character. Therefore, the only point in this package, which is to be promoted with a project share, is the development of an appropriate digital support infrastructure. **Story 2.1:** Develop and set up the SIM-SSN. This relates to Epic E1. Within this story, (1) the results of WP 1 have to be prepared and structured according to a course ontology to be agreed upon the partners and prepared for machine processing. (2) Uniform open source tools have to be developed to manage the data locally at the HEI partners in *SIM-SSN Nodes*. The data from different locations can be combined by means of tools to form different overall views – the *SIM-SSN Cloud*. (3) With this decentralized architecture, which can easily be extended to other partners, a decentralized data updating is combined with the possibilities of centrally available presentation and search structures. The architecture implements advanced Semantic Web technologies based on RDF. (4) To sustain that development, a *SIM-SSN competence centre* shall be established to develop the node architecture and to support the partners in its operation. This will be based on the structures currently being developed with the *Central German Competence Center on SIM* in Leipzig. The development of these tools is to be carried out according to an iterative development model in three consecutive sprints, with updated versions of SIM-SSN going live at P3, P4 and P5. The requirements analysis is due for approval at P2. The lead of the package LUT which has great experience in developing digital tools is chosen different from ULEI as the main developer to apply the SCRUM methodological difference between Project Owner and Team.
Tasks *(Recommended limit 3000 characters)*	**2.1:** Develop and set up the SIM-SSN.
Estimated start date	M3
Estimated end date	M20
Lead organisation	LUT
Participating organisations	All partners

WP No.2	

WP2 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP2	Networking the Knowledge Alliance
	Title	Develop and set up the SIM-SSN.
	Type	Web infrastructure, Text documents
	Description *(Recommended limit 1500 characters)*	Open Sourced Code at github, Software installations at the different nodes, handbooks for the different service levels, skilled operators to run the infrastructure, documentation of the development process. The output of this WP is supplementary for the core aims of the project but a cornerstone of the digital supporting infrastructure of this Knowledge Alliance.
	Due date	M20, with intermediate milestones at M8 and M14
	Language(s)	English
	Media(s)	Web, PDF
Dissemination level	**X** Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP2 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs". (Recommended limit 3000 characters)

VII.3. Work Package 3 – *(Development of Courses and Teaching Material)*

WP3 description

WP No.3	
Work Package/ Activity type	☐ Preparation ☐ Management ☒ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Development of courses and teaching material
Description *(Recommended limit 1500 characters)*	Story 3.1.x: Development of new courses.
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	HSO
Participating organisations	All HEI partners

WP3 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP3	
	Title	
	Type	
	Description *(Recommende*	

	d limit 1500 characters)	
	Due date	
	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP3 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.4. Work Package 4 – *(Train the Trainers)*

WP4 description

WP No.4	
Work Package/Activity type	☐ Preparation ☐ Management ☒ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Teach the Teachers
Description *(Recommended limit 1500 characters)*	In this WP a *mobility part "train the trainers"* is provided. Since the methods for teaching SIM used at the different locations are different, the partners should be trained in 6 training units at 6 different HEI locations by one of the partners as trainer according to the teaching methods used on that site. The training is supervised by the Target Invention partner to incorporate their large experience im SIM applications and trainings around the world. The participation of *additional partners* is explicitly provided. In the last part of the project measures are to be taken to promote the establishment of appropriate structures for student mobility according to Key Action 1 at the individual HEI locations for our Knowledge Alliance.
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	INSA
Participating organisations	All partners

WP4 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP4	
	Title	
	Type	

	Description *(Recommended limit 1500 characters)*	
	Due date	
	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP4 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.5. Work Package 5 – *(Involving Industry)*

WP5 description

WP No.5	
Work Package/Activity type	☐ Preparation ☐ Management ☒ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Involving Industry
Description *(Recommended limit 1500 characters)*	The focus of this WP is on raising the awareness of other EU companies, particularly those in the manufacturing sector, and on winning them to join the network as additional partners. The WP is divided into three parts, in which project funds are initially used to achieve a boost effect, the self-organizing potential of which should have an effect in the intermediate phase. In the first phase, potential candidates should be addressed intensively with the aim of establishing a (sub)network of interested industrial companies that is able to enter into a fruitful exchange with the network of the HEI and thus to synchronize the curricular developments with the needs of the industry. In a second phase these efforts should be consolidated, in a third phase the focus is primarily on quality assurance and forward orientation in order to ensure the further consolidation of self-supporting structures, which also have a lasting effect beyond the end of the project.
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	Jantschgi
Participating organisations	All industrial partners

WP5 Results (outputs and outcomes)

Please add tables as necessary.

Expected result	WP5	

(output or outcome)	Title	
	Type	
	Description *(Recommended limit 1500 characters)*	
	Due date	
	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP5 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.6. Work Package 6 – *(Project Management)*

WP6 description

WP No.6	
Work Package/Activity type	☐ Preparation ☒ Management ☐ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Project Management
Description *(Recommended limit 1500 characters)*	
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	ULEI
Participating organisations	All partners

WP6 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.7. Work Package 7 – *(Dissemination and Transfer)*

WP7 description

WP No.7	
Work Package/Activity type	☐ Preparation ☐ Management ☐ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☒ Dissemination and Exploitation of results
Title	Dissemination and Transfer
Description *(Recommended limit 1500 characters)*	
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	UTC
Participating organisations	All partners

WP7 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP7	
	Title	
	Type	
	Description *(Recommended limit 1500 characters)*	

	Due date	
	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP7 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.8. Work Package 8 – *(Quality Control)*

WP8 description

WP No.8	
Work Package/Activity type	☐ Preparation ☐ Management ☐ Implementation (the substance of the work planned including production, testing, etc.) ☒ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Quality Control
Description *(Recommended limit 1500 characters)*	Quality Control is part of the Sprint Review process within the PM P2...P7. The corresponding phases are prepared together with external partners (CCI) in the last third of each sprint, the results of this QA are discussed on the final PM and adopted as deliverable.
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	BUT
Participating organisations	All partners

WP8 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP8	
	Title	
	Type	
	Description *(Recommended limit 1500 characters)*	
	Due date	

	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP8 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.9. Work Package 9 – *(Evaluation)*

WP9 description

WP No.9	
Work Package/Activity type	☐ Preparation ☐ Management ☐ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☒ Evaluation ☐ Dissemination and Exploitation of results
Title	Evaluation
Description *(Recommended limit 1500 characters)*	In the last phase of the project, a more intensive evaluation of the successful implementation of the two project priorities • HEI network • Network of industrial partners has to be done based on the structures built up with the other WP and using the expertise of various CCI. The exact methodology is to be determined in the course of the project implementation.
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	BUT
Participating organisations	All partners

WP9 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP8	
	Title	
	Type	
	Description	

	(Recommended limit 1500 characters)	
	Due date	
	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP9 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.10. Work Package 10 – *(Digital Tools)*

WP10 description

WP No.10	
Work Package/Activity type	☐ Preparation ☐ Management ☒ Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Digital Tools
Description *(Recommended limit 1500 characters)*	
Tasks *(Recommended limit 3000 characters)*	
Estimated start date	11/2020
Estimated end date	10/2023
Lead organisation	BUT
Participating organisations	All partners

WP10 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP8	
	Title	
	Type	
	Description *(Recommended limit 1500 characters)*	
	Due date	

	Language(s)	
	Media(s)	
Dissemination level	☐ Public ☐ Restricted to other programme participants (including Commission services and project reviewers) ☐ Confidential, only for members of the consortium (including EACEA and Commission services and project reviewers)	

WP10 Explanation of Work Package expenditures

Please explain what costs will be associated to each Work Package and covered by scale of unit costs. If learning mobilities are to be organised, please explain what is covered under the heading for "travel and subsistence costs" (Recommended limit 3000 characters).

VII.7. Overview of consortium partners involved and resources required

Please add lines as necessary according to number of Work Packages and partners involved.

Indicative input of consortium staff - *The total number of days per staff category should correspond with the information provided in the budget tables.*

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category	Category	Category	Category	Total	
				1	2	3	4		
1	**Lead partner**	ULEI	Germany	**8**	**50**	**70**	**12**	**140**	
		INSA	France	**4**	**21**			**25**	
		HSO	Germany	**4**	**21**			**25**	
		UTC	Romania	**4**	**24**			**28**	
		LUT	Finland	**4**	**21**			**25**	
		Schaeffler	Germany	**2**	**16**			**18**	
		Arxia	Romania	**5**	**17**			**22**	
		TPlast	Romania	**5**	**17**			**22**	
		Jantschgi	Austria	**4**	**13**			**17**	
		TI Minsk	Belarus	**5**	**17**			**22**	
Subtotal				**45**					
2	**Lead partner**	LUT	Finland	**4**	**30**	**30**			
		ULEI	Germany	**10**	**30**	**150**			
		INSA	France	**4**	**30**	**30**			
		HSO	Germany	**3**	**20**	**20**			
		UTC	Romania	**2**	**20**	**30**			
Subtotal									
3	**Lead partner**	HSO	Germany	**14**	**50**		**15**		

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category	Category	Category	Category	Total	
				1	2	3	4		
		INSA	France	**24**	**90**	**80**	**20**		
		UTC	Romania	**8**	**45**		**4**		
		LUT	Finland	**14**	**50**		**15**		
		TI Minsk	Belarus	**5**	**50**		**2**		
Subtotal									
4	**Lead partner**	INSA	France	**3**	**16**				
		ULEI	Germany	**13**	**2**		**5**		
		HSO	Germany	**3**	**16**				
		UTC	Romania	**3**	**16**				
		LUT	Finland	**3**	**16**				
		Jantschgi	Austria	**3**	**16**				
		TI Minsk	Belarus	**30**	**100**				
Subtotal									
5	**Lead partner**	Jantschgi	Austria	**30**	**160**		**22**		
		ULEI	Germany	**8**	**15**	**90**			
		Schaeffler	Germany		**23**				
		Arxia	Romania	**11**	**80**				
		TPlast	Romania	**11**	**80**				
		TI Minsk	Belarus	**15**	**120**				
Subtotal									
6	**Lead partner**	ULEI	Germany	**100**			**200**		
		INSA	France	**30**			**70**		

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category	Category	Category	Category	Total	
				1	2	3	4		
		HSO	Germany	**30**			**70**		
		UTC	Romania	**30**			**70**		
		LUT	Finland	**30**			**70**		
		Arxia	Romania	**30**			**70**		
		TPlast	Romania	**30**			**70**		
		Jantschgi	Austria	**30**			**70**		
		TI Minsk	Belarus	**30**			**70**		
Subtotal									
7	**Lead partner**	UTC	Romania	**40**	**135**				
		ULEI	Germany	**15**	**50**				
		INSA	France	**25**	**85**				
		HSO	Germany	**25**	**85**				
		LUT	Finland	**25**	**85**				
		Schaeffler	Germany	**10**	**20**				
		Arxia	Romania	**15**	**50**				
		TPlast	Romania	**15**	**50**				
		Jantschgi	Austria	**15**	**50**				
		TI Minsk	Belarus	**25**	**85**				
Subtotal									
8	**Lead partner**	ULEI	Germany	**15**	**20**		**50**		
		INSA	France	**3**	**4**		**6**		
		HSO	Germany	**3**	**4**		**6**		

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category	Category	Category	Category	Total	
				1	2	3	4		
		UTC	Romania	3	4		6		
		LUT	Finland	3	4		6		
		Schaeffler	Germany	3	4		6		
		Arxia	Romania	3	4		6		
		TPlast	Romania	3	4		6		
		Jantschgi	Austria	3	4		6		
		TI Minsk	Belarus	3	4		6		
Subtotal									
9	**Lead partner**	HSO	Germany	**13**	**94**		**25**		
		INSA	France	**1**	**4**		**10**		
		UTC	Romania	**1**	**4**		**10**		
		LUT	Finland	**1**	**4**		**10**		
Subtotal									
10	**Lead partner**	INSA	France	**8**	**20**	**140**			
		UTC	Romania	**8**	**20**	**140**			
		LUT	Finland	**8**	**20**	**140**			
		TI Minsk	Belarus	**8**	**20**	**140**			
Subtotal									
TOTAL									

VII.8. Overview of expected results (outputs and outcomes)

Please add lines as necessary according to number of Work Packages (WP) and results (outputs or outcomes).

Nº of WP	Lead organi-sation (Pn)	Delive-rable nr	Start date	End date	Title of the deliverable	Medium that will be used (publication, electronic, online, other (specify))	Languages	Dissemination level (Public, Restricted, Confidential)	Target groups/potential beneficiaries

PART VIII. Specific arrangements regarding Associated Partners (if applicable)

In addition to full partners, Knowledge Alliances can also involve Associated Partners who contribute to the implementation of specific project tasks/activities or support the dissemination and sustainability of the Alliance. From a contractual point of view, they are not considered as project partners and do not receive funding, however it is important to make clear in the application how they will contribute to the project

Please list hereafter the associated partners

Names of the Associated Partner organisations	**Types of organisations**

Explain their involvement and role in the project and different activities (Recommended limit 1500 characters)

Annex – Affiliated Entities (if applicable)

Please fill in this Annex in case your Consortium involves Affiliated Entities.

I. List of Affiliated Entities that are members of the beneficiaries' organisation(s) involved in the application

Please fill in the table indicating the beneficiaries' and their affiliated entities who will participate in the project activities.

Beneficiary Nº *(please use the same numbering both in the eForm and in the Excel budget table)*	**Name of the beneficiary (partner) organisation**	**Country**	**Affiliated Entity Nº** **AE (AE1 – AEn)**	**Name of the Affiliated Entity of the beneficiary organisation**	**Country of the Affiliated Entity**
P 1			AE	Affiliated Entity 1	
				Affiliated Entity 2	
				Affiliated Entity 3	

II. Description of the Affiliated Entities

This section must be completed separately by each Affiliated Entity participating in the project. Please use the same numbering as in the table above, corresponding to the one on the eForm and the Excel budget table (e.g. AE1 refers to Affiliated Entity 1 of the beneficiary organisation who is Px in the eForm).

Partner number - P x *[P1 – Pn] (beneficiary organisation)*
Affiliated Entity number AE x (AE1 – AEn) (member of the beneficiary organisation)

Organisation name	
Country	

Please provide information on the legal or capital link between the Partner organisation and the Affiliated Entity. Please briefly describe the profile (with regard to the required types of organisations) and the role of your organisation in the project.
Please indicate the names of the staff that will be involved and provide a brief description of their expertise.

III. Overview of consortium partners and their Affiliated Entities and resources required

Please add lines as necessary according to number of Work Packages, partners and Affiliated Entities involved.

Indicative input of consortium staff - *The total number of days per staff category must correspond to the information provided in the budget tables.*

For each Work Package concerned, please fill in the table for each partner organisation whose Affiliated Entities will be involved in the project activities. Please list the number of days and tasks allocated to each Affiliated Entity in additional rows. The number of days dedicated to a beneficiary organisation has to be splitted between the partner organisation and its Affiliated Entity. For example, the partner organisation has 10 days for category 1, but after including the Affiliated Entities, it will have 5 days, Affiliated Entity 1 - 3 days and Affiliated Entity 2 – 2 days (total will be 10). Information regarding the other partners should not be modified.

Nº of Work Package	**Partner organisations involved**	**Country**	**Number of staff days**					**Role and tasks in the Work Package**
			Category	**Category**	**Category**	**Category**	**Total**	
			1	**2**	**3**	**4**		
1	P(x) Partner organisation							
	Affiliated Entity 1 (name of the organisation)							
	Affiliated Entity 2 (name of the organisation)*							
	Affiliated Entity 3 (name of the organisation)*							
2	P(x) Partner organisation							
	Affiliated Entity 1 (name of the organisation)							
	Affiliated Entity 2 (name of the							

	organisation)*							

*Please add rows as necessary.