



# CASE STUDY: EIT MANUFACTURING: TEACHING FACTORY COMPETITION

January 2023





<b>INTRODUCTION .....</b>	<b>3</b>
OBJECTIVES OF THE CASE STUDY .....	3
METHODOLOGY .....	3
RATIONALE FOR SELECTION OF THE CASE STUDY .....	4
CONTACT INFORMATION .....	4
<b>INFORMATION ABOUT ACTIVITY .....</b>	<b>5</b>
RATIONALE OF THE ACTIVITY: VALUE ADDED AND BENCHMARKING THE ACTIVITY WITH OTHER ACTIVITIES .....	5
DESCRIPTION OF ACTIVITY .....	6
DATES OF IMPLEMENTATION AND FUNDING ALLOCATED .....	7
INFORMATION ABOUT PLANNED KPIS AND OUTPUTS .....	8
PRESENTATION OF PARTNERS. KNOWLEDGE TRIANGLE APPROACH .....	8
BENEFICIARIES.....	10
PRESENTATION OF THE IMPLEMENTATION PROCESS .....	10
ACHIEVED OUTPUTS AND KPIS.....	14
IDENTIFIED VALUE ADDED.....	15
HOW THE ACTIVITY HAS APPLIED KICS FINANCIAL SUSTAINABILITY PRINCIPLES .....	17
<b>QUALITATIVE ASSESSMENT OF THE PROGRAMME AND ITS ACHIEVED IMPACT .....</b>	<b>19</b>
QUALITATIVE ASSESSMENT OF THE ACTIVITY .....	19
ACHIEVED IMPACT .....	20
<b>GOOD PRACTICES AND LESSONS LEARNT .....</b>	<b>22</b>
PRESENTATION OF LESSONS LEARNT FROM THE ACTIVITY IMPLEMENTATION .....	22
GOOD PRACTICES FOR SHARING, INCLUDING KEY IMPLEMENTATION CONSIDERATIONS .....	24
PRESENTATION OF POTENTIAL FOR REPLICATION AND SCALING-UP.....	26
<b>CONCLUSIONS .....</b>	<b>28</b>



# INTRODUCTION

## OBJECTIVES OF THE CASE STUDY

**Teaching Factory Competition (TFC)** is a new initiative related to advanced training for students in universities, and vocational education in collaboration with industrial organizations. It was piloted for the first time in 2022 and is a “lighthouse initiative” of EIT Manufacturing.

This case study presents the framework, objectives, innovative educational approach and expected impact of the TFC. TFC can be regarded as innovative practice, further expanding from the previous “teaching factories” methodology used in several universities and VET organizations, as it is adding the competition element and increasingly an innovation and business component. It is based on the real-life manufacturing challenge which needs to be solved. Lessons learnt from the implementation of the TFC and the resulting good practices for sharing are identified, so they can be scaled up and adapted in other institutions and environments to support entrepreneurship development.

## METHODOLOGY

The study involved conducting one-on-one in-depth interviews with the significant persons in charge of the planning and execution of TFC, as well as its partners and beneficiaries:

- Director of education EIT Manufacturing.
- TFC programme manager.
- Industry partners.
- Students, and their mentors (tutors).

The case study was enriched based on the desk research. The **documents** and **reports** regarding the implementation of TFC as well as **information** shared on EIT Manufacturing and programme’s website were examined, with special focus put on:

- EITM TFC2022 Call for companies.
- EITM TFC2022 Call for universities.
- Communication about TFC 2022 for external partners (.pdf brochure).
- EIT Manufacturing, TFC toward financial sustainability (internal document)
- All available documents, articles and other items published on-line and publicly available.



## RATIONALE FOR SELECTION OF THE CASE STUDY

As evident from the description of this initiative<sup>1</sup>, what started as the tool to improve the teaching methods in the universities and VET organizations has in the end demonstrated equal benefits for the participating companies on whose challenges the students were engaged. The TFC case study has the following strengths:

- It is a specific case to demonstrate the **knowledge triangle** integration. Apart from the links between academia-driven innovation and entrepreneurs, it has an element of business planning with the involvement of the business creation pillar of EIT.
- It directly creates value added for both the company and the students. The TFC initiative is open also to the companies, universities, and VET schools outside the existing EIT network, provides benefits to wider stakeholders, and further promotes the activities of EIT.
- The initiative can further promote interdisciplinary cooperation. Even though EIT Manufacturing is oriented toward engineering, the TFC promotes a real interdisciplinary approach to the problem solving, such as in environmental sciences and economics. Higher involvement of business-oriented skills will be further promoted to enhance all components of the knowledge triangle.
- TFC can be easily scaled up to involve multiple teams and remain focused on different EU policy priorities. For example, in 2022 the focus was on green manufacturing, and in 2023 it could be linked to DG EAC Innovation agenda related to Deep Tech talent.
- **The initiative has a big potential for financial sustainability and independence from own EIT funding.** Even though the first TFC was fully funded by EIT Manufacturing, in the future the participation fee will be introduced for the participating companies, justified by the tangible benefits they gain from the participation.

## CONTACT INFORMATION

- Initiative website: <https://www.eitmanufacturing.eu/calls/teaching-factories-competition-green-manufacturing/>
- Programme's contact email address: [tfcompetition@eitmanufacturing.eu](mailto:tfcompetition@eitmanufacturing.eu)

---

<sup>1</sup> More information available at: <https://www.eitmanufacturing.eu/calls/teaching-factories-competition-green-manufacturing/>



## INFORMATION ABOUT ACTIVITY

### RATIONALE OF THE ACTIVITY: VALUE ADDED AND BENCHMARKING THE ACTIVITY WITH OTHER ACTIVITIES

The idea for the initiative originally came through the model developed in the **University of Patras (Greece) and its Laboratory for Manufacturing Systems and Automation (LMS)**, which has been part of the EIT Manufacturing network. The initial inspiration came from the “teaching hospitals” who offered students learning opportunities based on real-life hospital situations and patients. That has become the standard educational approach which ensures that the graduates are sufficiently equipped with theoretical and practical knowledge and experience by being exposed to different stakeholders and understanding their needs, communication, and organization culture.

The University observed the practice and wanted to expand it with the exposure of engineering students to the companies and their real-life challenges (even in different countries). Furthermore, the students needed the experience of the real dynamics within the industry and understand the characteristics of the stakeholders – their specific communication models, timeframe of implementation of activities (often quite different from the academic dynamic), interdisciplinary perspectives of a specific industrial challenge such as adding the environmental, costing and market aspects to the technical solutions.

The methodology for this collaboration, and subsequently the methodology for the TFC was developed by the network of teaching factories<sup>2</sup> (an EIT initiative which started in 2020). Through this network the companies (industrial partners) demonstrate some real-life challenges and receive assistance from the academic sector in solving their problems by using the high-quality research and methodologies and training the staff of the companies. The whole concept is based on the **open innovation approach**<sup>3</sup>, where the company seeks ideas and inputs from the external stakeholders (for example, from universities or research institutes).

EIT Manufacturing has adopted the model and elaborated it further to make it more structural. It has developed processes to facilitate the collaboration between universities and companies and has developed an IT collaboration platform (AGORA) and other systems and tools. EIT also made available the support staff to facilitate the collaboration between the solving teams and the challenge owners as well as coaches, especially for the business aspects of collaboration. In this way, the collaboration projects did not need to start “from scratch” in setting up the collaboration model, and benefited from already developed, tried-and-tested tools provided by EIT Manufacturing<sup>4</sup>.

The main needs of the stakeholders addressed by the TFC are:

---

<sup>2</sup> For more information see: <https://www.eitmanufacturing.eu/what-we-do/education/resources/teaching-factory/>

<sup>3</sup> [What is Open Innovation? A definition and an explanation \(oxford-review.com\)](https://www.oxford-review.com/what-is-open-innovation-a-definition-and-an-explanation/)

<sup>4</sup> Interviews conducted with the EIT Manufacturing programme director and educational director



- Need of the universities to improve their educational efforts by bringing in more practical experience and knowledge in the teaching activities (through so-called “challenge-based learning”), thus developing the real entrepreneurial skills of the students.

---

*"We were dealing with a real manufacturing problem which required innovative solution from our team and it could not be found in the existing literature."*

*Fotis Basamaklis, University of Patras, member of the solving team*

---

- Need of the companies to solve the industrial challenges using innovative concepts and knowledge not available in the companies themselves while getting access to potential future employees (adequate work force) with the developed entrepreneurial and problem-solving skills.

---

*"We are currently working towards a more sustainable and greener products by reducing waste and embracing the circular economy concepts in our processes and it has been a great experience to have hosted a Solver Team within this programme and **get fresh ideas from the University students** to the manufacturing challenges."*

*Dr. Marta Calvo, Director of Innovation, ARNEPLANT, challenge owner*

---

Additional benefit of this TFC was to increase the green manufacturing competencies in the European companies by exposing them to top-class innovation and methodologies existing in the academic sector.<sup>5</sup>

## DESCRIPTION OF ACTIVITY

Teaching Factories Competition on Green Manufacturing is an initiative of advanced training dedicated to university students and VET (Vocational Education & Training) students promoted by EIT Manufacturing.

The main objective of the initiative is to promote the “teaching factory” educational methodology among the stakeholders throughout Europe to improve the benefits and visibility of the cooperation between academia and business.

By participating in the TFC, the students (“solver teams”) improve their competences by being exposed to the real-life manufacturing challenges within the context of a real industry and the participating companies (“challenge owners”), gain access to the knowledge, new methods and interdisciplinary approaches from the universities and VET organizations. As a result, the companies are learning about the advanced knowledge and methods thought in the universities and are exposed to fresh minds and innovative ideas, which can help them further improve their manufacturing processes and final products.

---

<sup>5</sup> As indicated in the call for participants. For more information see: <https://www.eitmanufacturing.eu/calls/teaching-factories-competition-green-manufacturing/>



## DATES OF IMPLEMENTATION AND FUNDING ALLOCATED

The preparation of the TFC started in December 2021 with support from EIT to develop the calls documents, legal documents (cooperation agreements), financial statements, and the IT platform (AGORA) to support the industry-academia collaboration.

Calls for expressions of interest for companies, universities and VET schools were launched in March 2022 with the submission date end-March (companies) and early April 2022 (universities and VET).

**Timetable for the implementation in 2022** is presented in Table 1.<sup>6</sup> It is to be noted that 2022 was the first year of the TFC implementation.

**Table 1. Timetable of TFC implementation**

Phases and timeline	The phases description
<b>Calls for interested companies and universities/VET schools</b>  2 March 2022	Elaboration and publication of the call for the expression of interest from the companies, universities and VET schools.
<b>Evaluation, communication of the results</b>  7 – 28 April	Evaluation, communication of the results to the selected organizations / universities, configuration of the solver teams, assignment of challenges and preparatory actions (webinars)
<b>Kick-off event</b>  28 April 2022	Kick-off event with institutional presentations, presentations of the challenges and optimization objectives to the solver teams by the selected companies (online event). <sup>7</sup>
<b>The challenge solving activities</b>  16 May - 22 July 2022	Approximately 8 weeks in which the teams carried out the challenge solving activities independently, in collaboration with the selected companies, assisted by expert mentors and teachers. The activities to be carried out during the 8 weeks may differ according to the type of challenge assigned. In total, it is estimated that the competition will engage the students for approximately 32 hours in 8 weeks (approximately 4 hours per week), including kick-off meeting, final event, business meetings, virtual visits, group, and individual activities.
<b>Deadline for delivery of the results package</b>	Delivery of the results package (report, PPT pitch and supporting documents) for assessment by an evaluation committee composed by EIT Manufacturing personnel and members of the companies

<sup>6</sup> As indicated in the call for participation. For more information see: <https://www.eitmanufacturing.eu/calls/teaching-factories-competition-green-manufacturing/>

<sup>7</sup> Launching video is available at: <https://www.eitmanufacturing.eu/news-events/events/info-session-teaching-factories-competition/>



22 July 2022	proposing the challenges.
<b>Pitching sessions, assessment and selection of the best Solver teams passing to the Final Event</b> 24 – 28 October 2022	Assessment of the results by an evaluation committee composed by EITM members and participating officers of the companies proposing the challenges. Selection of the best solving proposal for each challenge to be invited to participate in the final competition and award ceremony.
<b>Final event and award ceremony</b> 17 November 2022	Final event and award ceremony with presentation of the results in a pitching session by the selected solver teams to a jury composed by selected experts in the EIT Manufacturing Summit Days 2022.

Source: EIT Manufacturing

## INFORMATION ABOUT PLANNED KPIS AND OUTPUTS

As this was the first time TFC is launched, the indicators identified for 2022 were:

- Selection of 6 challenge owners (companies).
- Selection of 8 universities/VET organizations, each with the team of 5 members (4 students and 1 mentor/tutor).
- 70 platform users (5 per organization).

For the future TFCs, the indicators will increase over time, as presented in Table 2. As of 2023, a revenue is envisaged to cover the TFC cost and render the initiative fully financially sustainable:

**Table 2. The TFC programme indicators**

Indicator	2023	2024	2025
No. of challenge owners	12	20	30
No. of universities/VET	24	40	60
Platform users	180	300	450

Source: EIT Manufacturing

## PRESENTATION OF PARTNERS. KNOWLEDGE TRIANGLE APPROACH

One of the key principles of the EIT Label education provision listed in The EIT Label framework is Knowledge Triangle Integration, which must be embedded in all EIT education and training provisions. Enhancing co-creation and collaboration between education, business, and research help overcome societal, economic and environmental challenges.





Such a principle was also adopted in the design of the TFC. The competition was open to the members of the existing EIT Manufacturing networks but also to the outside partners and it has resulted in the participation of both groups, from within and from outside of the existing EIT ecosystem. In this way there were no limitation to the participation apart from the selection criteria elaborated in the call for participation documents. There were intensive communication activities to increase the visibility of the call for companies and universities/VET organizations through the existing EIT Manufacturing network.

The total number of company applications in the call was 20, in the end 6 companies were selected. The pool of applicants was good enough to make an adequate selection based on the pre-defined selection criteria. Geographical distribution was not a decisive factor but in the end the coverage was quite satisfactory and geographically diverse.

Eight universities answered to the open call, each could have proposed solving teams of 5 members. Each challenge owner could receive support from one or two solving teams.

The partners are presented in Table 3, with the indication of the challenge on which they are collaborating.

**Table 3. The programme partners**

Company - challenge owner	University/VET school - Solving team(s)	Challenge
ARNEPLANT (Spain), shoe producing multinational company with subsidiaries in Vietnam and Romania	CAS Lavoslav Ružička Vukovar (Croatia)	Reducing waste and embracing the circular economy concepts in the manufacturing processes of their products.
PROTOSFERA (Croatia) is a company implementing modern production technologies such as additive manufacturing, industrial digitalization, and automation.	Aalto University (Finland) & University of Patras (Greece)	Develop failure detection system for additive manufacturing machines.
GE AVIO (Italy), operates in design, manufacture and maintenance of civil and military aeronautics subsystems and systems.	Ss. Cyril and Methodius University (Macedonia)	Finding the best practices for enabling greener manufacturing of aeroengine products.
INTELLIMECH (Italy) is a company filling the gap between the research and the industrial sector.	École Centrale de Nantes (France) & ELTE Informatikai Kar Savaria Műszaki Intézet (Hungary)	Finding a solution for development of an on-line continuous quality inspection for electrical cables optimisation.



Company - challenge owner	University/VET school - Solving team(s)	Challenge
ISCLEANAIR (Italy), company pursuing the technological development, the IP transfer, the industrialisation and commercialisation of the APA technology.	University of Pisa (Italy) & University of Patras (Greece)	Creating Nature-Based Pure & Quiet Air for working ambiances
P&G multinational company (committed to environmental responsibility)	Aalto University (Finland) & Mondragon University (Spain)	Develop an affordable smart energy monitoring system

Source: EIT Manufacturing

## BENEFICIARIES

The main beneficiaries were the engineering university students or the students from VET schools, but also companies and their employees. The solving team came from one single educational institution (in this first TFC there were no mixed student teams from different universities and schools) to facilitate the coordination of the tasks and guidance from their mentors/tutors. The selected student teams came from both the EU Member States and from EU Candidate countries, which was regarded as an additional value of the process. By keeping the participation fully open, EIT also promoted its activities outside the existing network and its partners and through the implementation of the TFC it further expanded its network.

## PRESENTATION OF THE IMPLEMENTATION PROCESS

The activity starts with the call for expression of interest to participate from the companies, universities and VET schools. Based on the applications received, EIT screens the proposals, assesses its quality and engages in the match-making process between the proposed challenges and the proposed student solving teams. Companies ("challenge owners") who have applied to the initiative elaborate a specific, real-life challenge related to their manufacturing process in line with the focus of the initiative on the "green manufacturing".

The universities and VET organizations, competent in the fields related to the green manufacturing, nominate their solving teams (composed of students and their tutors) to address the challenges and problems raised by the companies. The students are accompanied by their teachers/mentors which help them navigate the solving process in the collaborative environment.

The challenge solving process starts after the kick-off event and the initial workshops which include the training on the AGORA communication platform, the requirements for the results package and the initial training on the pitching sessions.



The solving teams are working on a dedicated industrial challenge for approximately eight weeks with bi-weekly information and coordination meetings with the companies. The implementation ends with the delivery of the results package (report, PPT pitch and supporting documents) which are then being evaluated by the members of the jury<sup>8</sup>. The jury selects the best solving proposal for each challenge to be invited to participate in the final competition and award ceremony.

The preparation of TCF required nearly three months of extensive efforts from the side of EIT Manufacturing team. The main efforts were put into the elaboration of the call and transparent selection procedure for both the challenge owners as well as solving teams. In addition, there was a need to tailor the collaboration platform (IT tool AGORA). Furthermore, legal and administrative issues needed to be solved, especially related to agreements specifying the responsibilities of both parties, collaboration models, ownership issues related to the collaboration results, privacy statements, non-disclosure agreement templates etc.

The process started in December 2021 and the calls were ready for launch in March 2022. The launching of the call was accompanied by extensive communication activities (an external communication agency was engaged to support the process) as the calls were open to the participants outside the existing EIT manufacturing network.

The main selection criteria for the TFC are presented in Table 4.

**Table 4. Main selection criteria TFC**

Selection criteria for the companies (challenge owners)	Selection criteria for the universities and VET organizations (solving teams)
<p>The eligibility criteria used by the Selection Committee are as follows:</p> <ol style="list-style-type: none"> <li><b>Relevance:</b> relevance of the Challenge to the innovation Area of the initiative: “Green manufacturing” (score: 0-5).</li> <li><b>Experience</b> on similar initiatives and time to be dedicated to the activity (score: 0-5).</li> <li><b>Involvement with universities/VET schools</b> (score: 0-5).</li> <li><b>Impact:</b> potential impact of the Activities and expected Results on the company's business (score: 0-5).</li> <li><b>Quality:</b> clarity of the Challenge and related innovation objectives and completeness of information (score: 0-5).</li> </ol> <p>Score description:</p> <p>0 - The application fails to address the criterion or cannot be assessed due</p>	<p>Criterion 1: ability to carry out the Activities as planned (from 0 to 5 points).</p> <p>Criterion 2: completeness and maturity of the results produced (from 0 to 5 points).</p> <p>Criterion 3: innovativeness of the results produced (from 0 to 5 points).</p> <p>Criterion 4: fit for purpose and potential business impact of the results produced (from 0 to 5 points).</p> <p>Criterion 5: effectiveness of the presentation of the Results in the pitching session (from 0 to 10 points).</p> <p>In the case of a tied score, the Solver</p>

<sup>8</sup> In the TFC 2022 the jury of experts was composed of Dr Renata Urbone, CEO & Co-founder of Leaneria, Lithuania, Virgil Pamfill, Managing Director of VIP Profconsult srl., Romania, and Dr. Sima Valizadeh, CTO of Sandbacka Science Park, Uppsala, Sweden.



Selection criteria for the companies (challenge owners)	Selection criteria for the universities and VET organizations (solving teams)
<p>to missing or incomplete information.</p> <p>1 - Poor. The criterion is inadequately addressed, or there are serious inherent weaknesses.</p> <p>2 - Fair. The application broadly addresses the criterion, but there are significant weaknesses.</p> <p>3 - Good. The application addresses the criterion well, but a number of shortcomings are present.</p> <p>4 - Very good. The application addresses the criterion very well, but a small number of shortcomings are present.</p> <p>5 - Excellent. The application successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.</p> <p>To be considered eligible, Challenges must achieve a minimum score of fifteen (15) points. Once the ranking has been drawn up, the Selection Committee selects the five (5) Challenges with the best score. If the same company has submitted more than one Challenge that will be eligible, only the Challenge rated with the highest score will be considered.</p>	<p>group with the highest score on criterion 1 and, subsequently, on the following criteria, will prevail.</p>

Source: EIT Manufacturing

The preparation activities involve the staff of EIT Manufacturing: EIT educational teams, Co-location Centres (CLCs)<sup>9</sup>, finance team, legal team, activity managers, and a programme manager. It was considered as administratively quite intensive.

Throughout the process there were extensive communication efforts, especially in relation to the two main events: kick-off ceremony and final event. Apart from the communication activities managed by an outsourced agency, CLCs have reached out to their own networks to promote the initiative. Extra communication efforts were crucial for the success of the TFC as it relied on the participants both within and outside the existing EIT Manufacturing networks.

The initial idea was to select 5 challenges, but in the end 6 were selected as they all fitted very well within the green manufacturing focus and were suitable for collaboration with students. As a response to the selected challenges, 8 solving teams were initially selected by EIT (as more solving teams could work on a single challenge and this is even a desired setting), each composed of 4 students and one mentor/tutor. During the implementation, 2 solving teams have stopped their activities so in the end each challenge was tackled by one student solving team. Reasons for disengagement were mostly related to the organizational

<sup>9</sup> [Co-location Centre \(CIC\) | European Institute of Innovation & Technology \(EIT\) \(europa.eu\)](http://Co-location Centre (CIC) | European Institute of Innovation & Technology (EIT) (europa.eu))



issues. Namely, one student team has acknowledged the lack of adequate skills and knowledge to address the challenge and the other team stopped their activities due to the summer period and unavailability of some of its members.

Despite these described problems, the TFC programme director and EIT Manufacturing Director of Education, indicated that the response to the calls in this first round of the TFC was satisfactory and it was possible to make a good selection. EIT was happy to see the applications coming from both the existing networks and partners as well as from outside the network.

The solving teams had approximately eight weeks to implement the activities which needed to result in a final report, a PPT presentation as the pitch to the company, and supporting documents.

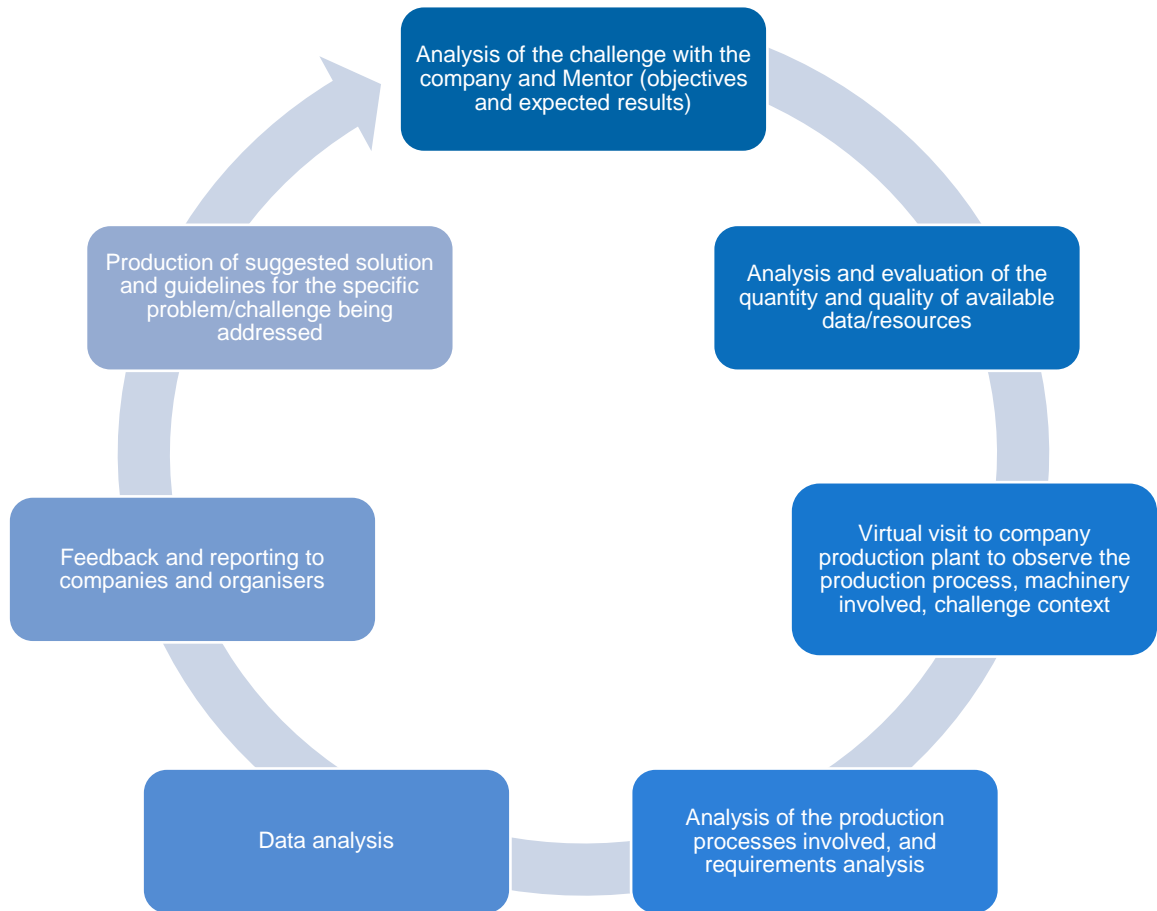
The work of the solving teams was supported by the mentors/tutors from their universities or VET schools, but they also had a designated industrial mentor coming from the company which was a challenge owner.

During the implementation, the companies and solving teams have designed their own way to collaborate (within the framework of the TFC), structure the communication channels and meetings, etc. The EIT supported this collaboration by facilitating the use of the IT platform (AGORA) and providing whatever additional guidelines and support was necessary. The involvement of EIT was also needed to ensure proper monitoring of the activities and identification of any bottlenecks or good practices. It is estimated that two EIT Manufacturing persons were enough to follow the implementation, not being engaged on that full time. In any case, the involvement of EIT Manufacturing is more indirect, without interfering with the teams' collaboration.

The concrete tasks of the solving teams are presented in the figure 1.



Figure 1. The tasks of solving teams



Source: EIT Manufacturing

As evident from the description of the implementation, TFC has a value proposition for both the companies and the universities or VET organization. It is evident that the students gain practical knowledge and experience, especially if they work with the professors and tutors who are passionate about expanding the approach to the companies. TFC offers exposure to different universities and different fields of knowledge, access to talents and supported models of cooperation with the academia.

Given that the manufacturing challenges were based on the real societal challenges, working in such a collaborative way contributes to the positive employer branding, helps in the competition for talents in future and provides excellent marketing as the results of the TFC are widely disseminated and promoted (through videos, pitches, quotes from participants, pictures, etc.).

## ACHIEVED OUTPUTS AND KPIS

The indicators identified for 2022 were all achieved as planned:



- Selection of 5 challenge owners (companies) – in the end this KPI was exceeded as the 6 challenge owners were selected.
- Selection of 8 universities/VET schools.
- 70 AGORA platform users (5 per organization).
- Amount of prize average per challenge – 1,835 EUR.
- Funding provided to the challenge owner (to cover their costs) – 15,000 EUR.

Furthermore, other outputs were achieved which will facilitate the future TFC: making the IT communication platform AGORA operational and elaboration of all administrative and legal documents as well as training materials (e.g., for training on pitching, business creation elements, etc.)

## IDENTIFIED VALUE ADDED

The initiative fits well with other kinds of EIT activities, targeting different maturity levels of an entrepreneurship activities: from the conceptual ideas of the students to promoting the start-ups, accelerating the growth of the start-ups, and supporting solving the challenges of the more mature companies. EIT offers support in scanning the opportunities for funding outside EIT, such as Horizon Europe programme or other relevant EU funding mechanisms (this is done with the support of CLCs and EIT Hubs in the individual countries).

EIT Manufacturing's Doctoral and Master School Programmes are also based on the Teaching Factories paradigms to ensure the combination of theoretical and practical approach and understanding the reality of the different stakeholders. TFC adds value in this sense by bringing in additional experience and lessons learnt from the supported collaboration projects.

The beneficiaries (both the solving teams from the universities and the challenge owners from the industry) highlighted several aspects of the value added of the participation in the TFC<sup>10</sup>. For the solving teams, the value added of this experience was:

- Understanding the complexity of the challenges and thinking as entrepreneur: technical aspects should be substantiated by business and market considerations to be feasible for the company.

---

*"The programme was an enriching experience for our students to test their technical and non-technical skills and competences and give them the possibility to deal with the real manufacturing activities that they will face in the future."*

---

<sup>10</sup> Interviews conducted with the EIT Manufacturing programme director, educational director and programme's partners and beneficiaries (December 2022)



---

*Dr. Nuria Herrero-Dorca, Mondragon University coordinator*

---

- Flexibility, innovation and openness: there is sometimes a need to seek the help from outside the initially established team to look for cross-discipline and innovative approaches, as the solution cannot be found through a literature review.
- Learning how to solve specific communication and coordination challenges in an international setting: team members are in different countries (sometimes different time zones), have different working dynamics and periods of most activity (the need to reconcile the academic calendar with the needs of the company, especially during summer period), and the English language in which they work and present, is not their native language.

---

*"There are several similar Hungarian versions of the competition, which I have been attending for years, but I felt honoured to have the opportunity to participate in an international competition."*

*Martin Agg from ELTE Informatikai Kar Savaria Műszaki Intézet in Hungary, 1st place awarded Solver Team of TFC 2022*

---

- Development of presentation skills: learning how to present and defend the proposed solution (written and orally) - so-called "pitching" skills.
- Commitment and motivation: the competition element increased the motivation of the students. They were more eager to make the effort to find the best solutions.
- Sparking future research topics: participation in the TFC opened new research ideas and collaboration options.
- Maybe most importantly, increasing the confidence of the students to engage with the entrepreneurial activities in the future by working in industry or starting their own enterprises.

For the **challenge owners (companies)**, the value added was:

- Actual connection with the potential future employees of the company which have had a chance to develop the entrepreneurial skills and understand different perspectives of an industrial project.
- Gather fresh views on their manufacturing challenge.

---

*"I experience the teaching factory methodology, but this is much more serious than the university course and brings additional motivation."*

*Markus Määttä, Aalto University, member of the solving team*

---





- Additional promotion of the company (participation in the TFC contributes to the positive employer branding).

---

*"TFC offered us the connection to the possible future employees. In our search for talents, we want to promote the company to different universities, and we want to be engaged in the connection with the academia."*

*Massimo Silvestrin, industrial mentor from AVIOAERO*

---

## HOW THE ACTIVITY HAS APPLIED KICS FINANCIAL SUSTAINABILITY PRINCIPLES

In the first year the programme was funded solely by EIT as an investment for future revenue generation approach. The cost structure was based on the following items:

- Creating the brand for the initiative (one-off cost, will not be present in the future TFCs).
- Adapting the infrastructure, tools and processes (one-off cost, will not be present in the future TFCs, only less significant costs are envisaged for fine-tuning the tools).
- Time of EIT Teaching Factory Competition manager (estimated at 0.5 FTE).
- Communication and promotion, award ceremony.
- External coaching.
- Jury experts.
- AGORA platform costs.
- The budget for the prizes for students equals to 11,000 EUR, distributed among 10 solver teams (6,000 EUR distributed over 6 solver teams after first evaluation – 1,000 EUR each; 2,000 EUR for the 1<sup>st</sup> ranked, 1,000 EUR for the 2<sup>nd</sup> ranked, 500 EUR for the 3<sup>rd</sup> ranked, 500 EUR for special mention, 1,000 EUR participation bonus divided among 4 solving teams).
- Contribution to participating companies (15,000 EUR for each participating company, in total here were 6 participating companies).

Total cost of 2022 TFC is roughly estimated at 300,000 EUR, out of which ca. 110,000 EUR were the participating fees, and the rest was related to the administrative, communication and IT costs (exact figure is not disclosed) and is considered a targeted investment from EIT as many of the cost items will not appear anymore in the subsequent rounds of the TFC.



After this first round of its implementation and initial investment by the EIT Manufacturing, a clear financial sustainability plan for the implementation of the TFC has been elaborated, as presented below.

For the future TFCs, the indicators will increase over time, as presented in Table 19. As of 2023, based on the statements of the programme director and EIT Manufacturing Director of Education, will be a year of transition from providing support to receiving fees from the companies. From 2024, the revenue is envisaged to cover the TFC cost and render the initiative fully financially sustainable. Further increase in revenue in 2025 will cover the increased communication, IT and management costs related to the increased number of the participants.

The most important change in the approach is related to the participating companies – challenge owners: instead of receiving a participation fee of 15,000 EUR each, they will be asked to pay the participation fee of 10,000 EUR, which is justified by the clear benefits they receive from the participation, as explained in the previous chapters. During the interviews with the participating companies, they have confirmed that the future payment requirement will not discourage them from participating in the future TFCs. The future market benefits of the participation in the TFC should provide a return on the investment in the participation fee (and much more than that).

**Table 5. The TFC programme indicators for the period 2023-2025**

Indicator	2023	2024	2025
No. of challenge owners	12	20	30
No. of universities/VET	24	40	60
Platform users	180	300	450
Fee per challenge owner		10,000 EUR	10,000 EUR
Amount of prizes average per challenge	2,000 EUR	2,000 EUR	2,000 EUR
Revenue total		200,000 EUR	300,000 EUR

Source: EIT Manufacturing



# QUALITATIVE ASSESSMENT OF THE PROGRAMME AND ITS ACHIEVED IMPACT

## QUALITATIVE ASSESSMENT OF THE ACTIVITY

The main benefit of the TFC programme has proved to be related to the improving the learning outcomes through the development of entrepreneurial skills of the students by exposing them to real-life situation in the industrial manufacturing context. Such experience can hardly be obtained by the regular university classes as most cases on which the students work and learn are hypothetical or do not include all aspects such as market, prices, timing, promotion, etc. Furthermore, they are seldom exposed to international teams and the need to work across different languages, different timeframes, and even different time-zones.

Acquiring this kind of experience motivates the students to engage further in the entrepreneurial activities and consider more engaging in the start-ups (or founding their own). Students interviewed during this study have very positively assessed these aspects of the TFC programme.

Even though the main beneficiaries of the TFC programme are the university and VET schools' students, there is a visible benefit also for the participating companies in terms of gaining visibility as an employer, getting to know their potential future employees and getting access to the most recent research and methodologies available outside the company. This positive attitude of the participating companies, demonstrated by their expressed willingness to contribute financially to the programme, has allowed to design a feasible financial sustainability plan.

Further value added is the outreach of the EIT Manufacturing activities to the participants beyond the current EIT networks (as already indicated, some of the participants came from outside the EIT network), leading to their further promotion and expansion. Systems and tools developed by EIT Manufacturing (mostly by its CLCs<sup>11</sup>) significantly facilitate the linkages and practical collaboration between the industrial partners and academia thus supporting the further development of the networks and promotion of the open-innovation approach which positively impacts the competitiveness of both the companies and the educational organizations.

Table 6. presents an analysis of TFC strengths (internal and external), weaknesses, opportunities and threats (SWOTs).

---

<sup>11</sup> EIT Co-location Centres (6): Central, East, West, South, South-East, North. For more information see: <https://www.eitmanufacturing.eu/in-your-country/>



Table 6. SWOT analysis of TFC

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>▪ Offering innovative approach to challenge-based learning with real-life examples and more complex environment: working in an international setting, there is a competition character, teams must use dedicated communication platform, understanding the dynamic of the activities in the industry, etc.</li> <li>▪ Expansion of the participants outside the existing EIT networks</li> <li>▪ Opening the TFC to VET schools (not exclusively for the universities) increases the learning outcomes also for VET students</li> <li>▪ TFC brings clear benefits to both the students and participating companies</li> <li>▪ Linking the topic of the TFC to the main EU policy priorities allows for lot of synergies with other EU initiatives and support programmes</li> <li>▪ With scaling-up of the programme and introduction of the participation fee for the companies, it is easy to achieve the financial sustainability of the programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ As this was the first round of TFC, the overall number of participants was relatively low to bring tangible impacts</li> <li>▪ AGORA platform still needs further upgrade to make it fully user-friendly an serving its purpose (e.g., need to overcome technical difficulties in accessing the content, need to upgrade the navigation through the platform content, etc.)</li> <li>▪ Suboptimal matchmaking between challenge owners and solver teams led to dropping out of two teams.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>▪ Methodology and learning tools easily adaptable to a wide range of topics and sectors</li> <li>▪ Easy replication in other EIT KICs and non-EIT institutions</li> <li>▪ Easy scalability and huge pool of potential beneficiaries in the universities and VET schools but also among the partner companies, challenge owners</li> <li>▪ Possibility of sustained integration of teaching factory competitions into university and VET schools, national curricula and professional development courses</li> <li>▪ Relatively low cost for KICs to implement successive editions of the programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ Topics of the TFC which might not meet the needs of the companies might lead to low interest of companies to participate</li> <li>▪ TFC requires flexibility of the solver teams in relation to the working dynamics which does not correspond to regular academic calendar – the management of the universities and schools might not always support these initiatives</li> <li>▪ Professors (mentors) which participate and guide the solver teams need to use their own time and energy for such initiatives</li> </ul>

Source: Ecorys

## ACHIEVED IMPACT

Based on the achieved results from the first round of the TFC programme: participation of 6 companies challenge owners, 8 solving teams (out of which 6 finalized their activities) which have mobilized in total 32 students and 8 professors (mentors/tutors) and reaching in total over 70 users of AGORA platform, there are already several tangible impacts achieved by the programme.

It is to be noted that the first round of the TFC has ended less than one month before the start of the elaboration of this case study (end of November 2022). Therefore, the achieved longer-term impact cannot



yet be fully objectively measured. Nevertheless, by interviewing the participants and managers of the programme, there is already some evidence of the achieved impacts. They can be summarized as follows:

**Impacts in relation to the beneficiaries (participating student solving teams):**

- Better understanding of the industrial challenges is developing the entrepreneurial mindset among the students.
- Entrepreneurship skills developed, especially in terms of understanding the need for adaptability, flexibility, innovation and openness in the approach to solving the manufacturing challenge.
- Soft skills developed: students have learned how to solve specific communication and coordination challenges in an international setting (in different language, cultural and organizational practices), they have improved their presentation and pitching skills necessary for the future successes of their possible start-ups, and they have increased their confidence to engage with the industry or to start their own enterprises. By understanding the organisational culture of different stakeholders, the students gain significant new experience and further improve their soft skills.
- Students are exposed to making their pitches in front of the companies and jury (composed from the pool of EIT experts), which also develops valuable soft skills and experience.
- Increased employability of the participating students in the industry through improved educational outcomes - professors are also improving their regular courses based on TFC experience,

**Impacts in relation to the partners (participating companies challenge owners):**

- Improved manufacturing practices of the participating companies based on the proposed solutions from the solving teams (at least partly).
- New ideas gathered for future collaborative research projects with the universities.
- Staying in contact with the students which can be potential future employees of the company, understanding their strengths and weaknesses which can improve their mentoring and coaching skills of their future employees.
- Participation in the TFC contributes to the positive employer branding as it demonstrates openness to the wider stakeholder groups and interest in the societal challenges (such as the sustainable or “green” manufacturing).

**Impacts in relation to EIT:**

- Further promotion of the EIT Manufacturing activities outside the existing networks.



- Improvement of the administrative and management tools, useful also for different programmes.
- Development and testing of the AGORA open innovation platform - it has gathered over 70 users which have tested and provided feed-back on its strengths and weaknesses which would allow for further improvements and optimization in the future.

To summarize the most important impacts: all the interviewed students have improved their understanding of the industrial ecosystem and the stakeholders involved (e.g., the way they operate, communicate and organize their business activities). Furthermore, all have confirmed that such integrated approach to the industrial manufacturing challenges have significantly developed their entrepreneurial skills and they feel much more capable of working in the industry after the graduation (either as employees in an existing company or starting their own company). In addition, it can be concluded that there is a high possibility that there would be new start-ups opened based on the increased knowledge, capacities, and confidence of the participating students to engage with entrepreneurial endeavours.

## GOOD PRACTICES AND LESSONS LEARNT

Despite the novel nature of this EIT Manufacturing programme, after the first edition of the TFC the stakeholders interviewed have already identified several lessons learnt to acknowledge in the preparation of the future editions of the programme. Furthermore, there are good practices which should be kept in the future editions of the TFC, and can also serve as inspiration for other KICs. In the applications of good practices, attention is drawn to specific implementation considerations to ensure the successful transfer of the practice.

### PRESENTATION OF LESSONS LEARNT FROM THE ACTIVITY IMPLEMENTATION

There is an overall very high satisfaction with the first edition of the TFC held in 2022 and all the key stakeholders have expressed their willingness to participate in the same or similar EIT programmes in the future. Assessing different aspects of this first round of TFC, there are important takeaways to be considered in the subsequent rounds of TFC to achieve the maximum impact of the programme in the future. Most of the lessons learnt have been identified through the interviews conducted with the EIT Manufacturing programme director, educational director and programme's partners and beneficiaries (in December 2022).

#### Lesson learnt 1: Ensuring commitment from the participants throughout the competition

*Allowing the students to influence the choice of the challenge might increase the commitment and decrease the rate of dropping out of the competition*

The choice of the challenge can influence the motivation and commitment of the solving teams – the more interested the challenge is and more linked to their basic competences, the more motivated they are to find the working solutions. During the feedback received it was evident that the matchmaking between the



challenges and the solving teams could be further improved by allowing the solving teams to choose the challenge they want to work on. In such a way, there could be even more commitment and motivation achieved, which would reduce the cases of the solving teams stopping their activities or dropping out of the competition due to the lack of interest or even required skills (which has happened in the first round of TFC).

### Lesson learnt 2: Ensuring the efficiency of the work of solver teams

*Introducing the initial workshops for the university mentors and tutors would increase the efficiency of the work of solver teams.*

Such a workshop has proved to add much value as it has led to their full commitment and further raising their capacity to manage the solving teams. Sharing the experiences and listening to each other could lead to the community creation and more value for teachers in the longer term, leading to the even further improved approach to the university education or VET.

### Lesson learnt 3: Managing expectations and communication between challenge owners and solver teams

*Keeping the challenge owners aware of the changes in the solver teams allows them to manage better the communication and expectations on the final outcome.*

In some cases, several solving teams were assigned to a single challenge owner but during the implementation, some of them stopped their activity for several reasons (not disclosed). It is important that such changes are communicated with the challenge owner so they are aware that they will not receive more solutions (which could be disappointing for them). This would allow them to focus more on the remaining solving team(s), optimize the resources from their side (in terms of the activity of the industrial mentor) and manage well their own expectations.

### Lesson learnt 4: Ensuring regular and frequent communication

*It proved to be very important to maintain regular (minimum bi-weekly) communication between the solver teams and the challenge owner, to ensure proper guidance and sufficient level of information needed to solve the challenge.*

With the AGORA platform being the only communication tool to be used for exchanges between the companies challenge owners and the student solving teams, it is important to keep the dynamics with at least bi-weekly meetings. Other option could be the introduction of some kind of interim reporting, next to the required final report. This would allow to tackle in the timely manner any obstacle encountered, or clarifications needed. It would also help the solving teams to keep the dynamic of their activities: namely, in the summer periods of the project implementation (which is normally the free time for the students and



their mentors), the students are not always by default very pro-active and disciplined to stay on course without any delays.

### Lesson learnt 5: IT tools used during the programme need to be continuously upgraded

*There seems to be the need to further optimization of AGORA platform to ensure the exploitation of its full potential.*

As the number of platform users increase, there is a significant user experience gathered which can guide in the further optimization of the platform to ensure its user-friendliness and maximize the communication and learning benefits for the users. The tools need to be constantly validated and fine-tuned to meet the needs of different stakeholders. The most prominent example is the IT communication platform AGORA which proved to be an excellent tool but needed some adjustments in terms of technical performances (such as dealing with different firewall setting of the users, confidentiality of some of the data, interruptions in the proper functioning of microphones and cameras, etc.).

In addition, the ease of navigation through the platform and user-friendliness of all the functionality should be ensured. The beneficiaries have reported that there is so much activity on the website and platform which sometimes leads to the confusion and losing track on the important information (to quote one student: *“There are too many things going on AGORA, too many places to join so it becomes impossible to keep up with all.”*)

## GOOD PRACTICES FOR SHARING, INCLUDING KEY IMPLEMENTATION CONSIDERATIONS<sup>12</sup>

### Good practice 1: Focus on developing a wide range of entrepreneurial skills

*Why: Developing entrepreneurial skills seemed to be the most important attraction point for the beneficiaries to engage in the TFC as it builds their confidence to engage with industry in the future or start their own company.*

The students have gained wider perspective on different aspects of an industrial project: from technical solution and technical feasibility to the market analysis, competitors, pricing strategy, and pitching to the investors. All the consulted beneficiaries have expressed that they feel much more confident to work more in the industry and to consider their own start-ups in the future.

Furthermore, the EIT Business Creation department was involved to teach the students about the principles for giving a great pitching of ideas and proposals and students had the opportunity to “learn by doing”. These benefits can be communicated more widely in the promotion of the TFC in the future to attract the

---

<sup>12</sup> Interviews conducted with the EIT Manufacturing programme director, educational director and programme's partners and beneficiaries (December 2022).





students with high motivation for their future engagement with the entrepreneurship. Testimonial in this respect can significantly influence the credibility of messages and support the promotion of the TFC.

---

*"Engineering students very often lack the entrepreneurial thinking and this competition should help in developing it."*

*Harrys Bikas, University of Patras, student mentor*

---

When considering the entrepreneurial skills, it must not be neglected to pay attention to the fact that the students are not only required to find a feasible manufacturing solution, but also to do so while working in an environment which is different from typical academic setting. They must find a way to organize themselves in an international setting, using English language (not native to any participant), working across countries and different time zones. Furthermore, they need to organize their time efficiently outside the “regular” academic timetable (e.g. during summer break).

### Good practice 2: Focus of the TFCs aligned with the EU policies

*Why: Alignment of the focus to the EU policies offers possibilities for creating synergies with other EU or national supporting instruments which follow the European policy agenda and policy priorities*

Synergies can be created with the grants from nationally operated EU programmes, Erasmus+, Horizon Europe, etc. For example, in 2023 the focus might be on Deep Tech talent, based on the DG EAC Innovation agenda as the 2022 focus was on green manufacturing based on the EU Green Deal. This will lead to the development of the entrepreneurial activities and more start-ups which promote the main EU priorities thus contributing to the overall competitiveness of the European economy, while respecting the most prominent European social and environmental values.

---

*"We are currently working towards a more sustainable and greener products by reducing waste and embracing the circular economy concepts in our processes and it has been a great experience to have hosted a Solver Team within this programme and get fresh ideas from the University students to the manufacturing challenges."*

*Dr. Marta Calvo, Director of Innovation at ARNEPLANT*

---

Continuing discussions with other relevant European organizations such as EISMEA, JRC, DR RTD, or similar can facilitate the discussion on the thematic priorities for the future TFCs.

### Good practice 3: TFCs fit well into the different support levels provided by EIT

*Why: The participants of the TFC become motivated to explore other forms of EIT support and seek to exploit more their participation in EIT networks*



With its diverse programmes, EIT covers different stages of the innovation cycle – from supporting the innovative idea generation during education, supporting the links between the companies and research and educational organizations, to creating innovative startups, creating the communities which allow for peer-learning and cross-disciplinary solutions, and facilitating access to funding (scouting for future funding from other available programmes).

That approach ensures the optimal internal and external coherence of the initiatives as well as positions EIT as an attractive and very useful partner for the economic growth based on the knowledge and innovation. To achieve it requires big efforts from EIT to manage and connect different networks developed by the different components of EIT. This means that also inter-departmental cooperation within the EIT should remain strong.

#### Good practice 4: Encouraging the interdisciplinary approach.

*Why: Working across disciplines brings new insights into possible innovative solutions, contributes to team-building skills and creates better business opportunities*

In this first edition of the TFC engineering students were predominant, but some other disciplines were present which was found very beneficial by all the stakeholders. The aim to gather more multidisciplinary team to allow for solution finding outside the engineering/manufacturing sector should for sure be kept. The business creation component would ensure the market value of the innovation and the solution provided (there would be more involvement from the business creation pillar of EIT). This would lead to the increased innovation-entrepreneurship linkages.

Nevertheless, not all the universities and VET schools have seamless cooperation between different educational departments which could discourage some of them from applying to the TFC. For this reason, the initial workshops (see above) with the university professors and tutors could play a key role in understanding the benefits of such cooperation and provide some practical tips and tricks on how to facilitate such inter-departmental cooperation within a university or VET school.

---

*"Proposals from the solving teams need to have the business aspect, not only manufacturing. The big benefit of TFC for the students is to make them understand the stakeholders and the market."*

*Massimo Silvestrin, industrial mentor from AVIOAERO*

---

## PRESENTATION OF POTENTIAL FOR REPLICATION AND SCALING-UP

The first edition of the TFC has shown clear benefits of promoting the use of open innovation approach to build stronger links between the academic stakeholders and the companies. Despite working with relatively small number of participants (8 solver teams and 6 companies), the programme demonstrated big potential



for both its replication (fully or partially) in the programmes implemented by other KICs and scaling the programme up, to include much more participants and thus achieving more measurable longer-term impact.

Therefore, there is a need to make the initiative known across the EU and scale it up substantially, to ensure there is a real tangible impact created as a direct result of the programme activities. Furthermore, only by scaling it up with the inclusion of more participants (especially industrial partners), the financial sustainability can be reached. Plans already exist: by 2025 TFC aims at engaging 30 companies, challenge owners, and at least 60 universities or VET schools with their solving teams.

Based on the extensive interviews with the stakeholders, it was possible to identify several key factors which should be considered in the replication and scaling up of the identified good practices, as presented in Table 7:

**Table 7. Conditions for successful programme replication and scaling up**

	Replication	Scaling up
The programme needs to be promoted also outside the existing EIT networks – this leads to the better choice and selection of the candidates (both companies and universities) and allows for interdisciplinary approaches which add lot of value in the programme (as indicated by all the stakeholders during the interviews),	x	x
There should be intensive communication activities before, during and after the implementation of the programme. The final event and follow-up communication activities are especially important to provide evidence of the benefits of the participation in the programme (including live testimonials from the participants). Promote the programme as widely as possible. Former participants are always the best programme advertisement and showcase. Ask for their support - interviews, short presentations of their experiences during the programme promoting or quotes on websites and in promotional materials.	x	x
The programme must be designed to replicate as closely as possible the business environment, including the timing of activities, communication process, combining technical and business considerations	x	x
When promoting the TFC to the partners, it is important for EIT to emphasise to partners the need to assign a dedicated person willing to commit to working with students,		x
The more partners and universities/VET schools are involved, it seems there is a bigger need to have well-structured initial workshops and trainings to agree on the process and communication lines – the workshops should aim at both the university mentors as well as industrial mentors,	x	x
The programme needs to take into consideration the dynamics of the activities of both the industrial and academic partners (e.g., exam periods, summer breaks, etc.) and provide the necessary facilitation to achieve the adaptability of	x	x



the academic partners to the business dynamics		
Continue to link the topics of the challenges to the wider European policy priorities to ensure synergic effects with other different existing support programmes.	x	x
A software platform to manage the activities and monitor participants' engagement	x	x
A team of people combining business knowledge, education techniques, promotion, and the right set of management and communication skills	x	x
The programme needs to create an evaluation framework to measure its impact. This assessment should not focus solely on immediate start-up creation but should also include indicators of human capital or the quality of partnerships	x	x

Source: Ecorys

Although the formal monitoring and evaluation mechanisms do not exist to follow-up on both the participating companies and solving teams, it is planned in the future to capture the real long-term impacts of the initiative. The EIT would also like to use the participants in the further promotion of the TFC.

## CONCLUSIONS

Teaching Factory Competition was a new initiative of EIT Manufacturing for the advanced training for students in universities and vocational education organizations. It was piloted for the first time in 2022 and is a “lighthouse initiative” of EIT Manufacturing with the main objective to promote the “teaching factory” educational methodology and to improve the benefits and visibility of the cooperation between academia and business.

Regardless of the fact that the “teaching factory” methodology has already been implemented in a number of universities, existing practices did not have the two crucial elements which the TFC has included: **the work on a real-live manufacturing challenge** (taking into account a wider perspective of markets, competition, pricing, supply chain issues etc.) and **the international competition aspect** which has provided an additional motivation and enthusiasm among the participating teams. Furthermore, the international aspects rendered the possibility to compare the approaches from different solving teams throughout the Europe.

The TFC was initially designed to **improve the skills and knowledge of the students**, but it has **proved to add a real value to the participating companies**, the challenge owners. In the end of the competition, they have received the feasible green manufacturing solutions based on the most recent engineering knowledge available in the universities, gained access to potential future employees and managed to increase their positive employer image by demonstrating the openness to such collaboration opportunities and contributing to the quality of the education.



The positive feed-back from the participating students especially emphasised the learning how to communicate with the industrial partners, what dynamics are expected (in terms of timing and intensity of communication and delivery) by the industry toward the solving teams and how solving the industrial challenge required a multidisciplinary approach (such as combination of engineering and economics, engineering and natural sciences etc.).

Despite the fact that TFC was implemented for the first time in 2022, from the extensive feed-back received from various stakeholders (EIT programme managers, companies which were the challenge owners and students from the solving teams) it can be concluded that TFC was a very successful initiative with positive impacts which could be measured immediately such as concrete technical solutions developed and offered to the companies but also in more long-term perspective, such as increased skills and confidence of the students to engage in the collaboration projects with the industry or think about their own start-ups, positive employer branding of the participating companies and easier access to future employees and partners. Furthermore, the initiative has demonstrated a significant potential for scaling-up.