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. – 2158 characters*

Knowledge and skills in the field of **Systematic Innovation Methodologies** (SIM) has a growing importance as a cross-sectional qualification for systematic analysis of complex contradictory situations in everyday professional life and to reveal innovative solutions. The further development of SIM training structures can only take place in close contact between experienced HEI training institutions and industry. 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 Technologies AG & Co. KG 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.

To increase the strength of SIM knowledge and skills structures in Europe this Knowledge Alliance **aims to**

1. **form** a strong networking structure of already successful SIM teaching and training in HEI at different EU locations and in different forms of HEI,

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,

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 use cases and challenging operational tasks for training and further development of the students,

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

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

The project contributes to strengthen the innovative power of EU companies by expanding structures of SIM training and further education in close and sustainable cooperation between HEI, 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.

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) – 3386 characters

Systematic Innovation Methodologies (SIM) are an important tool for structuring complex, contradictory requirement situations that occur not only in engineering but in many other domains (requirements engineering, business planning, sustainability management, change management, technology forecasting, …) and are thus increasingly important as skills that are required on a broad range in companies in order to keep up with the growth markets of the future. Having systematic *invention* methodologies at its core SIM also consider the conditions of implementation of such inventions in the economic context as *innovations*, establishing the link between social objectives and technical feasibility on a scientific basis.

Such challenges affect the fields of activity not only in engineering and technical professions, but increasingly also of the middle management. The ability to quickly analyse socio-technical systems in sufficient depth in interdisciplinary teams on the background of rapidly changing business conditions requires coordinated methodological *and* technical knowledge and skills, a challenge for both theory and practice.

The broad formation of such knowledge and skills is the subject of SIM training thus addressing important cross-sectional skills with significant influence on the cultural-technical development potential of companies on the long run. This **challenge to Europe's innovation capacity** requires the broad anchoring of such training structures in HEI of different form within Europe's higher education systems and beyond it.

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. Our analysis has shown that European industrial companies do still insufficiently recognise the strategic importance of SIM skills. 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 in the broader socio-economic environment – see (Heilbronn 2020) – rather than at the level of individual companies.

Our project aims to take the networking of SIM 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 HEI of different form and at different 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) – 2783 characters

The full partners are both HEI and industrial companies in which the strategic importance of SIM has already been recognised. SIM training and the development of relevant human resources as part of their own HR strategy are already strategically anchored in the objectives of these participating organizations. From the project they *expect a significant boost* not only to their own activities through the strengthening of appropriate structures by leveraging synergies and consolidating overarching structures at European level, but will also benefit from the specific experiences of *additional partners* joining the network. This will further enhance both the visibility and recognition of the importance of developing SIM skills within the different objectives in the strategic development concepts of participating organisations.

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. Such a regional development approach is to be bundled in a *Central German SIM Competence Centre*, which is currently being established. Special support in these effort is expected from partners in Minsk, with whom Leipzig University

has traditionally good relations, for example through an ERASMUS University Partnership between Leipzig University and BSU Minsk, which has been in place since 2006. Even if this regional development project cannot be a focal point of this application, its experiences will be 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.

I.1.3 Please explain how the expected results, outputs and outcomes will meet the identified needs. (Recommended limit 1500 characters) – 3220 characters

We explain how the expected results, outputs and outcomes meet the identified needs relating this to the fundamental project objectives (epics) described in more detail in Section 1.3.1.

Epic 1: Just as semantically based *research data infrastructures* are currently being set up in the European area, the SIM-SSN will be a *teaching data infrastructure* based on similar principles to support the various cooperation requirements in the KA with digital tools. The decentralised operating concept ensures that partners provide their own resources in order to participate in this infrastructure in the long term, thus ensuring its operation beyond the scope of the full partners and beyond the end of the project. **Related project activities are planned in WP 1 and 2**.

Epic 2: The development of new and the enhancement of existing courses and teaching materials forms the bridge between teaching concepts and teaching experiences. This was and is an ongoing task, especially for the SIM-experienced HEI training institutions in the project, regardless of whether they are involved in a KA. In the project, this development process is to be traced in more detail on four examples, documented and discussed with the involvement of industrial partners, in order to increase quality standards. **Related project activities are planned in WP 3, in WP 5** (involving industry) **and WP 9** (evaluation).

Epic 3: The use, development and improvement of digital tools that support the educational process is an essential characteristic of teaching in the digital age, but at the same time a resource-intensive challenge. Here, too, it is important to leverage mutual synergies bringing the existing platform projects of the HEI partners closer together and further developing their complementarity by setting appropriate priorities. **Related project activities are planned in WP 10**. A clear roadmap on these issues can only be established after a more thorough joint analysis of the existing tools, which INSA, as the lead of this WP, will set up during the first sprint.

Epic 4: As a result of this project effort, a Common Use Case Collection (CUCC) of exciting challenges is to be compiled, for which SIM approaches have proved particularly effective. The structure is to be set up as an OER that can be used publicly. However, it should be considered more carefully how to deal with the availability of solutions, as it is not advisable to make them publicly available. This collection, which will initially be built up from parts of the partners' holdings, will be further enriched and qualified through close contact with industrial partners. **Related project activities are planned in WP 3, in WP 5** (involving industry) **and in WP 2** (interoperability with the SIM-SSN).

Epic 5: Within the framework of the project, our priority task is to activate further potential for our KA as *additional partners.* We plan to reach the main target groups as described in section IV.1.1 with target group specific measures using the coordinating potential of ETRIA, multiplier effects between industrial companies and support by socio-economic environment, as, e.g., the Chambers of Commerce and Industry (CCI). **Related project activities are planned in WP 7.**

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) – 5137 characters

In an analysis in preparation for this application, Schaeffler Technologies 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 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.

  This paper shows that SIM training structures at HEI already existing in Europe go far beyond the core of the full partners involved in the project. There are already working contacts with a number of actors mentioned there, even if they argued in the end not to participate in the time-consuming preparation of this proposal. However, we assume that these partners will quickly join the KA if appropriate participation structures are proposed. **This relates to epic 5**.
- The survey (Bušov 2016) where the author explains 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).

  Even though Bušov at the end withdrew from the consortium for private reasons, his surveys on SIM structures in the Czech Republic show very clearly that and how a networking of SIM training capacities, consulting structures, network formation with other HEI, industrial partners and the wider socio-economic environment is conducive to identify and exploit the needs, potential and opportunities of closer cooperation in the field of SIM training. **These positive experiences are to be transferred to the European level** with our project, whereby we will of course also continue to promote cooperation with Czech partners.
- 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.

  This overview ranges from top-class academic research, stable industry contacts, founding start-ups as spin-offs in order to bring new research results to market, to sustainable teaching structures in the SIM area. This demonstrates the high dynamics of this area of modern innovation research, which requires concepts of "research-based teaching", according to which teaching content and teaching tools must be constantly developed further in line with the latest research findings. **This relates to epics 2-4**.

The project offers several **points that are new and different**.

- It emphasises the importance of building a digital supporting infrastructure based on Semantic Web tools and concepts to further increase the visibility of the topic. This extends the efforts to set up a European research data infrastructure to a teaching data infrastructure in the field of SIM training.
- It emphasises the importance of concepts for modern teaching with digital tools, media and materials ranging from entire course concepts to small 2-minute teaching sub-units to support compilation of individual learning scenarios adapted to the personal situation.
- It emphasises the potential of cooperative use of publicly available and jointly developed learning content in the spirit of the Open Source movement by focusing on marketing models of "training as a service" instead of "training materials as valuable assets”.

At the same time we pursue **essential innovative methods to trainings**, 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 Technical University Brno. 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.

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) – 5271 characters

To increase the strength of SIM knowledge and skills structures in Europe this Knowledge Alliance **aims to**

1. **form** a strong networking structure of already successful SIM teaching and training in HEI at different EU locations and in different forms of HEI,

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,

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 use cases and challenging operational tasks for training and further development of the students,

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

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

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. This is explained in section II.1 in more detail.

The project centers around the following **main objectives** (epics):

Epic 1: SIM-SSN. Plan, design, implement, run and improve a semantically supported decentralized digital infrastructure, the SIM Semantic Social Network. Related activities are planned in WP 1 and 2.

Epic 2: Development of courses and teaching materials. Define course projects for different HEI partners that will be developed, piloted, published, evaluated and promoted within the project. Related activities are planned in WP 3 with supporting activities in WP 7 (dissemination) and WP 9 (evaluation).

Epic 3: Extend existing digital tools. Qualify digital tools for application and teaching SIM that are used and developed by three HEI partners and Target Invention. This epic centers around use, collect requirements, redesign, evaluate, promote these tools and cooperation between partners. Related activities are planned in WP 10.

Epic 4: Development of a semantically based Common Use Case Collection (CUCC) 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 the CUCC as a first class OER to be maintained cooperatively. Related activities are planned in WP 3 with supporting activities in WP 5 (involving industry).

Epic 5: 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. Related activities are planned in WP 7.

These main objectives of the project address the problems and challenges identified above in two main directions. **Structurally**, the network structures to be established or further strengthened and interconnected building up a digital infrastructure support the *coordination of SIM teaching activities*, help to raise the *awareness of the KA to a greater public* and support the *structuring of activities within the partner network* at large. This is in particular *important for our priority task* to activate further potential for our KA as additional partners. Concerning the **output production** epics 2-4 *boost the development, piloting, publishing and promotion of teaching concepts, offers and OER teaching materials using and enhancing modern digitally backed infrastructures*.

Our project contributes to achieve **the following objectives of the Knowledge Alliances action:**

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

It acts towards *developing SIM skills* as part of modern *entrepreneurial mind-set and skills,* since

- 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.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) – 1698 characters

The initiative for this KA came from HEI, who either already have extensive experience in SIM training (INSA, HSO, LUT, UTC) or want to establish such training (ULEI). Each of these institutions has its own local networking structures with industrial partners, which are both source of input and target of corresponding training efforts.

The different experiences gained at the different locations on culturally and organizationally different backgrounds are the **main contributions** that the participating HEIs bring to the project.

The KA is intended to increase the visibility of these experiences to each other, but also to the primary target groups from the HEI sector identified in Section IV.1, highlighting best practices and facilitating cooperation. This gives access to knowledge, experience, tools, best practices and cooperation facilities as a first-class resource for further sharpening the own profile as **short-term benefit**, using particularly the intensive theoretical (WP 3) and practical (WP 4) exchange on concepts and teaching methods.

There is no significant difference of the short-term and long-term benefits between the full partners of the project and the primary target groups as identified in Section IV.2.2, since the involvement of the full partners and the additional partners in the project differs only in the intensity of involvement in the work processes of the KA.

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 that improves the visibility and competitive position of the partners on the training market.

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) – 1354 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 Technologies, Arxia, Tehnoprod Plast) 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 provide internships and theses in their companies as a contribution to the training tools that can be offered by the participating HEIs.

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 Target Invention Minsk with their extensive experience in the Asian market and profound knowledge of the TRIZ roots of today's more comprehensive SIM approaches. Involving these high-certified TRIZ experts in the project opens an additional perspective to the heterogeneous international developments in the SIM field.

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) – 1323 characters

The added value for the EU lies in the consolidation of SIM training activities and capacities as 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 and regional 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.

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) – 2442 characters

As one of the priority objectives of the project is the early involvement of additional partners in the activities of the KA, only an **agile strategy approach** can be applied to address the identified needs, which on the one hand secures the basic structure of the orientation along the project's objectives, but on the other hand allows for a flexible response to new impulses and challenges brought in by the new partners.

Our project organization is guided by the **SCRUM methodology** as an established agile process methodology which has already proven itself as successful in comparable project contexts. In particular we use the instrument of **SRCUM Epics** to transform the central goals of the project into practical action. 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.

According to the SCRUM methodology 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 P**roject Meetings P1 to P7**. At these Project Meetings the operational status of the work is analysed in more detail and deliverables in advanced stage are presented and discussed and essential deliverables are finally confirmed.

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.

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) – 6264 characters

Established SCRUM instruments are used to coordinate the work of the consortium. The **coordination is based on jointly agreed management documents** (Project Plan, Release Plan, Dissemination Plan), with the **Project Plan** being the central one. From these management documents the further documents for structuring the operational work according to the SCRUM methodology (Project Backlog, Sprint Backlog, Definition of Done, Burndown Chart) are to be derived. In the sense of an agile approach, these management documents are to be jointly updated at the Project Meetings P1 to P7 in order to take sufficient account of current developments and new approaches in the project implementation.

A 22-page document entitled *Work Packages and Budget Allocation* was produced preparing the project application in order to elaborate the project logic in detail and break it down to the specific requirements of the call. This document will be updated as *Initial Project Plan* to be adopted at P1.

The consortium tries as far as possible to arrive at decisions by mutual agreement. Three structures are envisaged for the concrete **decision-making**

- the lead of each partner,
- the lead of the individual WP as a closer management structure (this has already proved its effectiveness during the preparation of the application),
- ULEI as the applicant, which has overall responsibility for the project in relation to the EU and thus has a veto right over decisions that run against the objectives of the project.

The resources required for **internal project management** and documentation were calculated on the basis of our project experience and planned in WP 6 on a flat-rate hourly basis.

The **division of tasks between the partners and the allocation of resources** is described based on the epics as our main objectives described in section 1.3.1

Epic 1: After the partners have made the necessary contributions (WP 1), ULEI, as a partner with extensive experience in the application of semantic technologies, will be responsible for further processing of the data according to semantic principles as well as requirements analysis, design and technical implementation of the SIM-SSN in WP 2. LUT will monitor the work in the role of a SCRUM Product Owner. The delivery of the basic version as well as current updates are to be recorded in the Release Plan and presented for release at the respective Sprint Reviews at the project meetings. With regard to the implementation work to be carried out, a larger share of the personnel category technician is assigned to WP 2.

Epic 2: The work to be done for this epic is assigned to 4 HEI partners who already have extensive experience in SIM training. During the preparation of the application, a larger number of possible projects were suggested which could be implemented within the scope of this epic. Based on the priorities resulting from the analysis in WP 1, the responsible project partners each propose one of these projects for implementation. The selection will be substantiated at the Project Meeting P1 and detailed in the Project Plan, explicitly involving the industrial partners in the target definition with WP 5. In the following year, the project will be realized as a teaching project with an interim report at P2 and presentation of the results of the first roll out at P3, explicitly involving the industrial partners in the evaluation with WP 5. Further qualification in terms of content and methodology as well as a first evaluation are due at P4 as interim presentation and P5 as presentation of results, dissemination and joint use by the partners at P6 and P7.

Epic 3: The work to be done for this epic is assigned to 4 project partners, who already have experience in developing appropriate tools. A more detailed analysis of the possibilities of these tools is scheduled in WP 1 and part of the corresponding report to be presented at P1. On this basis, the cooperative approaches to be implemented in WP 10 are to be agreed upon more precisely among the participants. The projects are to be refined in the Project Plan at P2, and the more precise time targets for the implementation stages in the Release Plan, explicitly involving the industrial partners in the target definition with WP 5. Success control and, if necessary, target corrections are carried out within the scope of the Sprint Reviews at P2 to P6, the final presentation at P7, whereby this is, in the sense of *Software as a Process*, also only a further milestone in the development of the *SIM Cloud*. With regard to the implementation work to be carried out, a larger share of the personnel category technician is assigned to WP 10.

Epic 4: The work to be done for this epic is divided into two areas – the acquisition and structuring of content and its further processing using semantic technologies. The responsibility for the latter is at ULEI, since the collection is to be made available as part of and via the access mechanisms of the SIM-SSN. Accordingly, this part is included in the release planning of the SIM-SSN. The acquisition and structuring of content starts with the inspection of corresponding content that already exists at the partners and is made available to the CUCC (due at P2). First of all, the examples have to be evaluated, the data structures of the partners have to be harmonized and the provided data stocks have to be transformed (due at P3) and made available online in a first prototype (due at P4). Thus, a major milestone of WP 3 has been reached. On this basis, the expansion of the CUCC is to be advanced, in particular through contributions from industry in WP 5. In order to specify the steps to be taken, the Project Plan must be refined at P1 and P4 by HSO as package lead.

Epic 5: It is planned to involve further partners in the work of KA as early and broadly as possible. This is a core objective of our dissemination strategy, the achievement of which we intend to organise in close coordination with and support from ETRIA. Details on this are still to be developed in the Dissemination Plan, which is to be presented and adopted on the basis of the analysis work in WP 1 at P1 by UTC as package lead of WP 7. About 17% of the KA grant is reserved for WP 7 to implement the dissemination strategy.

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) – 3275 characters

In order to prepare the project meetings, as part of the quality assurance the project partners have to deliver a report about their own contributions to the current work status, which will be summarized for the Sprint Review by the ULEI as lead of WP 8 as basis for the analysis of the project status on the project meeting.

In the Sprint Retrospective, according to the SCRUM methodology, the obstacles and deviations from the project plan are analysed in more detail and necessary adjustments of the project alignment are worked out, which are then incorporated into the management documents and considered in the planning of the next Sprint.

This form of guided self-assessment as **specific quality measure** is a recognized and widely used manual quality assurance method for the qualitative evaluation of process-related aspects.

The presentation of outcome indicators, monitoring and evaluation is again based on the epic structure of our main objectives, see Section 1.3.1.

Epic 1: Monitoring for setting up the SIM-SSN is essentially performed within the framework of SCRUM structures, i.e. through interaction of LUT as SCRUM Product Owner and ULEI as Implementation Team and reporting the work status in the Sprint Reviews at the Project Meetings. A continuous evaluation results from user feedback on the different quality parameters of the software within the issue tracking system provided by github. These quality parameters according to ISO/IEC 25000 are to be specified more precisely within the framework of the requirements analysis. Outcome-indicators are user and access statistics, which, however, are to be digitally collected only sparsely due to data protection considerations.

Epic 2: These WP 3 activities are monitored via reporting on the Project Meetings. Their evaluation is organised by the stakeholders themselves as part of the WP 9 using a common methodology to be developed in this WP by HSO as package lead as a third party. Outcome indicators for the effectiveness of these and other courses is the number of participants enrolled in the courses.

Epic 3: The WP 10 activities are monitored via reporting on the Project Meetings. For evaluation and outcome indicators – user and access statistics – our project draws on the survey structures already implemented in these platforms.

Epic 4: This WP 3 activitiy is monitored via reporting on the Project Meetings. The evaluation is carried out by the target group of trainers in the context of the promotion activities in WP 7 (Story 7.2) as well as more intensively in contact with the industrial partners in WP 5. Outcome indicator is the size of the CUCC.

Epic 5: Monitoring and evaluation are to be based on an impact analysis of the corresponding dissemination measures. Corresponding analysis concepts are to be incorporated in the dissemination plan. The outcome indicator is the number of partners who explicitly commit themselves to participate in the networkIn order to prepare the project meetings, as part of the quality assurance the project partners have to deliver a report about their own contributions to the current work status, which will be summarized for the Sprint Review by the ULEI as lead of WP 8 as basis for the analysis of the project status on the project meeting.

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) – 1249 characters

The term validation of learning outcomes is understood as: The confirmation by a competent body that learning outcomes ... acquired by an individual … have been assessed against predefined criteria and are compliant with the requirements of a validation standard. Validation typically leads to certification. (European guidelines for validating non-formal and informal learning. Office for Official Publications of the European Communities, 2009. p. 15).

In the area of SIM training, only certification by MATRIZ, the International TRIZ Organization, is significant in this respect. Among the HEI involved, there is no common position on the question about the extent to which this expensive and time-consuming certification process should be supported in addition to granting Bachelor's or Master's degrees. Setting up further education programs, some partners have established their own certification procedures. In the project, these questions are of interest in the context of harmonising course offerings in WP 3 and the object of exploring corresponding expectations on the side of industry in WP 5. Since our proposal is aimed at building cooperation structures between organisations, such questions arise only on the periphery of the project.

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) – 1749 characters

The budget allocation was based on a 5-step approac

1. Approximate percentage allocation of the budget to the individual WPs according to their importance in the project.
2. Planning of the epics in order to fix the overall project logic and to determine what contribution are to be scheduled to the individual WPs for the respective epic.
3. Fixing the contributions in the individual WPs as Stories, distributing the allocated resources in the WP to the individual Stories and assigning them to the involved project partners.
4. Conversion of these amounts into funded person-days in the personnel categories required for the implementation of the stories.
5. Balancing between the partners by redistributing shares *and* tasks.

In this way, a budget distribution could be achieved that was accepted by all partners, taking into account upper and lower limits of the partners' participation.

We assume that the grant awarded to our KA covers about 50% of the real costs, i.e. the individual institutions have to make a substantial contribution of their own to the project implementation, which is usually provided by involving full-time staff. This is possible because the project implementation at the HEI is closely linked to the SIM training as their teaching service and in the participating companies these expenses can be presented as personnel development expenses. These boundary conditions were communicated during the budget distribution and were accepted by the partners. Thus, the cost efficiency of the implementation of the measures is sufficiently demonstrated.

Ensuring that the implementation is in time is subject of the general project management and will be monitored using standard progress control instruments from the SCRUM methodology.

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) – 2814 characters

The HEI partners INSA Strasbourg, HS Offenburg, LUT Lappeenranta and UTC Cluj-Napoca are 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 a strong research institution with focus on the education of young French engineers, HSO as a University of Applied Studies is a 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. Nowadays it is a research-strong university of general orientation with a full range of subjects. 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 trainings. The initiative is driven by an interdisciplinary team from 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 industrial companies involved in the project also all have experience with SIM deployment. Three of the companies are from the production sector – Schaeffler Technologies, a large German engineering company, as well as two SMEs, one from the manufacturing sector and one from computer business. Jantschgi C&R, the fourth company, is a consulting and training provider that also has many years of experience in the SIM sector.

Thus, on the industrial side, too, sufficient European experience has been gathered to achieve the objective pursued by KA to combine the experience gained in training at HEI – during the "production" of graduates – and qualified requirement profiles from the companies as "consumers" of graduates for the further qualification of the training.

Target Invention Minsk as an SME partner and a consulting and training provider from the partner country Belarus plays a special role in the consortium since it bundles decades of experience in consulting and application of innovative methodologies, especially in the Asian market (South Korea, China). The company is still a valued partner on the Asian market and belongs to the core of the SIM School in Minsk, which had and has a great influence on the development and consolidation of European SIM structures.

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 (ULEI) 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, ULEI 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. ULEI 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 ULEI 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/).

ULEI 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 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. The focus of IIRM is directed to an integrated approach for sustainable planning, operating and managing technical infrastructure systems for energy, 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 at 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 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 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 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)

Unlike the other HEI partners, ULEI 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 ULEI 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.

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.*
	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 Division of Software Systems, Faculty of Mathematics and Computer Science. 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 (1983) and habilitated (1988) on algebra, computer algebra and combinatorics. Since 1990 he is a staff member at the Institute of Computer Science at ULEI, 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 to the SIM community. With the plan to establish 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. **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 (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

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.*
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: 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.

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.*
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 a foundation for inventive design studies", Computers in Industry, 323–336, 2011,

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.*
	Elsevier.
Sebastien Dubois	Sébastien Dubois is a Research Engineer at the INSA Strasbourg graduate school of science and technology. He is supporting research activities in the field of innovative and inventive methods for technical problems solving. He teaches inventive problem solving methods at the master level. He got his Engineering degree in Mechatronics in 2000 at the Superior National University of Arts and Industry of Strasbourg. In 2004, he defended his PhD thesis in Engineering Sciences on the subject of TRIZ models used in inventive design. He also passed an Advanced Master in Innovative Design in 2006. He had developed research on inventive theory for problem solving, extending the model of TRIZ contradiction to fit complex systems requirements. He teaches both in initial training at the level of Master and in lifelong learning programs. His topic of teaching is the creative personality development, focusing on dialectical thinking and the reformulation process. He also participates to industrial partnerships to apply the developed approaches in order to help companies to design new technical systems. These projects lead to several patents in which S. Dubois is recognized as co-inventor. Today, his main subjects of interest are linked with the dialectic thinking and how to build cross-fertilization between creative mind approaches and automatic approaches to solve problems in industrial context, based on optimisation methods. **List of selected publications:** Sébastien Dubois, Roland De Guio, Hicham Chibane. Differences and Complementarities between C-K and TRIZ. In Rachid Benmoussa, Roland De Guio, Sébastien Dubois, Sebastian Koziołek (eds). New Opportunities for Innovation Breakthroughs for Developing Countries and Emerging Economies. Proceedings TRIZ Future 2019, 135-143, 2019. Springer. DOI: 10.1007/978-3-030-32497-1_12. Fatima Zahra Ben Moussa, Roland De Guio, Sébastien Dubois, Ivana Rasovska, Rachid Benmoussa. Study of an innovative method based on complementarity between ARIZ, lean management and discrete event simulation for solving warehousing problems. J. Computers & Industrial Engineering, vol. 132, 124-140, 2019. DOI: 10.1016/j.cie.2019.04.02 Hicham Chibane, Sébastien Dubois, Roland De Guio. From optimization till contradictions resolution related to the process of machining composite materials, The 2019 International Conference on Systematic Innovation, Liverpool, 2019. Sébastien Dubois, Hicham Chibane, Roland De Guio, Ivana Rasovska. From Simulation to Contradictions, Different Ways to Formulate Innovation Directions. In Sebastian Koziołek, Leonid Chechurin, Mikael Collan (eds.). Advances and Impacts of the Theory of Inventive Problem Solving. 83-91, 2018. DOI: 10.1007/978-3-319-96532-1_8 Sébastien Dubois, Nicolas Maranzana, Nathalie Gartiser, Roland De Guio. A global approach to manage the performance of the problem solving process in innovative design. International Journal on Interactive Design and Manufacturing, vol 11, 351-363, 2017. DOI: 10.1007/s12008-016-0357-9.
Hicham Chibane	Chibane Hicham is an associate professor at INSA Strasbourg since 2016 in the mechanical department in various disciplines of mechanics. He did a doctoral thesis on the machining of composite materials. In research, he works on the use of inventive design to develop new materials and structures. He also works on the transition from modelling to invention using the feedback of the companies. **Publications (selection):** A. El Magri, K. El Mabrouk, S. Vaudreuil, H. Chibane, M Ebn Touhami. Optimization of printing parameters for improvement of mechanical and thermal performances of 3D printed poly(ether ether ketone) parts. Journal of Applied Polymer Science, 2020. Wiley. S. Periane, A. Duchosal, S. Vaudreuil, H. Chibane, A. Morandeau, J. Cormier. Machining influence on the fatigue resistance of Inconel 718 fabricated by Selective Laser Melting (SLM). Procedia Structural Integrity 19, 415-422, 2019. Elsevier. R. Serra, H. Chibane, A. Duchosal. Multi-objective optimization of cutting parameters for turning AISI 52100 hardened steel. The International Journal of Advanced Manufac-

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.*
	turing Technology 99 (5-8), 2018. Springer. H. Chibane, R. Serra, R. Leroy. Optimal milling conditions of aeronautical composite material under temperature, forces and vibration parameters, Journal of Composite Materials 51 (24), 3453-3463, 2017. Sage. H. Chibane, A. Morandeau, R. Serra, A. Bouchou, R. Leroy. Optimal milling conditions for carbon/epoxy composite material using damage and vibration analysis. The International Journal of Advanced Manufacturing Technology 68 (5-8). 2013. Springer. A. Morandeau, H. Chibane, A. Bouchou, R. Serra, D. Bonhoure, R. Leroy. Machining carbon fibre reinforced plastics: lead angle effect. International Journal of Machining and Machinability of Materials 13 (2-3), 2013. Interscience.
Pei Zhang	Dr. Pei Zhang is currently a post-doctoral researcher at INSA de Strasbourg. Her research interest is Artificial Intelligence and knowledge engineering. Her research involves Natural Language Processing, Ontologies and ontology reasoning, machine learning and information retrieval systems. Now she is the project manager for PhysiSolve, which uses machine learning to retrieve effects and articles from other domains to inspire inventive design ideas. She also led 4 web application developments. She has tutored 6 students in computer science and was teaching inventive design methodology at INSA de Strasbourg. **Publications:** Pei Zhang, et al. Experience Capitalization to Support Decision Making in Inventive Problem Solving, Computers in Industry, 2018. Pei Zhang, Amira Essaid, Cecilia Zanni-Merk, Denis Cavallucci. Case-based Reasoning for Knowledge Capitalization in international Inventive Design Using Latent Semantic Analysis. Proceedings KES 2017. Procedia Computer Science 112 (2017), 323-332. Elsevier Publishing. Pei Zhang, et al. Can Altshuller's Matrix be Skipped Using CBR and Semantic Similarity Reasoning? In: Sebastian Koziołek, Leonid Chechurin, Mikael Collan, Mikael (Eds.). Advances and Impacts of the Theory of Inventive Problem Solving. Proc. TRIZ Future 2017. 27-37. Springer Publishing. DOI: 10.1007/978-3-319-96532-1 Pei Zhang, Cecilia Zanni-Merk, Denis Cavallucci. Latent Semantic Indexing for Capitalizing Experience in inventive design. Proceedings KES-SDM 2017. SIST vol. 68, 37-47. Springer Publishing. DOI: 10.1007/978-3-319-57078-5 Pei Zhang, et al. Towards Sustainability in Early Stages of Innovation Processes, Virtual Concept international Workshop, 2016. Pei Zhang, Cecilia Zanni-Merk, Denis Cavallucci. Towards Experience Capitalization for Inventive Problem Solving, TRIZ Future 2016. ETRIA Journal 2017-03.

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 <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)

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 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.

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.*
	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 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 databases).

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	Stelian Brad is a full professor in intelligent robotics & engineering and management of innovation. He is the president of the Cluj IT cluster and the 3B ICT cluster netowrk (18 IT clusters in Balkan, Black Sea and Baltic Region). He is the Head of the Digital Innovation Hub DIH4S (fully operational approved by the EC), expert in the EC/European Digital SME Alliance on Artificial Intelligence, EC/EASME AG 7 Innovation, as well as expert for the Romanian Government on Digitalization and Smart Specialization. He is also members in several other national and regional bodies on smart specialization, robotics, innovation, etc. He leads the Research Center for Engineering and Management of Innovation of the UTC and the robotics specialization (BSc and MSc). He published over 200 papers in international journals and conference proceedings, 20 books and book chapters, and led over 80 research projects, several in FP7, COSME and H2020. He was the founder of several software companies and until 2009 was acting as CEO of one of these companies. He holds a PhD in robotics and a PhD in economics. Since 2000 he runs research and consultancy on SIM tools, putting UTC in the top 20 universities in the world in terms of published papers in TRIZ. He is competent in several programming languages (C, C++, C#, Python, Processing, etc.), as well as in dedicated software for robotics (ROS, RAPID, KRL, etc.), competitive engineering design (e.g. the prize of the Romanian Academy for novel application in robotics), AI (machine learning, deep learning, expert systems, ontologies), innovation management. **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.
Mircea Murar	Mircea Murar graduated in electrical engineering (BSc) and robotics (MSc). He has a PhD in application of IoT in robotic systems. He is competent in control systems, process automation (e.g TIA portal), programming languages (C, C++, Java), design of driving systems, TRIZ application in electronic design. He is acting now as senior lecturer in UTC. **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.

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.*
	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	Anca Stan-Sarb graduated in management. She has a PhD in green building design and management. She is specialized in innovation management, project management, optimization tools, flexible manufacturing systems, and application of TRIZ in building construction and production processes. She is acting now as senior lecturer in UTC. **Publications:** 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)

The LUT University team has gained experience in teaching TRIZ and conceptual design since 2001. It has been teaching it digitally since 2016. LUT intends to share its experience in teaching TRIZ and teaching TRIZ digitally. The LUT team has been established the digital platform for industrial innovation graduate education CEPHEI.EU.

The role of the team would be to upgrade two existing and to produce at least one new course on conceptual design and innovation, to assist and to advice the partners on digitalization of teaching, to host the courses created within the SIM project. In our digitalization efforts we plan to add to the production of new, data-friendly type of e-Learning open courses that are designed to involve industry and business in the learning process as head hunters, outsourcers or re-trainees.

LUT University has a role of sharing and possible integrating in the developed curricula its recent developments in the following areas

a) semantic analysis of patent data, a new tool for defining the conceptual fixedness over a pool of patents,
b) application of inventive design tools in cutting edge physics like nano-physics (EU ETN Marie Curie Framework INDEED),
c) adapting of TRIZ curricula for schools and teacher`s training (World Intellectual Property Organisation, WIPO, Digital Academy initiative "IP4You").

The LUT team plans to use its network for dissemination of the results of the project to Finland, Russia and China. The LUT team will be involved in project management activities, quality assessment and sustainability of the project by contributing the experience and network gained in previous EU projects.

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 Engineering 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 Modeling 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. He is the Coordinator for the platform CEPHEI.EU that hosts e-Learning contents for industrial innovations authored by universities of EU, Russia, China and other countries. **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 Publishing. 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 Publishing. 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 Publishing. 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 Publishing, 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 Automa-

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.*
	tion. **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., 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 Technologies AG & Co. KG – Schaeffler)

Organisation name	Country
Schaeffler Technologies AG & Co. KG	**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)

The Schaeffler Group is a leading global supplier to the automotive and industrial sectors. Its portfolio includes high-precision components and systems for engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The Schaeffler Group is already shaping "Mobility for tomorrow" to a significant degree with innovative and sustainable technologies for electric mobility, digitalization, and Industry 4.0.

The company generated sales of approximately 14.2 billion Euros in 2018. With around 89,000 employees, Schaeffler is one of the world's largest family companies and, with approximately 170 locations in over 50 countries, has a worldwide network of manufacturing locations, research and development facilities, and sales offices.

With its strategy "Mobility for tomorrow", Schaeffler is setting the course for sustainable and profitable growth. The company is concentrating on the four focus areas "Eco-friendly drives", "Urban mobility", "Interurban mobility" and "Energy chain" across divisions and regional borders. Schaeffler is playing an active part in shaping these focus areas with its own research and development activities and, as a leading expert in the fields of innovation and technology, offers its customers and business partners an attractive product range.

Approximately 8,000 employees at 20 R&D centers develop new products, technologies, processes, and methods for solutions that are tailored to the market. With more than 2,400 patent applications in 2018, Schaeffler is Germany's second most innovative company according to the DPMA (German Patent and Trademark Office) and is therefore one of the leading innovators in the industrial sector. Currently Schaeffler holds 26,600 active patents and patent registrations.

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)

As a large organization with a dedicated focus on innovation, Schaeffler has successfully integrated numerous systematic innovation methodologies in daily practice since more than a decade and has set up corresponding internal trainings to further develop the innovation skills of employees.

In the project Schaeffler provides broad experience in applying systematic innovation methodologies in industrial settings and contributes requirements of large companies towards training these methodologies as well as the possibility to provide feedback on available and developed training concepts. The main contact points for the project are from the department of Innovation Management / New Business Fields Development which serve both as internal consultants for innovation projects throughout the company and apply the methodologies themselves when developing new business fields. well-trained in several systematic innovation methodologies including TRIZ methodology, have years of experience in applying the methodology in an industrial context and in training and they provide the company internal contacts to HR, internal training centers or corporate communication, if necessary.

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	Dr. Armin Lau has worked in the corporate innovation management of Schaeffler for more than five years with a focus on inventive problem solving and on the development of the company's innovation culture. As part of that, he was also involved in the set-up

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.*
	of TRIZ-related trainings within Schaeffler. Before joining his current employer, he has worked in research with a dedicated focus on applying systematic innovation methodologies in networks of small and medium-sized enterprises. In this context he also acted as a trainer of methods for SMEs. He has published several papers on systematic innovation methodologies and has been speaker at numerous industrial and research conferences, among others a key note speaker at last year's TRIZfest 2019.
Thomas Fuhrmann	After studying chemistry and obtaining a doctorate in the field of surface technology, Thomas Fuhrmann worked in research and development in various industrial companies, the last 8 years with a focus on innovation management. An essential aspect of this activity at his current employer is the planning, organisation and implementation of internal workshops for idea generation, using various creativity methods. He holds a MATRIZ Level 3 certification and is involved outside the company in working groups on the topic of TRIZ. He will support the ETRIA World Conference TRIZ Future 2020 by participating in the program committee.
Cansu Cetiner	After studying Business Adminsitration and Engineering with Bachelor and Master degrees, Cansu Cetiner gained many years of experience in product development in industrial companies, including the leading of development projects. Currently, she supports internal development projects at her current employer in a variety of ways as a consultant. Creativity methods as well as economic methodologies, for example business models, play the most important role here, along with the sustainable use of internal resources. She holds a MATRIZ Level 1 certification, strives for Level 2 and is therefore the ideal contact person for current training content and the there taken ways of communication.

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 <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)

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.

HGG to do: add a sentence or two about the (yet underestimated) relation of SIM approaches to software requirements engineering. This was accepted.

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)

Tehnoprod Plast SRL (https://www.tehnoprodplast.ro) is a family owned company, with 92 employees a turnover of over 3.5 million Euro annually. Its main object of activity is the production and marketing of low tension equipment (sockets, lengtheners, adaptors, power cords, injected plug etc.). 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.

We work very closely with the university environment for designing new products, implementing innovative management in the company. We have experience to implement competitive development methods based on TRIZ. We have been partners with the Technical University of Cluj Napoca in a European project TECH-IT-EASY using IT instruments to support SMEs in systematic innovation, based on a consolidated methodology and structured on scientific ontologies. TRIZ was used extensively in this project.

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)

As small and family-owned company, we have successfully used methodologies of competitive development in the internal systems of productivity, quality and management. Within the project we offer an experience but also a great desire to create a framework for implementing new methodologies for systematic innovation. We will also provide feedback within the project on important results and will try to disseminate and implement the results of the project in the development of the company and the entire community and human society.

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	Lucian Moraru is a graduate engineer in Robotics with a master's degree in Computer Assisted Design and a master's degree in Product Management. He has experience in the management board of the company for over than 17 years, experience in product design with a duration of more than 19 years and a vast technical experience of operating industrial machines.

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) – 1605 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.*

Minsk is one of the world's leading places where SIM is promoted in education, research and applications, see, e.g., (Orloff 2020:217). Target Invention Minsk bundles decades of experience in consulting and application of innovative methodologies, especially in the Asian market (South Korea, China). The company is still a valued partner on the Asian market. TRIZ Master N. Shpakovski with his many years of experience in the practical application of TRIZ in business, including 20 years in close cooperation with SAMSUNG, belongs to the core of the SIM School in Minsk, which has a great influence on the development and consolidation of European SIM locations such as at TU Brno or INSA Strasbourg. The SIM location Strasbourg, which belongs to the leading SIM capacities in Europe, was built up with significant personal commitment of Nikolai Khomenko from Minsk, who sadly passed away too early. Khomenko is the author of OTSM-TRIZ that combines the theory of inventive problem solving with elements of a general theory of strong thinking, emphasizing the social conditions of technical innovation ability.

The **essential added value to the project** intended with the inclusion of the Minsk partners is to ensure that the entire wealth of theoretical approaches to inventive thinking that have been developed in the Soviet and post-Soviet area over the last 70 years and that are known in Western Europe only in fragments can be made fruitful for our KA.

References

M. A. Orloff. Modern TRIZ Modeling in Master Programs. Introduction to TRIZ Basics at University and Industry. Springer Publishing, 2020.

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) – 3056 characters

Since our application is aimed at building cooperation structures between organisations, we distinguish primary and secondary target groups that will benefit from the project results and outcomes. As primary target groups we count actors who are to be actively involved in the work of the KA and who are to co-determine its internal structure. Secondary target groups include actors who benefit from the KA as a whole in its external relations.

Since 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 our priority task is the expansion of the network into the area of **primary target groups** at the organisational level. We identified 5 such target groups

- HEI and other actors in the academic field, who already offer comprehensive SIM training,
- HEI and other actors in the academic field, who want to set up such SIM training courses,
- companies in the HEI partner environment,
- companies from the manufacturing sector as *users of SIM skills*,
- companies from the consulting and training sector, that *provide SIM trainings and applications as service*.

Actors who decide to cooperate in this way not only have access to the results of the KA, they *are part* of the KA.

The **secondary target groups** include actors at the individual level such as

- Students and graduates as well as professionals in further education who are interested in personal SIM training,
- Trainers for in-house SIM trainings who are interested in "train the trainer" offers,
- Structures for SIM training in secondary education (the whole complex "TRIZ Pedagogy"),

and on the other hand actors at the systemic level such as

- political decision-makers and decision-making structures,
- regional development structures,
- inter-enterprise structures like the Chambers of Commerce and Industry (CCI).

For our KA, the *organisational consolidation of the internal structures of the alliance* is in the first place as a prerequisite for achieving a sustainable external impact. The dissemination focus "Enlarging the network" (Story 7.1) and "Promoting special results" (Story 7.2) in WP 7 are aimed at reaching actors of the primary target group and stimulate them to actively participate in the work of the KA.

An increased weight of the SIM knowledge and skills structures in Europe as the **outcome** of such a successful dissemination leads to a better visibility of the problem of insufficient SIM training capacity in the general perception and is thus the **basis for initiating necessary changes**.

A *realistic* assessment of the achieved visibility of the topic and the possibility of further alliances on the systemic level is an essential basis for effective dissemination measures in the external relations of our KA, especially towards political decision-makers. In WP 7 (Story 7.3), funds are reserved for this purpose. A clever spending strategy has to be further specified in a Dissemination Plan, that is to be updated from Sprint to Sprint in an agile manner on the basis of the internal coordination status achieved in the course of the project implementation. A first version of such a Dissemination Plan is due at P1.

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) – 3012 characters

Concerning the **primary target groups**, we assume that more partners will join our KA relatively quickly. In particular, the ETRIA structures as well as contributions in relevant TRIZ journals and at conferences should be used to draw attention to the activities of the KA. The entry into the KA should on the one hand have a binding character, but on the other hand not raise too big obstacles. As a minimum contribution a partner letter is planned as well as a standard contribution for the SIM-SSN.

These additional partners have the opportunity to participate in all activities of the alliance, especially in the workshops planned within WP 4, where – initially – different teaching concepts of several full partners will be presented and discussed. This is intended to turn into a forum focusing on questions of SIM teaching that otherwise have a shadowy existence compared to research activities.

Benefits at the local and regional level are induced primarily from the availability of best practice examples, such as the regional development project in Leipzig, which will be documented in more detail in the course of the project's dissemination.

Benefits at national and European level arise directly from the exchange structures of the Alliance for SIM training, whereby multilingualism is traditionally important in the SIM area due to the high proportion of Russian literature. Multilingually coordinated terminologies, as they are already been developed with various TRIZ glossaries, can be consistently digitized via the RDF localization concepts and open up new horizons for a dimension of semantic technologies that is still largely ignored.

Concerning the **secondary target groups**, it is planned to work primarily with the CCI and other inter-company institutions in order to further increase the visibility of the SIM topic and at a European level to make a fundamental change concerning the importance of the SIM topic for the strategic positioning of the European high-tech industry at the international market, even we do not expect that a comprehensive SIM training for all relevant young people will be installed around Europe, as it is implemented in China by the state with the MEOTM program.

Links to the topic **TRIZ Pedagogy** would also be interesting to follow, that addresses the necessities and potentials of the development of SIM skills – comparable to the debates about STEM skills – in the secondary education sector. Our partner Jürgen Jantschgi, who is also the director of the HTL Wolfsberg, a vocational training institution in the secondary education sector, has own extensive experience in this area. There are also further activities in this direction around ETRIA and with the *TRIZ Cup* there exists an international competition, whose sixth edition will have its final in June 2020 in Minsk. In order to promote such connections, other ERASMUS instruments are to be taken up, which in the longer term should definitely become an issue in the network structures to be established.

*IV.1.3 Please describe how the target groups will be reached **after the project is finished**. (Recommended limit 3000 characters). – 684 characters*

With a massive expansion of the KA's partner structures from the very beginning, self-supporting structures are established at an early stage. Project funding is mainly used for the initial creation of appropriate networking and experience structures. The decentralised character of these structures ensures that a resource mix for the operational handling of these structures must be found at the different partner locations already during the project time, which will continue to operate beyond the end of the project. Thus, the end of the project does not represent a break in the structures for reaching the target groups, so that we can reference to section IV.1.2 on this issue.

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)

At the heart of the project is the establishment of a socio-technical networking structure of locations of SIM training and SIM demand that is capable of generating the required training output in terms of content and organisation to keep up with the anticipated growth in demand. To this end, much greater training efforts must be generated in this area throughout Europe. This is a longer process, which does not start from scratch with our application, but rather continues already existing efforts, e.g., by ETRIA or different CCI and aims at consolidating structures as developed, e.g., within the CEPHEI project of our partner LUT. These public and private training structures provide their own services and thus have their own resources, independent of our project, from which the established networking structures can be kept permanently alive. The decentralized architecture of the SIM-SSN as a technical backbone of these structures is beneficial here, since the resources required for the operation of the networking structure are distributed widely among the network partners. This basic design follows the established experience of operating infrastructures in the Linked Open Data Cloud as well as operating research data infrastructures.

On this basis, the content-oriented activities within the project – exchange on teaching concepts and joint use of teaching materials, quality assurance in close cooperation with industrial partners, further expansion of the CUCC, cooperation in the field of developing digital tools for teaching – can also be continued.

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) – 1290 characters

The short-term impact for the primary target group results from the active participation in the network structure as additional partners. This gives these actors access to knowledge, experience, tools, best practices and cooperation facilities, so that they can not only passively assess their position on the SIM topic as providers or users of training services, but actively shape it.

As long term impact, this primary target group improves its visibility and competitive position on the training market (providers of training services) as well as its entrepreneurial potential to react to the rapidly changing conditions on the high-tech markets of the future as explained in the statement of Schaeffler Technologies cited in section I.2.

The impact at local and regional level results primarily from the ability to appropriately integrate and implement available best practice examples, such as generated by the regional development project in Leipzig, in regional development concepts.

Impact at national and European level depends on the extent to which the structural challenges on intensifying SIM trainings formulated, e.g., in section I.1, are taken seriously at the level of national and European decision-making structures. Only on such a basis can the results of our project develop their full impact.

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) – 1113 characters

As explained in section IV.2.1 we regard our application as a building block in a longer process of sharpening the attention of systemic structures for SIM training issues, that continues already existing efforts, e.g., by ETRIA or different CCI and aims at consolidating structures as developed, e.g., within the CEPHEI project of our partner LUT.

The possibilities for cooperation with other partners will be explored in more detail in the course of the project and also strongly depends on the potential that additional partners bring to the network. This is an important issue in the updating of the project plan and dissemination plan. Already from the perspective of saving own resources, the discovery of synergies as opposed to double developments as quick fix has a high priority in the project logic.

The transferability and accessibility of the project outcomes and results to a broader audience through project structures that stimulate early involvement of additional partners from the primary target groups as equal project actors is a fundamental constitutive element of the logic of our proposal.

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). – 1518 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.

TRIZ is a Russian acronym for theory of inventive problem solving that – after a short intermezzo of the acronym TIPS – is used worldwide to describe a theory complex of inventive methods. The worldwide rise of TRIZ after 1990 is a significant result of the end of the systemic confrontation of the 20th century between a liberal, open Western model of society and the Eastern model of etatistic development dictatorships, which came to an end with the collapse of the international networking structures of the latter.

In view of the global challenges, however, it is stupid to call the Western model of society as the "winner of history". The Eastern everyday experience with inventive solutions on a cooperative basis in an economy of scarcity take on new significance in times of increasing scarcity of global resources and massive ecological problems.

Traditions and limits of the theoretical self-reflection of those experiences, especially the strongly universalistic claim of the classical TRIZ theory building, are to be examined and historically contextualized, as for example in (Gerovich 1996).

However, the critical appropriation of this heritage is on the European agenda. The good knowledge of language and culture of a number of our partners is a guarantee that this heritage will be made accessible within the framework of our KA.

References:

Slava Gerovitch. Perestroika of the History of Technology and Science in the USSR: Changes in the Discourse. Technology and Culture, Vol. 37/1 (1996), 102-134.

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	☒ 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)*	The aim of this package is to compile and consolidate the results of a more detailed analysis of the SIM courses offered by the HEI partners and to set up the digital, communicative and organisational project infrastructure. For a more detailed analysis of the SIM courses on the one hand, the publications listed in section 1.2 will be evaluated in more detail, on the other hand, updated contributions will be provided by the HEI partners. This will be pre-structured according to a scheme to be agreed upon. The analysis will be carried out to a large extend already in the pre-project phase. The analysis will be **presented at P1** afterwards completed as a **text report due at P2** and serves as a basis for a deeper semantic preparation in WP 2. **This relates to epic E1**. The digital project infrastructure essentially uses the tools already successfully used in the proposal preparation phase and supplements these with further initially classical tools. In the course of the project, this will be expanded to a SIM-SSN, which can be easily joined by other partners. The output of this WP is supplementary for the core aims of the project.
Tasks *(Recommended limit 3000 characters)*	**Story 1.1:** Analysis of the teaching offers and digital tools of the partners. At the very beginning of the project we conduct a more detailed analysis of the teaching offers and digital tools 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 pre-project 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 the more detailed deliverable for P2. **Story 1.2:** Bootstrapping the (digital) cooperation structure and infrastructure. This is mainly due to ULEI which also has chosen the tools for successful communication in the application phase. Also within the project ULEI will hosts a major part of the digital infrastructure and focus on developing appropriate tools for project-internal cooperation. The HEI partners are the key partners since they have to operate the core of the upcoming SIM-SSN 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.
Estimated start date	M1
Estimated end date	M8

WP No.1	
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	Analysis of the teaching offers and tools 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	A first report at P1 (M3), the deliverable at P2 (M8)
	Language(s)	English
	Media(s)	electronic
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, a first web presentation, prototypical web tools to deliver content. Another part of the digital infrastructure is project-internal. **Outcome:** A smoothly running project infrastructure.
	Due date	P1 (M3)
	Language(s)	English
	Media(s)	online
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 – develop and set up the SIM-SSN. **This relates to Epic E1**. 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. The SIM-SSN nodes should be operated by the HEI partners as key partners of the upcoming infrastructure. 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.
Tasks *(Recommended limit 3000 characters)*	**Story 2:** Develop and set up the SIM-SSN. 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 semantically backed meta 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*. Even if the tools support works, it is still essential that permanently operational input of the individual nodes is guaranteed by the respective partners. Only then does a technical network become a living organism. The decentralized architecture design and the semantic technologies of the Linked Open Data Cloud ensure that only "living nodes" remain visible in the network. The network therefore "lives" as long as nodes live in the network. (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.

WP No.2	
Estimated start date	M3
Estimated end date	M20
Lead organisation	LUT
Participating organisations	ULEI, INSA, HSO, UTC, LUT

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)*	**Output:** 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. **Outcome:** A smoothly running SIM-SSN to support the various cooperation requirements in the KA with digital tools also beyond the end of the project.
	Due date	P5 (M26), with intermediate milestones at P2 (M8), P3 (M14) and P4 (M20)
	Language(s)	English, potentially multilingual using the RDF multilinguality concepts
	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)*	The HEI partners have already a number of different SIM courses running that are shared at different platforms. Dissemination of such courses is addressed in Story 7.2. Another goal of the project is to **produce fresh courses and teaching material on different SIM themes**. There was a large number of proposals about themes for such courses by the HEI partners, so that we will continue to produce and publish such courses and course materials in the project. The KA grant will be used in this WP to do this exemplary for 4 courses and also to document the corresponding experiences. **This relates to epic E2**. For each such subproject there is another share from Story 9.2 in WP 9 to support the evaluation. As a second objective of this WP a **Common Use Case Collection (CUCC)** has to be compiled. **This relates to epic E4**, which aim is explained above in more detail. The target of this story is the creation of the CUCC as a semantically driven OER Collection. This will be an important common resource for the teaching of SIM skills, since in all serious concepts for the teaching of such skills the use of coherent, well elaborated use cases, in which important experiences from the industrial use of SIM are consolidated, play a central role. This also **relates to Story 5.4** to solve with industry partners the challenge how to contribute high quality use cases from their own practice to this collection. The openness of problems and solutions has to be handled differently, as solutions should be available to the trainers but not to the trainees, but on the other hand should be developed further in a tight cooperation of the teachers. For this purpose, more precise regulations of an internal KA visibility infrastructure are required – this challenge has to be settled within the project. The lead of the package HSO is chosen in particular different from INSA and TI Minsk as the main developers of the CUCC to apply the SCRUM methodological difference between Project Owner and Team.
Tasks *(Recommended limit 3000 characters)*	**Story 3.1**: Development of new courses. In this story three of the partners (LUT, HSO, INSA) put the development as described above into practice and develop, pilot, publish, evaluate and promote a new course each and fix their practical experience on that task as separate SCRUM Story 3.1.x. UTC will do the same developing a MOOC on teaching SIM. **Story 3.2:** Compile the CUCC. The target of this story is the creation of a common semantically driven OER Use Case Collection extending existing ones of the partners. One core point here is to develop an appropriate ontology and use semantic technologies to support the operation. This story will mainly be driven by INSA (technical realisation) and supported by TI Minsk (advice and providing additional material).

WP No.3	
Estimated start date	M1
Estimated end date	M36
Lead organisation	HSO
Participating organisations	3.1: INSA, HSO, UTC, LUT 3.2: INSA, TI Minsk

WP3 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP3	Development of courses and teaching material
	Title	Development of new courses.
	Type	Digital material, service
	Description *(Recommended limit 1500 characters)*	**Output:** For each story a piloted and evaluated course ready for dissemination. **Outcome:** Enlarging the base of courses that are available in the KA network for student training and can be rolled out at partners. At the same time, this will improve the training opportunities for the target group of students at European level.
	Due date	P7 (M36), with intermediate milestones at P3 (M14) and P5 (M20)
	Language(s)	Different languages
	Media(s)	Electronic, online
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)	WP3	Development of courses and teaching material
	Title	Common Use Case Collection
	Type	Semantically based collection
	Description *(Recommended limit 1500 characters)*	**Output:** The collection. A part will be available only to the members of the KA at large (i.e., also to the additional partners in the upcoming network, see Story 7.1). **Outcome:** With this collection, the quality of all courses in which use cases play a central role can be improved. This will improve the training quality for the secondary target group of students at European level. A further effect is the strengthening of cooperation between the trainers themselves as one of the primary target groups induced by such a common collection. A third effect is the interface with industry as another primary target group, which has a direct influence on the focus of SIM skills training by providing suitable use cases.

	Due date	P7 (M36), with intermediate milestones at P2 (M8), P4 (M20), P6 (M32)
	Language(s)	multilingual
	Media(s)	electronic
Dissemination level	X Public X 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 X Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Train the Trainers
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, it is planned to train the partners in 6 three-day training units at 6 different HEI locations by one of the partners as trainer according to the teaching methods used on that site. The local trainer will be supported and supervised by a trainer from TI Minsk to incorporate their large experience in SIM applications and trainings around the world. These workshops are equally open to project partners and additional partners. Since the KA grant is designed as a subsidiary that does not cover the full cost of a training a workshop fee has to be collected from the participants – equal fee for full and additional partners. A mobility share is used to support the participation of project partners in these trainings by travel grants.

WP No.4	
	Story 4.2: Prepare for students' mobility. We do not address directly students' mobility in the project, but this is an important point for the students as target group. Students' mobility is a Key Action 1 goal and should be managed on an individual basis. Nevertheless this requires cooperation agreements between HEI. This story aims at supporting the conclusion of such agreements.
Tasks *(Recommended limit 3000 characters)*	**Story 4.1**: Train the Trainers. In these 6 three-day training units at 6 different HEI locations the teaching concepts are extracted from the real students' training at the location, including usage of learning tools. For each workshop an accompanying material is produced, that is afterwards published as OER at github. The workshops are evaluated using a standardized approach, see **Story 9.3** for details. **Story 4.2:** Prepare for students' mobility. This story aims at compiling best practice documents how to organise an exchange of students and graduates within the KA using ERASMUS Key Action 1 measures The best practice should be applicable for both the full partners and the additional partners.
Estimated start date	M1
Estimated end date	M36
Lead organisation	INSA
Participating organisations	4.1: Training locations: INSA, HSO, LUT, UTC, ULEI/TI Minsk, Jantschgi; Support: TI Minsk; Trainees: All partners 4.2: ULEI

WP4 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP4	Train the Trainers
	Title	Train the Trainers.
	Type	Trainings, OER Material
	Description *(Recommended limit 1500 characters)*	**Output:** 6 three-day workshops with satisfied attendees, workshop material as OER in the github repository, evaluation report. **Outcome:** Better understanding of teaching concepts and approaches at central locations teaching SIM, in particular for industry. Dissemination of best practice experiences in the KA network at large beyond the circle of full partners, as the workshops are open also for additional partners.
	Due date	M3, M8, M14, M20, M26, M32 (approximately)
	Language(s)	English
	Media(s)	electronic
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)	WP4	Train the Trainers
	Title	Prepare for students' mobility.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	**Output:** A sample students' mobility agreement document, a handbook on students' mobility agreements and several such agreements between full HEI partners as best practice. **Outcome:** Boost the students' mobility to obtain SIM skills.
	Due date	P7 (M36)
	Language(s)	English
	Media(s)	electronic
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)	

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 **X** Implementation (the substance of the work planned including production, testing, etc.) ☐ Quality Assurance (quality plan) ☐ Evaluation ☐ Dissemination and Exploitation of results
Title	Involving Industry

WP No.5	
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.
Tasks *(Recommended limit 3000 characters)*	**Story 5.1:** Development of a comprehensive brokerage structure for student internships and theses on SIM themes. This would have to be technically supported by the SIM-SSN, the industrial partners have to set up a practical structure to keep the database up-to-date. **Story 5.2:** Requirements analysis towards networking, current and future curriculae and train-the-trainer concept from an industry point of view. **Story 5.3:** Evaluation of networking, current and future curriculae and train-the-trainer concepts from an industry point of view. **Story 5.4:** Support the CUCC. This **relates to epic E4** and **Story 3.2**. Industry is requested to contribute appropriate useful use cases in a format that has to be specified in the epic E4.
Estimated start date	M1
Estimated end date	M36
Lead organisation	Jantschgi
Participating organisations	All industrial partners

WP5 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP5	Involving Industry
	Title	Development of a comprehensive brokerage structure for student internships and theses on SIM themes.
	Type	Web infrastructure, part of the SIM-SSN
	Description *(Recommended limit 1500 characters)*	**Output:** Part of the digital infrastructure of the SIM-SSN. **Outcome:** Opportunities for students to improve their SIM skills in practical applications.
	Due date	P7 (M36), with intermediate milestones at P3 (M14) and P5 (M26)
	Language(s)	Multilingual, using the RDF multilinguality concepts
	Media(s)	online
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	WP5	Involving Industry

(output or outcome)	Title	Requirements analysis towards networking, current and future curriculae and train-the-trainer concept from an industry point of view.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	**Output:** Requirements analysis with two updates in order to document the progress of an impact analysis by the industrial partners in the course of project implementation. Together with the evaluation in Story 7.3, the conflict between substantiated expectations (requirements) and experienced results (evaluation) is addressed here within an iterative development approach. The requirements analysis documents the aspect of substantiated expectations. **Outcome:** Better understanding of the needs and possible mismatches of current offers from an industry point of view.
	Due date	P2 (M8), with updates at P4 (M20) and P6 (M32)
	Language(s)	English
	Media(s)	electronic
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)	WP5	Involving Industry
	Title	Evaluation of networking, current and future curriculae and train-the-trainer concepts from an industry point of view.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	**Output:** Evaluation results with two updates in order to document the progress of an impact analysis by the industrial partners in the course of project implementation, see Story 7.2. The evaluation documents the aspect of experienced results. **Outcome:** Better understanding of the needs and possible mismatches of current offers from an industry point of view.
	Due date	P3 (M14), with update at P6 (M32)
	Language(s)	English
	Media(s)	electronic
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)	WP5	Involving Industry
	Title	Support the CUCC
	Type	Text document, Contribution to the semantically based collection

	Description *(Recommended limit 1500 characters)*	**Outputs:** Best practice document on the experience of providing examples of CUCC from industrial practice. Supplementary contributions to the CUCC. **Outcome:** A clear understanding of the conditions under which industrial companies can contribute to the CUCC.
	Due date	P4 (M20)
	Language(s)	English
	Media(s)	electronic
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)	

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)*	Organise and realise the project management at all full partners, having administrative staff to maintain all the reporting and the finance.
Tasks *(Recommended limit 3000 characters)*	**Story 6:** Project Management
Estimated start date	M1
Estimated end date	M36
Lead organisation	ULEI
Participating organisations	All partners

WP6 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP7	Project Management
	Title	Project Management
	Type	documents
	Description *(Recommended limit 1500 characters)*	Timely delivery of the required accounting documents within the project structures and to the EU authorities.
	Due date	M36, regular intermediate reports in the different Sprint Reviews at the Project Meetings.
	Language(s)	English

	Media(s)	electronic
Dissemination level	☐ 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)	

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)*	**Story 7.1:** Enlarging the Network. This is explained in **epic 5** in more detail. Within the project we have first to develop a more detailed expansion strategy (concepts for addressing target groups, preparation of appropriate materials) and then roll it out in several steps. **Story 7.2:** Promoting special results This is about promoting the results produced within the project in WP 3, 5 and 10. This should be done across the individual special activities and according to a common strategy. The following kinds of results have to be covered: • Promotion of existing courses and materials. • Promotion of the use cases data base (epic 4). • Promotion of newly designed courses (WP 3). • Promotion of new and extended Digital Tools (WP 10). For *Best practice of HEI-Industry cooperation* a template FAQ how to organize the cooperation between HEI and companies or even a more solid report about success stories and failures in that area could be worked out. This promotion has to be organised and done by the partners who offer such courses, materials and tools (HSO, INSA, LUT, UTC, TI). **Story 7.3:** Other dissemination activities Organise external presentation of internal activities of the KA, use various digital channels etc.
Estimated start date	M1
Estimated end date	M36
Lead organisation	UTC
Participating organisations	All partners

WP7 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP7	Dissemination and Transfer
	Title	Enlarging the Network
	Type	social
	Description *(Recommended limit 1500 characters)*	
	Due date	M36
	Language(s)	Not applicable
	Media(s)	Not applicable
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)	

Expected result (output or outcome)	WP7	Dissemination and Transfer
	Title	Promoting special results
	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)	

Expected result (output or outcome)	WP7	Dissemination and Transfer
	Title	Other dissemination activities
	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 to be prepared in the last third of each sprint, the results of this QA are discussed on the Project Meeting and adopted as deliverable.
Tasks *(Recommended limit 3000 characters)*	**Story 8:** Internal Quality Control This is the organisation of QA of the project itself. Main duties: • monitor the fulfillment of the different tasks, • for each of the project meetings prepare a QA report, • prepare and distribute the other documents for the project meetings, • conduct the sprint retrospective.
Estimated start date	M1
Estimated end date	M36
Lead organisation	ULEI
Participating organisations	All partners

WP8 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP8	Quality Control
	Title	Internal Quality Control
	Type	Text document
	Description *(Recommended limit 1500 characters)*	**Output:** QA reports.
	Due date	The Project Meetings P2 (M8) to P7 (M36).

	Language(s)	English
	Media(s)	electronic
Dissemination level	☐ 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)	

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)*	**Story 9.1:** Develop evaluation templates for the course development activities in WP 3. **Story 9.2:** Do evaluation of the course development activities in WP 3. **Story 9.3:** Develop evaluation template and do evaluation of the WP 4 activities. **Story 9.4:** Develop template and do the overall evaluation of the project.
Estimated start date	M1
Estimated end date	M36
Lead organisation	HSO
Participating organisations	All partners

WP9 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP9	Evaluation
	Title	Develop evaluation templates for the course development activities in WP 3.
	Type	Text document
	Description *(Recommended limit 1500*	

	characters)	
	Due date	
	Language(s)	English
	Media(s)	electronic
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)	WP9	Evaluation
	Title	Do evaluation of the course development activities in WP 3.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	
	Due date	
	Language(s)	English
	Media(s)	electronic
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)	WP9	Evaluation
	Title	Develop evaluation template and do evaluation of the WP 4 activities.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	
	Due date	
	Language(s)	English
	Media(s)	electronic
Dissemination	**X** Public	

level	☐ 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)	WP9	Evaluation
	Title	Develop template and do the overall evaluation of the project.
	Type	Text document
	Description *(Recommended limit 1500 characters)*	
	Due date	
	Language(s)	English
	Media(s)	electronic
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)	

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)*	There are four partners that strongly develop tools. I propose to set up four cooperation projects along the lines of epic 3 and distribute the share of the WP equally between the four "shareholders" of the systems as the "senior partners" of the cooperation project (i.e., 10.1.1 INSA 35 TE, 10.1.2 LUT 35 TE each, 10.1.3 UTC 13 TE, 10.1.4 TIM 13 TE). Of course the share should be redistributed with the junior partners if they are found.
Tasks *(Recommended limit 3000 characters)*	**Story 10:** Cooperative Use of Digital Tools
Estimated start date	M1
Estimated end date	M36
Lead organisation	INSA
Participating organisations	All partners

WP10 Results (outputs and outcomes)

Please add tables as necessary.

Expected result (output or outcome)	WP10	Digital Tools
	Title	Cooperative Use of Digital Tools
	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**	**217**	**70**	**12**	**344**	
2	**Lead partner**	LUT	Finland	**4**	**30**	**30**		**64**	
		ULEI	Germany	**10**	**30**	**150**		**190**	
		INSA	France	**4**	**30**	**30**		**64**	
		HSO	Germany	**3**	**20**	**20**		**43**	
		UTC	Romania	**2**	**20**	**30**		**52**	
Subtotal				**23**	**130**	**260**		**413**	
3	**Lead partner**	HSO	Germany	**14**	**50**		**15**	**79**	

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category 1	Category 2	Category 3	Category 4	Total	
		INSA	France	**24**	**90**	**80**	**20**	**214**	
		UTC	Romania	**8**	**45**		**4**	**57**	
		LUT	Finland	**14**	**50**		**15**	**79**	
		TI Minsk	Belarus	**5**	**50**		**2**	**57**	
Subtotal				**65**	**285**	**80**	**56**	**486**	
4	**Lead partner**	INSA	France	**3**	**16**			**19**	
		ULEI	Germany	**13**	**2**		**5**	**20**	
		HSO	Germany	**3**	**16**			**19**	
		UTC	Romania	**3**	**16**			**19**	
		LUT	Finland	**3**	**16**			**19**	
		Jantschgi	Austria	**3**	**16**			**19**	
		TI Minsk	Belarus	**30**	**100**			**130**	
Subtotal				**58**	**182**		**5**	**245**	
5	**Lead partner**	Jantschgi	Austria	**30**	**160**		**22**	**212**	
		ULEI	Germany	**8**	**15**	**90**		**113**	
		Schaeffler	Germany		**23**			**23**	
		Arxia	Romania	**11**	**80**			**91**	
		TPlast	Romania	**11**	**80**			**91**	
		TI Minsk	Belarus	**15**	**120**			**135**	
Subtotal				**75**	**478**	**90**	**22**	**665**	
6	**Lead partner**	ULEI	Germany	**100**			**200**	**300**	
		INSA	France	**30**			**70**	**100**	

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category 1	Category 2	Category 3	Category 4	Total	
		HSO	Germany	**30**			**70**	**100**	
		UTC	Romania	**30**			**70**	**100**	
		LUT	Finland	**30**			**70**	**100**	
		Arxia	Romania	**30**			**70**	**100**	
		TPlast	Romania	**30**			**70**	**100**	
		Jantschgi	Austria	**30**			**70**	**100**	
		TI Minsk	Belarus	**30**			**70**	**100**	
Subtotal				**370**			**830**	**1200**	
7	**Lead partner**	UTC	Romania	**40**	**135**			**175**	
		ULEI	Germany	**15**	**50**			**65**	
		INSA	France	**25**	**85**			**110**	
		HSO	Germany	**25**	**85**			**110**	
		LUT	Finland	**25**	**85**			**110**	
		Schaeffler	Germany	**10**	**20**			**30**	
		Arxia	Romania	**15**	**50**			**65**	
		TPlast	Romania	**15**	**50**			**65**	
		Jantschgi	Austria	**15**	**50**			**65**	
		TI Minsk	Belarus	**25**	**85**			**110**	
Subtotal				**210**	**695**			**905**	
8	**Lead partner**	ULEI	Germany	**15**	**20**		**50**	**85**	
		INSA	France	**3**	**4**		**6**	**13**	
		HSO	Germany	**3**	**4**		**6**	**13**	

Nº of Work Package	Lead partner	Partners involved	Country	Number of staff days					Role and tasks in the Work Package
				Category 1	Category 2	Category 3	Category 4	Total	
		UTC	Romania	3	4		6	13	
		LUT	Finland	3	4		6	13	
		Schaeffler	Germany	3	4		6	13	
		Arxia	Romania	3	4		6	13	
		TPlast	Romania	3	4		6	13	
		Jantschgi	Austria	3	4		6	13	
		TI Minsk	Belarus	3	4		6	13	
Subtotal				**42**	**56**		**104**	**202**	
9	**Lead partner**	HSO	Germany	**13**	**94**		**25**	**132**	
		INSA	France	**1**	**4**		**10**	**15**	
		UTC	Romania	**1**	**4**		**10**	**15**	
		LUT	Finland	**1**	**4**		**10**	**15**	
Subtotal				**16**	**106**		**55**	**177**	
10	**Lead partner**	INSA	France	**8**	**20**	**140**		**168**	
		UTC	Romania	**8**	**20**	**140**		**168**	
		LUT	Finland	**8**	**20**	**140**		**168**	
		TI Minsk	Belarus	**8**	**20**	**140**		**168**	
Subtotal				**32**	**80**	**560**		**672**	
TOTAL				**936**	**2229**	**1060**	**1084**	**5309**	

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)	Deliv e-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 1	**Category 2**	**Category 3**	**Category 4**	**Total**	
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.