New Initiatives for Knowledge Transfer between Industry and Academia: The INDUSAC Project

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ABSTRACT / POVZETEK

At the Jožef Stefan Institute most current practices of knowledge transfer involve licensing and contract and/or collaborative research between researchers and industry, whereas student-industry relations are less explored, often do not regard geographical or gender balance, and rarely involve upskilling in entrepreneurship. In the Horizon Europe INDUSAC project, the main objective is to develop and validate a simple and user-friendly industry-academia collaboration mechanism for short-term (4-8 weeks), challenge-driven co-creation. Knowledge transfer is importantly extended from researchers to also involve students, who are in turn financially supported. Gender balance is ensured by the conditions set out in the project's calls for applications. Emphasis is put on upskilling, achieved through looking for solutions to real-life challenges faced by industry. The workflow involves registering on the INDUSAC online platform, issuing a Challenge by companies, assembly of student/researcher co-creation teams, and submitting Motivation Letters to apply to solve a Challenge. Once Motivation Letters are evaluated and approved, selected co-creation teams proceed with solving the Challenge with assistance from the company. Once completed, companies and co-creation teams submit reports and feedback on the process in terms of experience with the project, and upskilling and familiarity in regards to selected entrepreneurial areas. The workflow will be carried out three times during the project, so as to allow for dynamic Challenge solving and feedback-based improvements on the process itself. By solving companies' Challenges, students are expected to acquire international collaborative experiences as well as transversal and entrepreneurial skills, access to companies from the EU and associated countries, and references for future networking. Through supporting at least 300 transnational co-creation teams and creating a dynamic community of industry-academia stakeholders, the INDUSAC mechanism will establish the co-creation system as a catalyst for integration of academia in business practices and technical solutions in the future.

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KEYWORDS / KLJUČNE BESEDE

INDUSAC project, international cooperation, student-industry cooperation, upskilling

1 INTRODUCTION

Knowledge transfer may involve different types of collaboration; in most often listed examples, it takes place between knowledge-rich entities (such as universities and research institutes) and industry. The Jožef Stefan Institute (JSI) is the largest Slovenian public research organisation and hosts working units that carry out activities connecting research and industry. While current practices at JSI involve licensing and contract and/or collaborative research between researchers and industry, student-industry relations are less explored, or they are explored indirectly, involving students in cooperation with departments that may cooperate with industry, and mostly without particular regard to geographical or gender balance. Furthermore, researcher-industry collaboration takes place mostly as licensing or contract / collaborative research but rarely as upskilling in the fields of entrepreneurial skills such as marketing, product development, or business modelling. Lastly, knowledge transfer is not inherently financially supported; therefore, funding schemes and mechanisms that encourage collaboration by, for example, cascade funding (such as the calls for third parties within running Horizon Europe projects) are constantly sought in order to boost small-scale short-term R&D projects.

Enter the INDUSAC project. The on-going Horizon Europe Quick Challenge-driven, Human-centred Co-Creation mechanism for INDUStry-Academia Collaborations (acronym INDUSAC) project (www.indusac.eu) started in September 2022 (EU project number 101070297) with the main objective to develop and validate a simple and user-friendly industry-academia collaboration mechanism for quick, challenge-driven co-creation. The process allows to develop solutions that address the needs and interests of companies, students, and researchers in the EU, with special attention to widening[1] and associated[2] countries. In the project, knowledge transfer is extended from researchers to also involve students, who are in turn financially rewarded for successfully completing the project, and gender balance is ensured by the conditions set out in the project's calls

[1] Widening countries: Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia

[2] Associated countries: Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, North Macedonia, Norway, Serbia, Tunisia, Turkey, Ukraine, Morocco, UK

for applications. Emphasis is put on upskilling, achieved through looking for solutions to real-life challenges faced by industry.

2 METHODOLOGY AND OUTPUTS

The INDUSAC platform. To enable the workflow of the project described below, an online platform has been set up as a user-friendly and intuitive tool for posting industrial challenges, assembling co-creation teams, applying for calls to solve the challenges, and submitting reports.

General workflow of the project. The workflow (Figure 1) starts with a company registering on the INDUSAC platform and issuing a Challenge (eg. a particular problem that needs to be solved). Students and researchers likewise register on the platform, select a Challenge to solve, assemble an international team, and submit a Motivation Letter to the company. If selected, the student/researcher teams proceed to solve the Challenge, and submit appropriate reports for evaluation, as well as responses to upskilling questionnaires.

Registering on the INDUSAC platform. Before co-creation projects can take place, companies, students, and researchers need to register on the platform. Registration allows a company to create a profile and publish a Challenge, and students/researchers to submit Motivation Letters.

Issuing of industrial Challenges. In October 2023, companies will be invited to issue a Challenge by selecting one of nine different predefined Challenge type templates, covering mainly entrepreneurial skills, and ranging from developing a product, market analysis and strategy, and developing service/product ideas, to developing a business plan and a business model. There is no limitation regarding the area of industry – Challenges may, for example, be from the area of sustainable biotechnology seeking product development, automotive industry seeking business plans, or textile industry seeking assistance with marketing. The Challenge, apart from describing the problem (excluding confidential information), will also list the companies' expectations in terms of solutions, and in terms of the co-creation team's skills. Eligible companies shall comprise companies established in the EU or associated countries, but there are no restrictions on the sector, type, or size of a company to issue a Challenge, or the number of Challenges issued per company. The company defines the maximum number of teams that may be accepted to solve the issued Challenge.

Submitting Motivation Letters. As part of an ongoing campaign, students and researchers from public universities and public research institutions are made aware of the INDUSAC project by promotion by the INDUSAC Consortium and by the academic institutions themselves, as well as by non-academic institutions such as clusters and chambers of commerce, through social media and physical leaflets. In November 2023, students and researchers will be able to apply to a Call, which entails putting together an international and gender balanced student/researcher (ie. co-creation) team and filling out a joint Motivation Letter. The Motivation Letter includes a description of the applicant's motivation and skills.

Eligibility of co-creation teams and team members. Students and researchers in each co-creation team must come from EU member states or associated countries, as indicated by their citizenship or residency. Students must attend public universities during the entire duration of the activity whereas researchers must be employed at a public research organisation during the entire duration of the activity. An individual student or researcher will be able to participate in more than one co-creation team but in no more than three different applications of a Motivation Letter. The co-creation team must have at least three and up to six members. Team members must be from at least three different EU member states or associated countries and at least 60% members of the co-creation team must be from widening countries. The co-creation team has to be gender balanced, including at least two out of the [Male], [Female], and [Would rather not say] gender options. A co-creation team must include at least one student, ie. no co-creation team may comprise exclusively researchers.

Evaluation of Motivation Letters. As noted above, a company may select more than one co-creation team to solve a Challenge. Motivation Letters are evaluated by a company representative, on a number of criteria - team's motivation and enthusiasm, excellence, market impact, team quality, resource allocation, and transversal criteria.

Signing the FSTP Declaration. If a Motivation Letter has been approved, the co-creation team signs the Declaration on Financial Support to Third Parties. FSTP, in the amount of up to 1,000 EUR gross per student and up to 3,000 EUR gross per co-creation team, is given solely to student members of the co-creation teams, after the finalisation of the project.

The co-creation process. INDUSAC will provide the co-creation teams with a list of deliverables, methods and tools for solving the Challenge. Throughout the process, the company will have an introductory meeting, and subsequent milestone meetings as needed, with the co-creation team. The co-creation process will also be monitored by the INDUSAC consortium so as to enable smooth progress. Should the co-creation process give rise to any form of intellectual property (IP; for example, a patent application), division of ownership of IP rights, the type of IP and its management will be arranged with appropriate agreements.

Reporting by co-creation teams. After completion of the co-creation project (ie. solving the Challenge), co-creation teams submit implementation reports including a summary / description of results (ie. solutions to Challenges), deliverables as defined in the Challenges, filled-in upskilling and familiarity questionnaires (one before the project and one after the project), and testimonials about the experience. Solutions to Challenges are evaluated by the Evaluation Board and companies, and include scores on deliverable quality, business performance indicators, technical performance indicators, and deadline compliance. The co-creation process ends when the Evaluation Board and the company evaluate and approve the implementation report and students receive funding.

Reporting by companies. In addition to co-creation teams, the company also provides feedback in form of a quality assessment of the solution to the Challenge, including deliverable quality, business performance, technical performance, and deadline compliance. The company also fills out the questionnaire indicating their experience during the project.

Time dynamics of the project. Industrial Challenges will be posted continuously. Motivation Letters will also be able to be

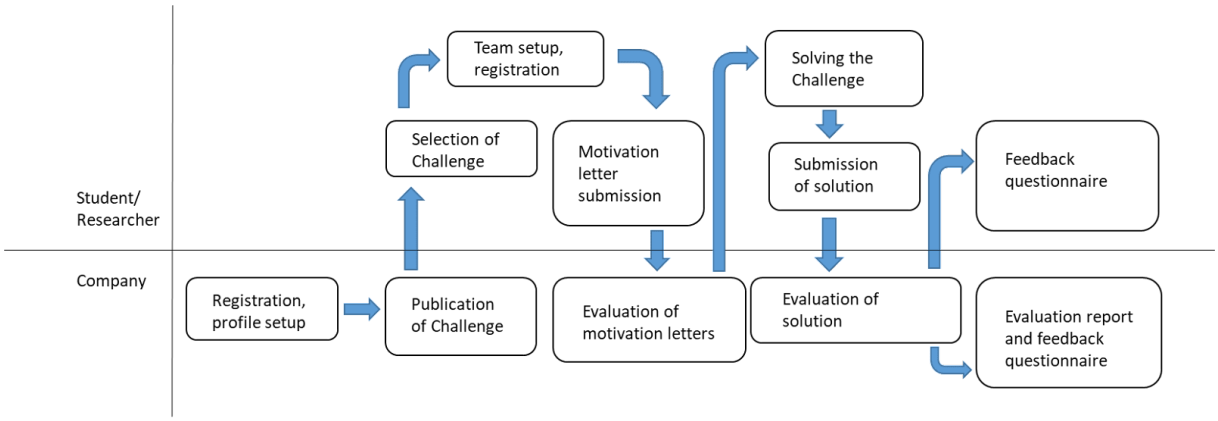

Figure 1: Simplified general workflow of the INDUSAC project.

submitted continuously, but they will be evaluated following three cut-off dates (in January 2024, May 2024, and October 2024). Four weeks after the call opening, applicants receive a decision on their applications. If approved, one week later, solving of the Challenge may begin. Individual co-creation projects will be given 4-8 weeks to complete. Three months after the first cut-off date, co-creation teams will be asked to submit final reports for revision; two weeks later, the Evaluation Board confirms the list of students from the co-creation teams to be funded; a month later, provided that administrative procedures from the students' side have been finalized, all students from the list receive funding.

3 DISCUSSION

The INDUSAC approach brings several advantages to the existing landscape of knowledge transfer practices. First of all, the calls for solving Challenges within the project are prepared with particular attention to geographical and gender balance in order to maximise inclusiveness. Including gender balance and an international dimension in a project have been shown to result in increased returns-on-assets and financial performances of companies, acquisition of new skills and knowledge, and increase in regional competitiveness (eg. [1-3]). Making sure the co-creation team members must be from at least three different countries not only increases geographical balance but also importantly provides the team members with experience in working in international teams. Thus it enables exchange in knowledge and experience between individuals from different backgrounds that come together to collaboratively create and innovate. This collaboration is further strengthened by the process that includes several checkpoints and feedback meetings between the co-creation team and the company. This encourages participants to provide constructive criticism, suggestions, and insights at various stages. Iterations and refinement of ideas based on the feedback received ensure continuous improvement and successful outcomes. The condition that at least 60% members of the co-creation team must be from widening countries further emphasises the support given to areas that do not reach 70% of the average research excellence index[3]. This is assisted by publishing a wide range of different types of Challenges, which enables diversity in content and field of work, and the possibility for individuals to participate in more than one co-creation team expands their opportunities as well.

The co-creation team also has to be gender balanced and the expected outcome is at least 50 % female representation in the co-creation projects overall, which will aid in changing the current trend of representation of women in entrepreneurship trailing behind that of men [4,5]. Finally, the project is strongly oriented towards students, as every co-creation team must include at least one student. The student status, as attested for by the registration process, is of particular importance as the INDUSAC mechanism puts emphasis on supporting the younger generations in acquiring experience in working with industry. This is further supported by the fact that only student members of co-creation teams receive financial support, which is a welcome mechanism for facilitating student-industry collaboration usually hindered by the lack of financial support [6,7]. The combination of geographical balance and the requirement for student participation also represents a unique opportunity for students to get a head start in creating international networks on their career paths.

Importantly, the major output of the project, which is the INDUSAC platform, enables most of the activities to take place conveniently and user-friendly at one place.

Rather than putting emphasis on particular technological achievements and inventions, the INDUSAC project makes upskilling the central knowledge transfer theme. Co-creation teams are given upskilling and familiarity questionnaires before the start of the co-creation project and after its end. It is the co-creation project's ambition to increase the students' and researchers' skills / experiences in working in an international team, working with companies, solving concrete tasks, assisting a group to agree on a mutually acceptable solution, working within a group to identify common goals, and listening to suggestions. Communication and negotiation skills, results oriented thinking, creativity, critical and analytical thinking, time management and effective planning, and leadership are among the skills mostly encouraged in the INDUSAC project. These types of skills have been shown to be important both in employer selection as well as for increased productivity in industry 4.0 and

[3] Widening countries, as defined by the European Commission, are countries where the Composite Index of Research Excellence is less than 70% of the average value of this indicator for all EU countries (modified after https://quantera.eu/spreading-excellence/).

digital transformation of manufacturing [8]. In particular, the project aims to improve familiarity of students and researchers with methods such as SWOT analysis, utility analysis, trend analysis, cost-benefit analyses, product portfolio analysis / BCG Matrix, creating marketing strategies, value proposition analysis, developing a business plan, preparation of business model canvas, and target group analysis. The concept, ie. the short-term nature of the co-creation projects and three separate opportunities (cut-off dates), encourage looking for quick and dynamic solutions with possibilities of advanced problem solving by extending the primary Challenge through the next cut-off date.

Specific control steps (evaluations), as defined in the INDUSAC project's methodology, ensure that the co-creation process is not only inclusive but also of high quality: the review process ensures a high-quality cooperation arrangement, and specific requirements for the reports (i.e. pre-set structure and content of the work) ensure high-quality performed tasks. Furthermore, by setting up three consecutive calls, the process is continuously refined through feedback-based improvements of the methodology itself.

In the first year of the INDUSAC project, 34 Letters of Support from universities from Cyprus, Greece, Hungary, Latvia, Lithuania, Czechia, Slovakia, Austria, Germany, Spain, Slovenia, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia have already been collected, indicating vast interest across Europe in participating in the project, and several students, approached at various conferences and fairs, have expressed interest in being informed about the call once it opens. Through the experience of supporting at least 300 transnational co-creation teams and creating a dynamic community of industry-academia stakeholders throughout the project lifetime, the INDUSAC mechanism will establish the co-creation system as a catalyst for integration of academia in business practices and technical solutions. At least 70% of students and researchers participating are expected to report at least one core professional transversal and entrepreneurial skill having been significantly developed by participating in the INDUSAC project. An improved set of skills in students and researchers by at least 30% compared to before the beginning of the project is expected, allowing them to rapidly expand their skill set in a short period of time and to find themselves more prepared for the business environment. Provided the project is successful, it represents an encouraging inspiration for similar industry-academia knowledge transfer practices, and the lessons learned will provide a basis for policy recommendations for similar EU and national initiatives in the future.

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