

Call: HORIZON-WIDERA-2021-ACCESS-03/Twinning

Project SustDesignTex (GA No. 101079009), title: „Sustainable Industrial Design of Textile Structures for Composites” funded by the European Union

Deliverable Report

SUSTainable industrial DESIGN of TEXTile structures for composites (SustDesignTex)

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Abstract:	<i>This deliverable report outlines the Joint Research and Innovation Roadmap developed collaboratively by the SustDesignTex project consortium partners to sustain the current network established between the partner institutions and for long-term strategic purposes. The roadmap outlines strategic research areas, shared priorities, and mechanisms for knowledge exchange, staff and student exchange, and long-term collaboration in projects.</i>

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1 Introduction

Strategic partnerships for advancing innovative textile structures have successfully initiated a range of research and innovation activities. The development of a Joint Research and Innovation (JR&I) roadmap among the consortium partners is based on data obtained from short-term visits, specifically, a study tour of TUL researchers to the foreign Twinning Partners, conducted from Month 2 to Month 4 under Task 1.1 of Work Package 1 of the SustDesignTex project ("Creation of the Joint Research and Innovation Roadmap as a Pivoting Component of the Project Results Sustainability"). This effort is further supported by long-term research stays of TUL researchers at partner universities during the implementation of micro-projects across various work packages. From the outset of the project and throughout numerous activities organized during the implementation of the SustDesignTex project, the consortium partners have worked to identify mutual interests, complementary expertise, and aligned strategic visions.



Figure 1. Short-term study tours at partner organizations.

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2 Objectives of Joint Research and Innovation Roadmap

The Joint Research and Innovation (JR&I) Roadmap is a key strategy for continuous collaboration between the consortium partners involved in this project. There are key objectives listed for this roadmap; however, the JR&I roadmap is not limited to these objectives but can also extend beyond them. The main objectives of this JR&I Roadmap are:

- To establish a substantial and long-term strategic partnership between the consortium partner organizations.
- To accelerate innovation jointly by linking research to development and commercialization pathways.
- To facilitate efficient resource sharing, knowledge exchange, and joint proposal writing among consortium partners.
- To jointly develop research that has a positive impact on the environment and is scalable, sustainable, and policy-relevant.

3 Key research collaboration areas

Innovation requires extensive research and collaboration among academia, small and medium-sized enterprises (SMEs), large industries, end-users, and other stakeholders. During the implementation of the SustDesignTex project, sixteen micro-projects were conducted by TUL researchers in collaboration with partner universities. Each micro-project focused on the sustainable industrial design of textile structures for composites. These initiatives serve as pioneering efforts in defining the research collaboration areas among consortium partners. This Research and Innovation (R&I) roadmap outlines the key areas of collaboration between the consortium partners:

- **Collaborative Research on Sustainable Composites:** Joint development of groundbreaking research in polymer-reinforced composite material manufacturing, property analysis, and the discovery of innovative and sustainable composites for various applications.
- **Addressing Textile Waste:** Recognizing that textile waste is a significant environmental concern globally, and particularly in Europe, the consortium partners will work together to propose innovative solutions for reducing, reusing, and recycling textile waste.
- **Development of Circular Textile Structures:** Partners will collaborate on the design and development of innovative textile structures that align with the principles of the circular economy.
- **Mitigation of Microplastic Pollution:** The consortium will work on reducing microplastic emissions from textiles, including raising awareness about their environmental impact and developing innovative mitigation strategies.

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- **Broader Collaborative Efforts:** In addition to the aforementioned focus areas, the consortium partners will work collectively on other emerging challenges to enhance human well-being and contribute to the protection of the environment from the threats posed by climate change.

4 Other Key Collaboration Areas: Knowledge Exchange and Skill Sharing

During the implementation of the SustDesignTex project, the consortium partners have collaborated extensively in building a strong network among participating organizations and beyond. A key focus has been on strengthening research management and administrative skills, as well as building the necessary capacity for successful participation in research and innovation (R&I) projects. Over the past two years, we have shared skills and collaborated with each other and industry stakeholders under the SustDesignTex project framework. Several initiatives were launched, which will continue beyond the project's lifetime to help achieve the goals outlined in this roadmap. These initiatives include:

- **Collaborative Workshops:** Numerous workshops were organized to share knowledge and skills with students, early-career researchers, administrative staff, academic personnel, and management bodies. These workshops provided a platform for interaction, idea exchange, and capacity building.
- **Collaborative Training Sessions:** Training plays a crucial role in advancing research and fostering innovation. Over the past two and a half years, the consortium has organized several research-focused training sessions, both online and in-person, on topics such as proposal writing, product development, and product analysis. These sessions have significantly contributed to strengthening collaboration between academia and industry and will be continued beyond the project's duration.
- **Summer School:** A short-term summer school held under the SustDesignTex project had a significant impact on fostering collaboration among researchers and stakeholders. It created a strong networking platform and stimulated the generation of innovative ideas to address global challenges such as climate change. Building on its success, the consortium partners plan to organize similar continuous events in the future.
- **Student and Staff Exchange:** During the short-term staff visits carried out as part of Work Package 1, we discovered that each partner institution possesses unique strengths and resources that complement one another. Since then, we have begun exchanging undergraduate, master's, and PhD students for both short- and long-term stays. This exchange has greatly enhanced our collaborative networks and research outcomes. We have also initiated co-supervision of student theses, which has facilitated the effective sharing and use of laboratory equipment and research resources. This trend is expected to continue beyond the project's lifespan, significantly advancing research and innovation while contributing to the goals outlined in this roadmap.

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- **Grant Proposal Development:** One of the most impactful outcomes of the SustDesignTex project has been the improvement in joint grant proposal writing. Thanks to the relationships built between researchers at partner institutions, we have collectively submitted nearly a dozen research proposals over the past two years. This collaborative effort will remain a priority and continue at a high level in the future.

5 Conclusion

The SustDesignTex project has laid a strong foundation for long-term collaboration in research, innovation, and sustainable development. Through sixteen pioneering micro-projects, the consortium partners have explored key areas, including sustainable composite materials, textile waste reduction, circular economy design, and microplastic mitigation. Beyond technical research, the project has also fostered knowledge exchange and capacity building through workshops, training sessions, summer schools, and student and staff exchanges. These collaborative efforts have not only strengthened the network among partners but also significantly advanced the development of joint grant proposals. A detailed strategy for post-twinning cooperation is currently under development as part of Deliverable 8.5, the "Strategic Post-Twinning Programme of Networking and Cooperation," which is scheduled for completion by the end of the project. This strategy will ensure the sustainability and further expansion of the partnerships established, continuing to drive impactful innovation and contribute to the JR&I goals outlined in this roadmap.