Feasibility Analysis for the New Mechanism of Knowledge Transfer within the INDUSAC Project

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ABSTRACT

In September 2022, the Horizon Europe INDUSAC project introduced a novel mechanism for knowledge transfer, extending the usual company-researcher partnerships to include students as well. Between March and May 2024, thirteen co-creation projects involving international teams of students and researchers solving companies' challenges, were carried out. This study describes results of surveys given to companies, students and researchers about their experience in the projects, and the level of usefulness of solutions made possible by the collaboration. We analyzed data collected from 10 companies, 57 students and 4 researchers. Measured on the Likert scale, satisfaction of companies with technical aspects of the methodology ranged from average to good (average values between 3.1 and 4.2), whereas their satisfaction with the solution to their challenge, and with the work done by the team, had a narrower range between 3.2 and 3.8. Financial support to student members of co-creation teams, in the amount of up to 1,000 EUR gross per student, was perceived as sufficient by 67% of students. Initial results indicate that the INDUSAC mechanism is relatively well accepted among companies, with room for improvement in certain aspects such as the user-friendliness of the platform and the time allowed to solve a challenge. Overall, around 30 % of co-creation projects have demonstrated true value to the company involved, and there is potential in the further 50 %. Selected testimonials from companies, complimenting the work of students and expressing their own belief that the students are richer for the experience as well, demonstrate that the INDUSAC mechanism shows promise in knowledge transfer.

KEYWORDS

INDUSAC project, international cooperation, student-industry cooperation, knowledge transfer

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1 INTRODUCTION

In September 2022, the Horizon Europe INDUSAC project (www.indusac.eu; EU project number 101070297) introduced a novel mechanism for knowledge transfer, extending the usual company-researcher partnerships to include students as well. It comprises a methodology that would allow for a streamlined facilitation of collaboration between industry and academia, and an online platform to support that methodology [1]. In November 2023, the INDUSAC project, coordinated by the Jožef Stefan Institute, commenced its piloting phase wherein universities, public research organisations, and companies were invited by the international project consortium to join the project. The idea behind the methodology is to bring together a company and an international team of 3-6 students and/or researchers to solve a company challenge within 4-8 weeks, with the company providing assistance during regular meetings with the team. The team delivers results in the form of pre-defined types of deliverables specific for the type of challenge, and the deliverables are evaluated by companies. Being the main target audience, during the project, special attention was given to students / researchers from EU widening countries, and geographical and gender balance was ensured by the criteria that team members must be from at least three different countries, and must include representatives of at least two gender groups; student members of the co-creation teams were financially rewarded for successfully completing the project. First such collaborations started in March 2024 and wrapped up in May 2024. This study describes results of surveys given to companies, students and researchers about their experience in the project, and the level of usefulness of solutions made possible by the collaboration. Implications for the feasibility of this concept of knowledge transfer are discussed.

2 METHODS

As per the methodology of the project, students and researchers were surveyed before they started working on the solution to the company's challenge, and after they finished. Topics in the survey, relevant to the scope of this study, included the students' feedback on how the collaboration affects social impact, and how appropriate the funding is. In addition, companies were surveyed

after the project, mainly about the quality of work performed by the students / researchers, and the impact that their work has. All surveyed individuals were asked to provide short testimonials about their impressions and satisfaction. Students / researchers were asked to fill in separate surveys for separate co-creation projects (maximum three) and companies were likewise asked to fill in separate surveys for each team they worked with. Further details are indicated in the Results section. In this study, we analyzed data collected from 10 companies, 57 students and 4 researchers.

3 RESULTS

In the first round of the INDUSAC co-creation projects, taking place between March and May 2024, thirteen co-creation projects took place that resulted in proposed solutions, two of which were rejected and eleven approved by companies. Companies' overall satisfaction with the INDUSAC process after the projects, expressed as various aspects of the methodology, is shown in Figure 1. Satisfaction was evaluated on a Likert scale from 1 to 5. On average, the processes of registering on the platform, publishing Challenges, and reviewing Motivation Letters (ie., students' applications) ranked highest at 4.0, 4.0, and 4.2, respectively, while the user-friendliness of the INDUSAC platform and the time allowed to solve a challenge ranked lowest, each at 3.1.

Companies' overall satisfaction with the solution to their challenge, and with the work done by the team, expressed as various attributes, is shown in Figure 2. Satisfaction was evaluated on a Likert scale from 1 to 5. On average, relevance of the solution, quality of work of the team, and satisfaction with the work of the team ranked highest at 3.8 each, while the market potential of the solution ranked lowest, at 3.2.

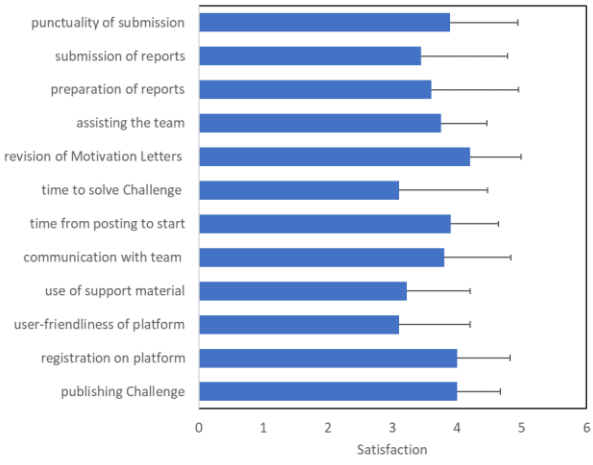

Figure 1: Satisfaction of companies with technical aspects of the methodology. Average values ± sd are shown (n = 8 for assistance to the team, n = 9 for support material, submission of deliverables and punctuality of submission, and n = 10 for the other nine categories). Satisfaction was measured on a Likert scale: 1 – very poor, 2- poor, 3 – average, 4 – good, 5- very good.

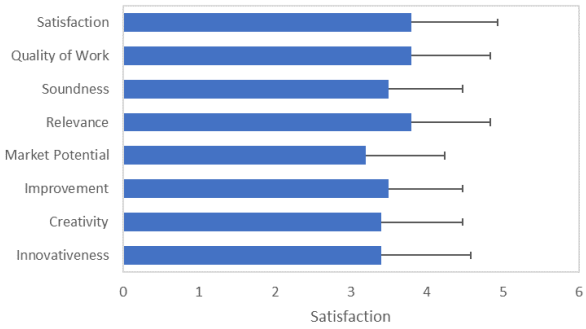

Figure 2: Satisfaction of companies with work of the co-creation team and the solution delivered. Average values ± sd are shown (n = 10). Of the categories surveyed, Satisfaction, Quality of Work, and Soundness refer to the work done by the co-creation team, whereas Relevance, Market Potential, Improvement over existing solutions, Creativity, and Innovativeness refer to the solution delivered. Satisfaction was measured on a Likert scale: 1 – very poor, 2- poor, 3 – average, 4 – good, 5- very good.

In terms of delivery of results, the companies have reported that all requested deliverables had been delivered by the co-creation teams in all cases except one (representing one of the projects where the solution was rejected). In terms of follow-up on the solution within the company, indicating its usefulness, two companies have already started, a third company has confirmed that they will follow up on the solution, while 5 have not yet decided and in two cases it will probably not happen.

Since the INDUSAC project put a fair amount of emphasis on social aspects such as geographically and gender-balanced collaboration, the survey for students and researchers included questions on agreement with (i) incorporation by the co-creation process of customer research and insights to understand the end-users' needs and preferences, (ii) solutions that specifically addressed gender-related issues or considerations, and (iii) successful prioritisation of the human aspect (Inclusivity, Gender dimension, Interdisciplinarity, User Perspective, Collaboration, Iterative Feedback, Ethical Considerations) and creation of a meaningful and inclusive environment. Results are shown in Figure 3. Agreement was evaluated on a Likert scale from 1 to 5. On average, all three categories ranked fairly high, between 4.0 and 4.5.

Lastly, questions about the adequateness of financial support to students, were also included in the survey. As per the INDUSAC methodology, each student received up to 1.000 EUR gross for a successfully finished project, and this amount was reduced as the number of students per team increased, as each team received up to 3.000 EUR gross. Results, demonstrated as distribution of opinions among different geographical groups (ie., EU member states, widening countries, and EU associated countries), are given in Figure 4, and indicate that overall, between 58% and 70% of students agree that funding was sufficient.

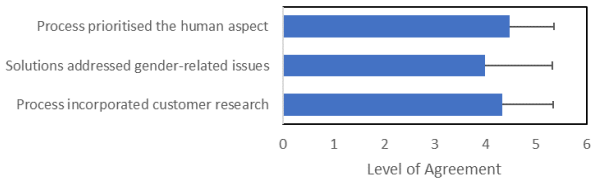

Figure 3: Agreement of students / researchers with incorporation of customer-oriented and human-focused elements in the projects. Average values ± sd are shown (n = 61). Agreement was measured on a Likert scale: 1 – very poor, 2- poor, 3 – average, 4 – good, 5- very good.

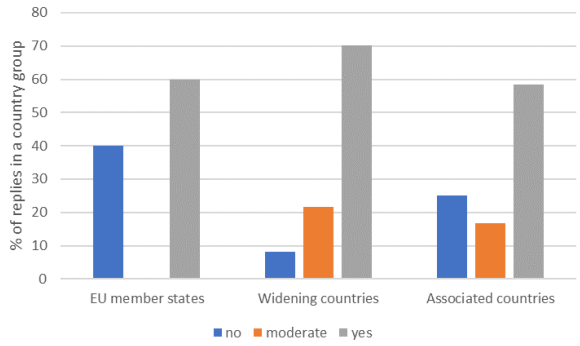

Figure 4: Perception of adequacy of funding within the scheme in the INUDSAC project, as surveyed among students and researchers from different countries of residency. Within EU member states, there were no opinions towards [moderate]. Total number of individuals responding was 5 in EU Member States, 37 in widening countries, and 12 in associated countries.

4 DISCUSSION

The INDUSAC approach set out to bring several advantages to the existing landscape of knowledge transfer practices, such as inclusiveness represented by gender balance, international cooperation by mandatory geographical diversity, enhanced support to widening countries by mandatory representation in the teams, and expansion to include students via mandatory participation of at least one student per team solving companies' challenges; some of these have already shown to be advantageous for companies [2-4]. Our results point to initial indications that the INDUSAC mechanism, comprising the methodology and the platform, is relatively well accepted among companies (Figure 1), with room for improvement in certain aspects such as the user-friendliness of the platform and the time allowed to solve a challenge. The latter points to a general enthusiasm among companies to engage in finding solutions for more serious challenges as well, which is encouraging – in two cases, work is already under way to continue with the projects, and overall, around 30 % of co-creation projects have demonstrated true value to the company involved, and there is potential in the further 50 %. So even with the constraints given, and taking two out of thirteen solutions rejected into account, companies have expressed a fair level of general satisfaction with the solutions and the work done by the teams (Figure 2). It is likely that this was aided by the methodology sections which defined interim reviews and evaluation steps (eg., reviews of challenges before publishing, reviews of Motivation Letters before starting, etc.), and regular communication between companies and co-creation teams during the project. In all except in one case, all deliverables were satisfactorily produced by the teams, indicating that the supporting documents that comprised the deliverables, and which were developed within the INDUSAC consortium, served as useful guidelines for particular type of challenge.

Having the project open to a wide range of challenge types also proved beneficial as among the 13 projects for which solutions were provided, seven out of nine possible challenge types were represented, and distribution among different challenge types was fairly even, with 'Marketing campaigns' and 'Service and product ideas' being most preferred.

An additional advantage was presented by the fact that the efforts to facilitate knowledge transfer between industry and academia are financially supported within the INDUSAC scheme. This type of support is particularly welcome, as the lack of funding is a frequent barrier for student-industry collaboration [5,6]. Around two thirds of surveyed students found funding to be adequate, and the largest percentage of this opinion was found among students from widening countries (Figure 4) indicating that the funding scheme shows promise for the major target group of the project.

There is, however, room for improvement – not least based on comments given by the companies themselves. Geographical balance, for example, may in some cases be an obstacle, as, in one company's opinion, having a team with members from different countries can make it difficult to work on projects that require physical experience with a product. It is likewise important to be able to streamline the process, which needs to be backed by a reliably functioning platform, as well as to unify the working space, as it was, in one company's opinion, difficult to keep track which information they received from which platform. Lastly, as mentioned, companies have expressed interest in a more flexible data management, as the project's timeline may prove too rigid. In terms of funding, one student pointed out that it would have been preferable to receive funding during the project rather than after, to allow for traveling to companies and collecting data. The problem of limited mobility was also perceived by companies, two of which stated that the biggest challenge in projects related to physical products was that the participants cannot get to know and test the products live, and that creativity may be limited due to the lack of face-to-face interaction with products and colleagues.

5 FUTURE PERSPECTIVES

The INDUSAC project set out to show that companies benefit from a particular type of knowledge transfer in the form of creative young minds, that this knowledge transfer brings satisfactory results and useful solutions, and that the gender and geographical balance, as well as the inclusion of social elements

(Figure 3) have a positive effect on the overall process (satisfaction by teams, satisfaction by companies). While we did not perform any control studies (for example, with single-gender teams) to truly test the effect of gender balance, there was a slight positive effect of (i) number of team members and (ii) ratio of female-vs-male team members, on company's satisfaction with results and quality of work (unpublished data). Other results and selected testimonials from companies, complimenting the work of students and expressing their own belief that the students are richer for the experience as well, demonstrate that the INDUSAC mechanism shows promise in knowledge transfer, and the rejected solutions stand as reminders that even following the careful process of team assembly and selection, monitoring of the work done needs to be vigilant for it to lead to satisfactory results. With this in mind, the INDUSAC methodology is continuously improving and mechanisms are put in place to minimize such occurrences. The challenges that remain also include attracting larger numbers of companies and students / researchers to engage into cooperation, but the level of success described here represents a strong starting point.

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