



## **Challenge-based Learning applied to Open Social Innovation: impacts on social companies**

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### **Abstract:**

The challenge-based learning (CBL) approach applied to real problems can lead to change by substantially impacting companies and organizations that offer challenges to be solved. This pedagogical approach can be used in open social innovation (OSI) processes. This innovative learning method leads to capacity building, soft skills or 21st-century skills acquisition, and experiential and active learning that connects students with companies, cooperatives, and Third Sector organizations. This working-progress paper aims to understand how a challenge-based learning initiative such as the 8 ECTS “Social Entrepreneurship and Sustainability” curricular course at the University of Trento (Italy) impacts entrepreneurial and innovation processes on the companies involved in the educational initiative. Companies that offer challenges are called challenge providers and involve students in open social innovation processes to solve companies’ problems and societal issues. Measuring the impact on challenge providers involves evaluating short- and long-term benefits and tangible and intangible outputs of the OSI. The research collects data from online questionnaires and semi-structured interviews with five challenge providers involved in the course through a qualitative methodology. From the challenge provider perspective, this course represents an opportunity to acquire new ideas and solutions, recruit young talents, and gain knowledge and competencies. All the interviewees’ challenge providers recommend this course to other organizations. They agree on positive benefits related to receiving new, fresh, valuable ideas and disruptive solutions not considered before. They thought the interaction with students to be good. However, attending a challenge-based learning initiative is time-consuming and requires some facilities and infrastructures that not all companies own or can put into practice. This research has some limits: results need to be completed and are partial. Some data is lacking since the course has just finished, and not all companies have completed the questionnaires or attended the final semi-structured interview. This paper’s originality stems from the extensive literature on the learning process and the student’s perspective.

**Keywords:** Social Entrepreneurship; Open Social Innovation; Challenge-based learning; University; Social companies

**Paper type:** working-progress survey research paper

## **1. Introduction:**

The CBL is gaining momentum among higher education institutions (HEIs) worldwide to benefit student learning and impact social organizations. CBL is an innovative approach to education that focuses on engaging students in solving real-world problems through collaboration, critical thinking, and problem-solving skills (Observatory Tecnológico of Educational de Monterrey, 2015). It is a constructivist (Knowles, 1975) and self-directed pedagogical approach (Scroccaro & Rossi, 2022), where students are the center of the learning. Thus, it is a student-centered learning approach. The literature on CBL is growing, and in this paper, we follow the definition of Norrman et al. (2022), where CBL is an experiential learning approach that starts with wicked, open, and sustainability-related real-life challenges that students in cross-disciplinary teams take on in their way and develop into innovative and creative solutions. Challenge providers (CPs) are companies, public institutions, associations, and communities that deal with real problems and seek sustainable solutions. This way of working strengthens the educational results and the regional innovation ecosystem by joining all parts of the knowledge triangle (EIT, 2012) or the so-called quadruple helix (university, industry, government, civil society). The CBL approach stands on the idea that students are more motivated and engaged when they have to deal with authentic problems to solve rather than listening to predetermined answers, as usual in traditional teaching. Therefore, CBL seems to be an excellent methodology for fostering entrepreneurial competencies (Perez et al., 2020).

In parallel, CBL can impact challenge providers' innovation processes since it fosters a strong interaction between students and companies. Students question and interview companies, often offering new perspectives. Students are involved in the so-called OSI processes (Chesbrough & Di Minin, 2014), applying open innovation strategies to social challenges. In this context, this working progress paper aims to understand the impact of participating in challenging educational initiatives on the challenge providers. In this regard, the research question is: RQ1: What are the effects of attending a challenge from the companies' perspective?; RQ2: What are the short and long-term effects?; RQ3: What are the tangible and intangible effects?

This working-progress paper presents a qualitative case study: the 2023/2024 edition of the Social Entrepreneurship and Sustainability course, embedded in the master's program on management at the Department of Economics and Management of the University of Trento (Italy). After describing the course, the paper shows the methodology and presents the preliminary results and findings. A section of the paper includes the managerial implications of designing a CBL initiative. Finally, the conclusions are explicit about the limitations and the following steps to improve this research.

## **2. Theoretical background:**

In the following section, the paper presents the theoretical background related to CBL and the implications of CBL on challenge providers' participation. There is a gap in the literature concerning the effects of attending a challenge-based initiative from the organizations' perspectives.

### **2.1. Challenge-Based Learning**

CBL emphasizes problem-solving, critical thinking, and collaboration skills to engage students in resolving real-world challenges (Observatory Tecnológico of Educational de Monterrey, 2015). The root of CBL (Nichols & Cator, 2008; Nichols et Al, 2016; Perna et

Al, 2023) is the constructivist theory, which suggests that the learner constructs knowledge through active engagement with the environment (Piaget, 1950; Vygotsky, 1978; Dewey, 1938; 1963). This approach emphasizes the importance of SDL since the learner's role is critical in the learning process (Pilling-Cormick, 1997). CBL has gained popularity in HEIs worldwide due to its ability to offer students an opportunity to work in a real job context, deliver solutions that companies can implement, revolutionize teaching approaches, and transform the role of teachers into coaches and mentors, known as “teamchers” in ECIU (Norrman et al., 2022). CBL also has significant societal impacts since students usually work in groups and can collaborate with peers from various disciplines, resulting in a multidisciplinary learning experience that includes stakeholder perspectives (Norrman et al., 2022; Kohn Rådberg et al., 2020).

## 2.2. OSI and effects of CBL on the challenge providers perspectives

OSI refers to new forms of organizing, bringing various stakeholders into the social innovation process, from problem identification to the solution creation and validation (Fayard, 2023; Mair & Gegenhuber, 2021). OSI includes various formats, from in-person and online hackathons and challenges to crowdsourcing platforms where various stakeholders collaborate (Gegenhuber & Mair, 2023). OSI differs from social innovation in that it refers to “innovative activities and services that are motivated by the goal of meeting social need” (Mulgan, 2006). While OSI is defined as “all those ideas, activities and processes that support the development of new social solutions (products or services), through the inflows and outflows of knowledge and technologies (inbound and outbound activities) and collaborations between different entities (coupled processes), mobilizing actions across boundaries and exploiting ecosystems” (Santoro, Ferraris, Vrontis, 2018, p. 30). For social impact, OSI needs coordinated collective action (Mair et al., 2023; van der Have & Rubalcaba, 2016). CBL conveys effects on challenge providers in terms of performance (Caputo et Al, 2016; Ahn et Al, 2015; Ebersberger et Al, 2012; Nguyen et Al, 2021).

## 3. The Sustainability and Social Entrepreneurship course:

The 48-hour course (8 ECTS) focuses on hybrid and sustainable companies and aims to transfer the ability to examine opportunities and challenges for promoting corporate and nonprofit/hybrid corporate responsibility and sustainability. It aims to impart knowledge, skills, competencies, approaches, and techniques specific to social impact business design. It also seeks to understand current challenges, trends, and future scenarios in sustainability, innovation, and social entrepreneurship, as well as the main business models available for creating social impact. Through developing knowledge related to social entrepreneurship and third-sector management, the course aims to analyze the spaces, tools, and opportunities for the strategic development of Third Sector organizations, the cooperative world, nonprofit companies, and B-Corp, focusing on new forms of social innovation.

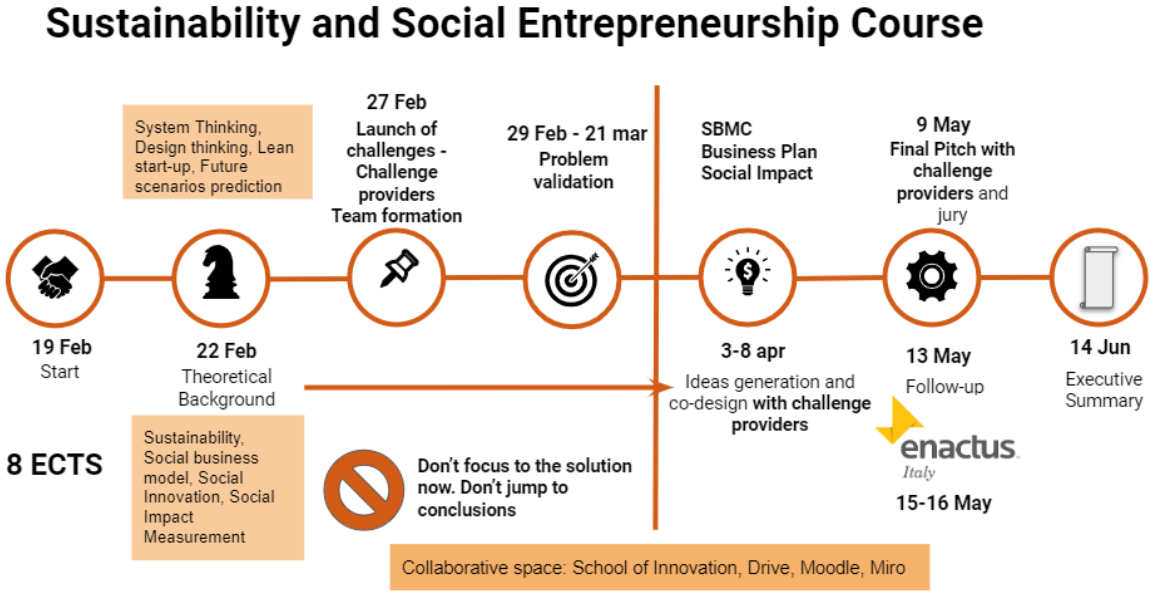
For the first time, in 2024, the course is designed as a challenge-based and hands-on course that includes developing a project idea and a social business model to be presented at the end of the course, starting from challenges launched by entities, the so-called challenge providers of the Trentino territory (such as organizations, cooperatives, and associations). By immersing themselves in the challenges, the students respond to concrete problems, presenting innovative and sustainable solutions at the end of the course. At the end of the course, students should be able to identify and describe the main models of social entrepreneurship and social innovation, recognize the main managerial approaches to

transform social entrepreneurial opportunities into business models, analyze and evaluate how social entrepreneurship and social innovation enable sustainability and how social entrepreneurs can act as change agents; analyze the needs and funding sources for social entrepreneurship and social innovation; analyze a problem, putting it in context, identifying key stakeholders, and understanding customer/user needs; generate innovative and sustainable social impact solutions; understand social impact design, measurement, and evaluation; present a pitch in front of an audience consisting of faculty, investors, and Third Sector organizations.

The course is structured into three main parts: i) problem validation, ii) idea generation, and iii) solution validation (Figure 1). Problem validation is a crucial phase through which teams understand challenges by interacting with challenge providers, collecting data and information through fieldwork and interviews, and doing desk research. During this phase, teams must use several tools, such as fishbone, iceberg model, and five whys, to understand problems. Then, they use future tools to envision scenarios and trends. Teams effectuate market analysis through SWOT (strengths, weakness, opportunities, threats), competitor analysis, and buyer personas. In the second phase, teams must imagine at least two or three solutions for their challenge providers. To achieve that, they follow structured brainstorming that supports them in stimulating creativity and identifying several disruptive ideas. Then, each team must present these ideas to challenge providers and together choose the solution. In the third phase, teams build and validate the solution through interviews and iterations in the fieldwork. They also create a social business model canvas and a business plan in this part. Finally, they pitch the solutions to an audience composed of teachers, investors, and entrepreneurs.

In the 2024 Edition, the class also competed in the Enactus competition. Enactus is an international social entrepreneurship organization funded by university students for university students.

Figure 1. The program of the course



3.1. Team formation and challenges

The class comprised 19 students, three non-attending since they were workers. The remaining 16 students were divided into four teams. The three non-attending students

formed a team. Teams were formed to be heterogeneous using three criteria: i) gender, ii) the 16-personalities test (based upon the NERIS® model), and iii) the students' preferences for specific thematics. This formation aims to have heterogeneous groups and create a job situation where people cannot choose colleagues. The 16-personalities test helped to understand the attitudes and personalities of students by combining introverted (I) vs. extroverted (E), intuitive (N) vs. observant (S), Thinking (T) vs. Feeling (F), Judging (J) vs. Prospecting (P), Assertive (-A) vs. Turbulent (-T) students. The five teams were matched with five challenge providers and their respective challenges.

For the course, teachers selected five challenges among social organizations in the Trentino region to focus on local social challenges in different domains, such as urban requalification, social inclusion, depopulation of rural areas, sustainable tourism, and valorization of local food. The selection process took two months, and teachers met and interviewed at least ten different organizations from different backgrounds, structures, and missions. The five chosen organizations had the most interesting, urgent, and impactful societal issues, the highest motivation in engaging with students, and the most significant time, resources, and staff to support the student teams. Challenge providers were identified to provide different organizations' typologies: cooperatives, WISEs (working integration social enterprises), start-ups, foundations, and social organizations. The five following challenges were designed before the start of the course (see Table 1).

Challenge 1. A local social foundation and a cooperative proposed to work on a social tourism project to generate funds and raise awareness of social issues among travelers, creating a replicable model in other cooperative settings.

Challenge 2. The second challenge focused on diminishing the depopulation of mountain areas, the closure of commercial activities, and the consequent abandonment of mountain areas. Teams had to work on fostering smart working places located in misused buildings.

Challenge 3. The third challenge was supporting an urban requalification project to transform some spaces of the Rovereto train station into a public civic hub dedicated to addressing climate change and biodiversity loss.

Challenge 4. The fourth challenge regarded relaunching the subcontracting business unit through identifying innovations in the production process of contracting to maintain a significant turnover.

Challenge 5. Finally, the fifth challenge was supporting local restaurateurs in a phase of profound change oriented towards sustainability and new technologies, starting with sustainable and ethical food delivery and developing the local communities.

Table 1. The five selected challenges and the challenge providers

<b><i>Challenges</i></b>	<b><i>Themes</i></b>	<b><i>Challenge providers</i></b>
1.	<i>Social tourism project to generate funds and raise awareness of social issues among travelers, creating a replicable model in other cooperative settings.</i>	<i>Local social foundation and local cooperative</i>
2.	<i>Fighting the depopulation of mountain areas, the closure of commercial activities, and the consequent abandonment of mountain areas. Teams had to work on fostering smart working</i>	<i>Rural bank and cooperative</i>

	<i>places located in misused buildings. Rural bank and cooperative</i>	
3.	<i>Support an urban requalification project to transform some spaces of the Rovereto train station into a public civic hub dedicated to addressing climate change and biodiversity loss.</i>	<i>Network of associations, local government, public transportation entity</i>
4.	<i>Relaunching the subcontracting business unit through identifying innovations in the contracting production process to maintain a significant turnover.</i>	<i>Local W.I.S.E</i>
5.	<i>Support local restaurateurs in a phase of profound change, oriented towards sustainability and new technologies, starting with sustainable and ethical food delivery and developing the local communities.</i>	<i>A start-up based in Milan</i>

The winning team of the Enactus class competition was the one that worked for Challenge 4. Students were called to improve the subcontracting business unit. However, instead of working on the specific challenge, they pivoted and imagined a new project: they contributed to employing fragile people in a social cooperative by starting a workshop producing fresh pasta. In the pasta workshop, fragile workers will be supported by trained tutors. In this solution, employees learn a new craft and foster their creativity. At the same time, the cooperative can introduce a more innovative business unit and improve its market image through original, refined, and high-quality production. The cooperative's clients can innovate their menus sustainably and recognizably. The label certifies the social workforce involved in the process. The workshop creates masterclass-style events where consumers can have the opportunity to see the production process and live a unique experience by participating in courses and purchasing the finished product. Through this project, the cooperative raises the local community's awareness and improves the cooperative's perception of the workshop.

### 3.2. The students' assessment

The course's assessment follows an integrated formative approach and combines individual and team assessments. 50% is an assessment of group work. The evaluation criteria for the final pitch are: 1) Validation of the solution, 2) Innovativeness of the solution, 3) Scalability and social impact of the solution, 4) Economic feasibility/sustainability of the proposal, and e) Quality of the oral presentation.

50% is an assessment of the individual's contribution in writing a final group report to be sent after the end of the course. This is an executive summary consisting of several sections describing the work done by the group during the course. The executive summary indicates each person's role in performing the work and preparing the document. The executive summary contains a description of the challenge, a description of the work performed, and the methodology used for problem validation, solution generation, prototyping, and testing of the solution, aided by all the tools presented in the classroom, the Social Business Model

Canvas and the income statement. The evaluation criteria for the individuals' contribution are 1) Completeness of the sections performed by the individual; 2) Correctness of the sections performed by the individual; 3) Originality, personal contribution, and creativity of the sections performed by the individual.

Only teachers evaluated and graded the oral presentations and the executive summaries. Challenge providers needed help to evaluate the oral presentation. However, the oral presentation was also connected to the Enactus initiative, so the final pitches took place in the presence of the contact persons of the organizations that proposed the challenges and a jury composed of experts, academics, and entrepreneurs. The jury evaluated the four teams (the ones composed of the attending students) through five criteria: 1) Entrepreneurial leadership (identifying a need and capitalizing on opportunities by taking personal responsibility, managing risk, and managing change within a dynamic environment); 2) Innovation (introducing new or improving existing ideas, services, technologies, products, or methodologies); 3) Business principles (applying a sound business model and business plan); 4) Sustainable positive impact (demonstrating a measurable, lasting improvement for people, planet, and prosperity intended as fulfilling lives economically and socially); 5) Quality of oral presentation.

#### 4. Methodology:

A qualitative methodology has been used to answer the three research questions concerning the impact of challenges on challenge providers' innovation processes. Data collection has been conducted in two ways. The first one is a short online questionnaire comprising eight questions, 7 out of 8 are closed questions asking on a Likert scale (from 1 to 5 where 1 is Very low and 5 is Very high) the satisfaction of attending the course as a challenge provider, the quality of tangible and intangible outputs received through the participation and the interaction with students. The second is a semi-structured interview to evaluate the challenge's impact from the provider's perspective. The set of tools used for this methodology is summarized in Table 2.

So far (July 2024), 4 out of 5 challenge providers were contacted, answered the online survey and were interviewed. The online survey received seven responses since two answered on behalf of two challenge providers. The semi-structured interviews were conducted online through Zoom calls separately for each challenge provider. Three challenge providers showed up in the interviews with two representatives (Challenges 2, 3, and 4). One challenge provider showed up with three representatives (Challenge 1). The current data collection does not represent Challenge 5 since the challenge providers have yet to answer the online survey and have not attended the interview. One teacher conducted interviews, and the notes were manually taken and coded into four categories: tangible and intangible outputs and short and long-term benefits.

Table 2. Methodology: tools set up for measuring the challenge providers' outputs

<i>Tool</i>	<i>Goal</i>	<i>Questions</i>
<i>Questionnaire</i>	<i>Measure the satisfaction</i>	<i>On a scale of 1 to 5, how satisfied are you with the tangible and intangible results that your organization has gained from being in contact with students/esses (tools, advice, prototypes, documentation, new ideas, new ways of learning and working, networking, talent</i>

		<i>scouting, getting to know new partners, customers and suppliers, etc.)?</i> <i>If you had to rate the relevance of these outcomes to your organization on a scale of 1 to 5, what grade would you give?</i> <i>From 1 to 5, how much do you rate the quality of the Lab's faculty and mentors (specific knowledge, proactivity, organizational skills, etc....)?</i> <i>From 1 to 5, how well did the Lab meet your expectations and those of your organization?</i> <i>From 1 to 5, how much would you recommend this experience to other organizations?</i> <i>In this space, you can leave a comment and/or let us know what we might consider to improve the Lab</i>
<i>Semi-structured interview</i>	<i>Identify tangible and intangible outputs</i>	<i>What kind of results did you gather from the challenge?</i> <i>What kind of tangible outputs did you gain? What kind of intangible outputs have you gained?</i> <i>Can we have a follow-up in the next six months?</i> <i>Are you willing to participate in another challenge edition?</i> <i>Have you any further comments or curiosity?</i>

## 5. Results:

6 out of 7 challenging providers answered that they have a high and very high correspondence between their expectations and the final satisfaction (see Figure 1). All the interviewees' challenge providers recommend this course to other organizations (see Figure 2).

In Table 2, the paper shows the main results of the data collection. Results were divided into tangible and intangible outputs and short and long-term benefits.

From the challenge provider perspective, this course represents an opportunity to acquire new ideas and solutions, recruit young talents, and gain knowledge and competencies. They agree on positive benefits related to receiving new, fresh, valuable ideas and disruptive solutions that were not considered before. They considered the interaction with students to be good. They were surprised by their proactive approach, through which students could more easily join other stakeholders such as companies, potential customers, providers, and experts. They confirmed the professionalism and organization of students. They value the tools and approaches used during the course, particularly the ones dedicated to creativity and assumption validation, and they think the final presentation and executive summary are valuable for their organization. One challenge provider admitted the importance of connecting with the university, people, and stakeholders through the course. These connections are beneficial for new collaborations and future projects.

Concerning the long-term benefits, all challenge providers think that the solutions provided by the teams are likely to be implemented or partially implemented in the future. One challenge provider mentions that participating in the challenge was beneficial to be inspired for new solutions to other organizations' issues.

Finally, in Table 3, this paper summarizes the main disadvantages of participating in the course from the perspective of the challenge providers. Challenge providers reported that



such an educational initiative is time-consuming and that they may need to prepare to dedicate such a significant amount of time to students. Challenge providers also claimed that having more than one organization per challenge confused them and the students. Each representative could have a different point of view on the same challenge, which could affect the student's comprehension of the issue. This “over-representation” of the challenge providers and the challenges sometimes provoked miscommunication and misalignment with students. In two challenges, weak communication with students affected the conduct of the interviews conducted by the students with challenge providers’ partners and potential customers. Generally, these issues were solved collaboratively between challenge providers and students without teachers' intervention. Moreover, the challenge providers admitted that these situations benefited them in gaining new perspectives and contacts with possible customers and partners.

Figure 2. The attained expectations of the challenge providers

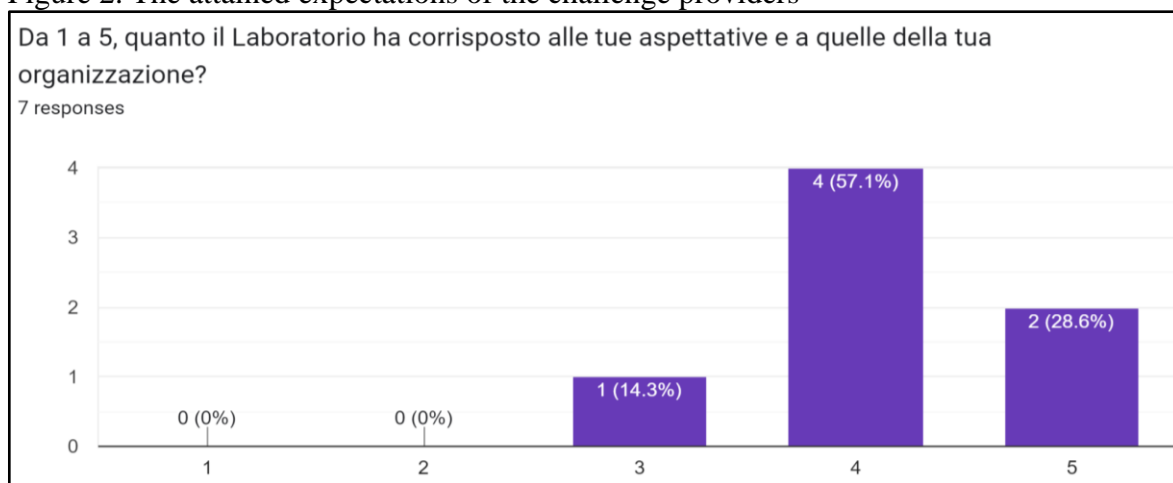


Figure 3. The level of satisfaction of the challenge providers



Table 2. Short and long-term, tangible and intangible results of the challenge providers

	<i>Short-term Benefits</i>	<i>Long-term Benefits</i>
<i>Tangible outputs</i>	<ul style="list-style-type: none"> <li>● <i>Fresh ideas</i></li> <li>● <i>New perspectives</i></li> <li>● <i>Assumptions' validation</i></li> <li>● <i>Executive summary</i></li> </ul>	<ul style="list-style-type: none"> <li>● <i>Solution implementation (even partially)</i></li> </ul>
<i>Intangible outputs</i>	<ul style="list-style-type: none"> <li>● <i>Time to reflect</i></li> <li>● <i>Topic exploration</i></li> <li>● <i>Networking with potential customers and partners</i></li> <li>● <i>New contacts</i></li> </ul>	<ul style="list-style-type: none"> <li>● <i>New collaborations</i></li> <li>● <i>Talent recruiting</i></li> <li>● <i>University as changemaker</i></li> <li>● <i>Inspiration for new solutions</i></li> </ul>

Table 3. The disadvantages of the challenge providers

<i>Areas</i>	<i>Disadvantages</i>
<i>Management</i>	<i>Time-consuming</i> <i>Too many representatives per challenge</i>
<i>Interaction with students</i>	<i>Not ready to interact with students</i> <i>Weak alignment with students</i> <i>Miscommunication with students</i>

## 6. Managerial implications:

The paper extensively details designing and managing a challenge-based course to have a coherent and efficient entrepreneurship education initiative. Through this course, the paper collects five main recommendations that can be useful to improve the design and management of similar challenge-based learning educational initiatives at the university level. The first recommendation is to pay more attention to selecting the challenge providers: challenge providers might need more time to be ready for this new way of interacting with students. The CBL is a new way of teaching and learning far from the traditional one, and organizations need to be used to working interactively with students. Moreover, if the organization has a clear governance structure, students might be well followed. Another crucial point is the time: if the challenge provider needs to dedicate more time to students, the latter gains motivation.

The second recommendation is to consider designing and building the challenge with challenge providers before starting the course. The challenge should concern clear goals and projects that are established over time. Otherwise, students feel they need more boundaries. The third recommendation is to provide all the theoretical background at the beginning of the course, showing and explaining the Social Business Model Canvas, the business plan, and the social impact assessment during the first phase of the semester. The fourth

recommendation concerns structuring the course differently, saving more time for solution validation and construction. Finally, the fifth recommendation is connected to dedicating more time to soft skills exercises, primarily focusing on creativity, getting out of the comfort zone, and stress management.

## **7. Conclusion:**

This working-progress paper presents the impact of the CBL approach on the challenge providers, identifying tangible and intangible outputs in the short and long term. The paper starts by explaining the theoretical background of the CBL approach and presenting the Sustainability and Social Entrepreneurship course held at the Department of Economics and Management of the University of Trento for management Master students. CBL is a constructivist student-centered approach that puts students directly in contact with companies and organizations, tackling real problems connected to society. Through a qualitative methodology, the research collects data from challenge providers, which is unique since, in the literature, most of the time, these educational initiatives are measured from the student's point of view.

From the challenge provider perspective, this course represents an opportunity to acquire new ideas and solutions, recruit young talents, and gain knowledge and competencies. All the interviewees' challenge providers recommend this course to other organizations. They agree on positive benefits related to receiving new, fresh, valuable ideas and disruptive solutions that were not considered before. They considered the interaction with students to be good. However, attending a challenge-based learning initiative is time-consuming and requires some facilities and infrastructures that not all companies own or can put into practice.

The limitations of this paper are connected to the fact that data collection and analysis need to be completed. Some data is lacking since the course has just finished, and not all challenge providers have completed the questionnaire and attended the semi-structured interview. Also, this research is punctual and considers a small number of challenge providers.

The following steps concern the completion of data collection and analysis through the questionnaires to challenge providers and semi-structured interviews. Moreover, in six months, challenge providers will be interviewed again to monitor the progress of the solutions' implementation and a follow-up of the interaction with students. A longitudinal study is currently only possible after this is the first edition of the course.

However, this research is open for future steps, such as a deep dive into the literature and reinforcing the methodology by considering, for example, a comparative analysis with other similar courses using CBL.

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