AIdesignTEX

D3.1 Needs assessment report on knowledge and skills gaps
Deliverable 9

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Abstract	This deliverable presents the outcomes of the needs assessment process conducted within the AIdesignTEX project. It identifies knowledge and skills gaps at the Lodz University of Technology (TUL), particularly in the context of applying Artificial Intelligence (AI), Machine Learning (ML), and Circular Economy (CE) principles in textile production. The report is based on internal analyses and a confidential survey conducted among project partners (UiS, GU, UCAV). The findings provide a foundation for future training activities, collaborative initiatives, and strategic planning aimed at strengthening TUL's research, innovation, and project management capacities.

Keywords	Needs assessment, skills gaps, capacity building, circular economy, textile innovation, artificial intelligence, collaboration

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1. Introduction

The Lodz University of Technology (TUL) has a strong tradition in textile research and innovation. However, to maintain and expand its leadership in sustainable textile technologies, it must address specific knowledge and skills gaps. The AIdesignTEX project aims to bridge these gaps by fostering international collaboration and integrating advanced digital tools into textile production processes. The report draws on both internal analysis and external validation based on feedback collected through a confidential survey conducted among project partners.

2. Objectives

The objective of this report is to **identify and analyze existing knowledge and skills gaps** within the research, innovation, and administrative capacities of the **Faculty of Material Technologies and Textile Design at Lodz University of Technology (TUL)** in the context of the AIdesignTEX project.

The report aims to:

- **Diagnose areas requiring development** in research, digital competencies, circular economy implementation, and industry collaboration.
- **Collect and synthesize feedback** from project partners (UiS, GU, UCAV) based on a structured survey tool to ensure external validation of identified needs.
- **Support long-term institutional strengthening**, aligning TUL's development pathway with European research excellence standards, especially in the field of sustainable textile technologies and digital transformation.

By achieving these aims, the report provides a **foundation for strategic decision-making** and ensures that project resources are directed where they are most needed for impactful and sustainable results.

3. Identified Knowledge and Skills Gaps

To accurately identify the most pressing needs and inform targeted actions, a **confidential survey** was developed and distributed among **AIdesignTEX project partners**: **University of Stavanger (UiS), Ghent University (GU), and Catholic University of Ávila (UCAV)**.

The survey aimed to assess perceived **knowledge and skills gaps** in the areas of research, industry collaboration, and project management from the perspective of advanced partners. Respondents rated various competencies on a **scale from 1 to 10** and provided open-ended feedback on areas requiring improvement.

The results of the survey served as a **diagnostic tool**, allowing the consortium to evaluate TUL's current strengths and weaknesses and align project activities with real developmental needs. It has provided valuable insights that directly inform the following gap areas:

3.1. Survey Analysis

3.1.1. Key Observations from Survey Analysis:

1. **Artificial Intelligence (AI) and Machine Learning (ML) in Textile Production**
   Partners recognize the value of AI/ML in textile design and highlighted the importance of further

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developing this competence, especially in defining project objectives, identifying relevant input data, and interpreting outcomes. This was viewed as a key area aligned with the project's goals.

2. **Circular Economy (CE) and Life Cycle Assessment (LCA)**

   These areas were seen as partly developed but requiring a more structured approach and continuous knowledge exchange. Their strategic importance to the project's sustainability goals was clearly emphasized.

3. **Research Project Management and Industry Collaboration**

   These areas were rated positively, but suggestions were made to further enhance organizational efficiency – especially regarding **timely planning of meetings** and setting clear objectives to improve task flow and coordination.

4. **Textile Recycling Technologies**

   TUL was perceived to have a solid base of knowledge in this area, and partners recommended ongoing monitoring of emerging technologies and innovations in textile recycling.

5. **Open Science, Communication and Dissemination**

   There is strong potential in science communication and promotion. Partners recommended more consistent use of communication tools and platforms to enhance visibility and collaborative work.

6. **Social and Behavioral Dimensions of Textile Waste**

   Partners emphasized the importance of addressing not only technological, but also social, economic, and organizational factors contributing to textile waste. These aspects are currently underexplored and represent an important direction for interdisciplinary development at TUL.

7. **Communication and Collaboration**
   The survey revealed areas where further improvements can be made to strengthen coordination and collaboration. While communication and partner engagement were generally appreciated, the survey highlighted the need for clearer articulation of the project vision, better meeting organization, and timely access to project materials—limitations that are expected to be resolved with the launch of the online communication platform by March 31, 2025.

3.1.2. Recommendations Emerging from the Survey:

Based on the survey insights and the broader strategic goals of the AIdesignTEX project, the following recommendations are proposed to strengthen TUL's institutional capacity in line with European research excellence standards:

- Enhance institutional learning through long-term mentoring and study visits. These formats will support experiential knowledge transfer between advanced partners and TUL researchers. They

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are especially valuable in building competencies in AI-driven design, Circular Economy practices, and LCA methodologies—key pillars of the project.

- Introduce a robust project management and collaboration platform to streamline communication, organize documentation, track deliverables, and support knowledge sharing.
- Develop structured, targeted training activities (e.g., workshops, internal seminars, expert-led webinars) that focus on applying digital tools (AI/ML), CE frameworks, and textile recycling techniques in practice.
- Foster interdisciplinary collaboration by encouraging open discussions among expert partners, aligning research approaches, and connecting technological, environmental, and socio-economic aspects of textile sustainability.
- Integrate knowledge transfer mechanisms into all project actions, ensuring that visits, conferences, and deliverables serve as practical learning opportunities contributing to TUL's long-term development strategy.

3.2. Integration with Project Work Packages

The findings from the survey and internal needs analysis will guide the implementation of key activities within:

- WP3: Design of targeted training, mentoring, and study visits.
- WP4: Alignment of research focus with identified development areas such as AI in textiles and CE implementation.
- WP5: Shaping communication strategies and stakeholder engagement based on partners' suggestions.
- WP6: Enhancing research management practices and administrative skills.

4. Next Steps and Follow-Up Actions

To ensure that the identified knowledge and skills gaps are effectively addressed, the following actions will be undertaken:

- Development and implementation of targeted training programs, workshops, and mentoring activities (WP3).
- Monitoring the implementation of recommendations through progress reports and internal evaluations.
- Continuous improvement of the project communication and knowledge-sharing infrastructure (e.g. project website and online platform).
- Ongoing partner engagement to support capacity building and knowledge transfer between institutions.
- Preparation of a Strategic Vision Plan and Post-Twinning Cooperation Strategy to secure long-term institutional growth.

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5. Summary

This report presents a structured analysis of the knowledge and skills gaps identified within the Lodz University of Technology (TUL) team in the context of the AIdesignTEX project. Drawing on feedback from project partners (UiS, GU, UCAV) and based on a confidential diagnostic survey, the report highlights development needs in the areas of digital innovation, circular textile design, project management, and communication.

Key findings confirm the relevance of the project's thematic focus—especially in the areas of AI/ML integration and Circular Economy (CE) principles—and underscore the need for continued capacity building through mentoring, study visits, and improved internal coordination.

The results of this assessment will directly inform training and development activities under WP3 and guide further collaborative and strategic efforts throughout the duration of the project. The report also lays the groundwork for sustaining institutional improvements beyond the lifetime of AIdesignTEX, positioning TUL as a forward-looking institution equipped to lead research in sustainable textile technologies at the European level.