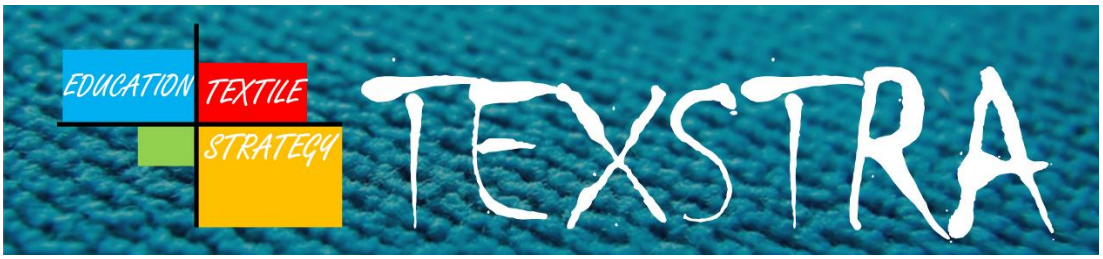
Erasmus+



Textile Strategy for Innovative Higher Education

TEXSTRA Handbook of Good Practices & Open Challenges

O6 Project Handbook of Good Practices & Open Challenges: training tools and methodologies to foster creativity and innovation within the textile and clothing manufacturing sector

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1 INTRODUCTION

The textiles and clothing manufacturing sector in Europe is facing several challenges; owing to the financial crisis, the competition from emerging markets, or the environmental demands, among others, the sector, one of the largest and most important in Europe, in order to rise above the existing and foreseen challenges, needs to reassess its position on one of the most critical factors affecting its competitiveness: the skills of its workforce, in line with the EU strategic position on knowledge and innovation, as competitive advantages.

All these challenges require highly qualified professionals, who should have the right mix of skills, both professional and transversal, in order to demonstrate their competence for applied research, development and technological transfer. Furthermore, the emphasis is on research and innovation in both academia and enterprises; that requires us to focus to making the knowledge triangle work in the textile and clothing industry, by linking higher education (HE), research and business, which are one of the goals of the EU policies.

Therefore, the industry, now more than ever, needs workforce qualified to manage the research and innovation actions; the application of good practices and the mastery of the most advanced methodologies for transferring the results of research into work environment through real project-based work focused on technological transfer are solutions that effectively answer these challenges.

Purpose

Textile Strategy for Innovative Higher Education (TEXSTRA) aim is bringing together the main stakeholders within the textile sector to promote and contribute to the transferring research and innovation knowledge to students & trainees of the textile/clothing Sector via project based learning, contributing to increase the efficiency and competitiveness of EU textile small and medium enterprises.

In this context, the TEXSTRA project has developed the tools necessary for skills enhancement, targeted to higher education, in relation to research and innovation. One of the project's Intellectual Output is the development of the "*Project Handbook of Good Practices & Open Challenges: training tools and methodologies to foster creativity and innovation within the textile and clothing manufacturing sector*".

This report summarizes good practices and initiatives regarding all relevant information related to the TEXSTRA project and its achievements as well as open challenges to be tackled in the partner countries of this project (Romania, Greece, Italy, Spain, Portugal, Lithuania and Bulgaria). These good practices are expected to serve as a useful framework and provide valuable insights that represent a sort of "lesson learned", which will be transferred to relevant stakeholders such as companies, research centres, training centres, universities, hubs, incubators and policy-makers responsible for economic development, creativity and education.

Outline of the Study

After the introduction part, Section 2 presents the methodology used for selecting good practices and open challenges.

Section 3 summarizes the good practices and open challenges identified under major headings such as: Product, Process, Sustainability, Marketing and Business.

In closing, Section 4 summarizes some of the key themes from the good practices and open challenges.

Annexes part presents a description of the 20 good practices and open challenges.

2 APPROACH AND METHODOLOGY

The review of good practices and open challenges included in this report was found through respective websites or through Interviews, meetings with experts and key stakeholders. Each partner has reported at least two suggestions (one good practice and one open issue). This information is being presented in the following sections.

Collecting information format

The format for collecting the information (Table 1) includes 2 major parts:

- The first part was designed to get general information on the good practice / open challenge e.g. title, time span and date (in terms of years), responsible organization, geographical coverage, target group, etc.
- The second part was designed to get information on the good practices / initiative or open challenge that could benefit the TEXSTRA project such as: summary, lessons learnt, innovation input, sustainability as well as other similar details.

Table 1: Format for collecting information on good practices and open challenges

Title	What is the name that best describes the Good Practice (GP) or the Open Challenge (OC)?
☐Product ☐Processes ☐Sustainability ☐Marketing ☐Business	Select the Theme that the GP or the OC addresses.
Year/Duration	Specify the period during which the practice has been carried out (timeframe). Is it finished?
Type	What type of intervention is the GP/OC include (eg. technological and non technological interventions: new product, new technology, new environmental practice, management technique, etc.)?
Web Address	Where information can be found and retrieved on the Internet?
Responsible Organisation	Who was responsible for implementing the GP/OC?
Contact Details	What is the address/email of the people to contact if you want more information on?
Countries participating	What countries where involved with the Good Practice/ Open Challenge?
Other Organisations involved	Who are the institutions, implementing agencies, donors, etc involved?
Summary of Good Practice/Open Challenge	What is the aim/objective of the GP/OC? What is the context (initial situation) and challenge being addressed? Provide a short description of the GP or OC being addressed?
Target groups	Who are the beneficiaries/users or the target group? To whom is this GP/OC addressed?
Impact	What has been or would be the impact (positive and/or negative) of this GP/OC on the beneficiaries' – target group, etc?
Innovation	In what way has the GP contributed or will the OC contribute to an innovation?
Constraints	What are the challenges encountered in applying the GP/OC? How have they been addressed?
Success Factors	What are the conditions (institutional, economic, social, technological, environmental, etc) that needs to be in place in order to be successfully replicated?
Lessons learned	What are the key messages and lessons learned to take away from the GP/OC?
Sustainability	What are the elements that need to be put into place for the GP/OP to be institutionally, socially, technologically, economically, environmentally, etc sustainable? *If possible, indicate the total costs incurred for the implementation of the practice. As much as possible, provide also some cost/efficiency indications: What are the institutional, social, economic and/or environmental benefits compared to total costs?*

List of Good Practices and Open Challenges

The sample good practices and open challenges in this report are presented under major headings such as: Product, Process, Sustainability, Marketing and Business. For each Good Practice/Open Challenge, a title has been given, that best describes it.

In general, there are 20 good practices/initiatives and open challenges reported, see Table 2. More specific there were reported 11 projects, 2 new products, 1 workshop, 1 new environmental practices, 1 new business model, 1 sustainable fashion brand, 1 exhibition and 2 clusters.

Table 2: List of good practices and open challenges

	GOOD PRACTICES	OPEN CHALLENGES
PRODUCT	• Smart Orthopaedic Support to Encourage Activity of Elderly People • Trash-2-Cash: utilising zero-value waste textiles and fibres with design-driven technologies to create high quality products	• Development of structure of 3D textile • Datemats - Knowledge & Technology Transfer of Emerging Materials & Technologies through a Design-Driven Approach • DESTEX - Industrial and creative design in advanced textile manufacturing
PROCESS	• Lectures about advanced textile materials with electroconductive properties • PRACTICE for competence	• Acceleration of the innovation in advanced textile materials through advanced technologies and processes • Implementing Virtual Internship in Higher Education curricula at TUIASI, Faculty of Industrial Design and Business Management
SUSTAINABILITY	• Substitution of hazardous chemicals in textile finishing • Fibersort – Closing the loop in the textiles industry	• Circular economy and eco-design • RESYNTEX - A New Circular Economy Concept for Textiles and Chemicals
MARKETING	• Extro Skills: Developing new skills for the extroversion specializations of fashion industry in Europe • Vintage for a cause	• FOSTEX: Fostering innovation in the Jordan and Moroccan textile industry
BUSINESS	• Textailor Expo • Specialized cluster institute for apparel and textile • Po.in.tex.	• TCBL Textile & Clothing Business Labs

3 TEXTILE AND CLOTHING MANUFACTURING SECTOR: GOOD PRACTICES AND OPEN CHALLENGES

PRODUCT

GOOD PRACTICES

1. **Smart Orthopaedic Support to Encourage Activity of Elderly People (Project)**

This project was financed by Research Council of Lithuania. Its objective was to develop orthopaedic knitted support with warming element and power harvesting during walking.

Results of the project is used for new orthopaedic knitted support development and promotion them for elderly people or other people who have some difficulties with walking.

2. **Trash-2-Cash: utilising zero-value waste textiles and fibres with design-driven technologies to create high quality products (Project)**

Trash-2-Cash was an EU funded research project which aimed to create new regenerated fibres from pre-consumer and post-consumer waste. It was also pioneering a whole new way of developing materials.

One resource that's becoming more abundant is waste. The idea of recycling textile waste has been popular for decades, but current mechanical methods give poor quality fabrics suitable only for industrial applications like insulation, and upcycling of pre-consumer textile waste into products is impossible to scale. Trash-2-Cash proposed a new model where paper and textile waste is recycled chemically - resulting in fabrics that are the same quality as new materials, to make products that are industrially replicable and infinitely recyclable.

OPEN CHALLENGES

3. **Development of structure of 3D textile (New product)**

The main context of this new product is to develop new structures of textiles according needs and possibilities of industrial company. It aims to improve student's skills in textile designing and communication with industrial partners, as well as to develop new structures of textile for industrial manufacturing.

The results of project can be used for industrial manufacturing as well as for student's thesis preparation.

4. **Datemats - Knowledge & Technology Transfer of Emerging Materials & Technologies through a Design-Driven Approach (Project)**

Datemats project aims to transfer and implement a unique design-led teaching method for students with a mixed background - design and engineering - in the field of Emerging Materials and Technologies (EMTs), and to boost knowledge and technology transfers from academia and research centres to industry.

New materials and technologies represent a key-factor not only to obtain better performances and innovative solutions, but also to enhance the product language in terms of new experiences and original expressive-sensorial dimensions. Emerging Materials and Technologies (EMTs) are at the leading edge in several sectors and are one of the key-elements through which industries stimulate innovation processes and foster creativity. The landscape of EMTs requires new interdisciplinary and transdisciplinary approaches in education, industry and business. By focusing on design methods, entrepreneurial skills, socio-cultural factors, and innovation potentials of EMTs, Datemats project contributes to fulfil the university's third mission, strengthening the 'knowledge triangle' by linking education with research and innovation, stimulating the social and economic development.

5. **DESTEX - Industrial and creative design in advanced textile manufacturing (Project)**

DESTEX project will foster the implementation of innovation through the development of the tools necessary for skills enhancement in order to support higher education students to acquire skills in transdisciplinary innovation, based on creative and industrial design applied to the textile sector.

The advanced textile materials sector is an emerging sector within the textile industry, driven by transdisciplinary innovation in several end-markets, focusing on the technical aspects and contribution of textile materials rather than on the aesthetics. In order to foster the innovation growth within companies operating in those sectors, higher education systems need to transfer the creative approach applied in industrial and product design to textile higher education programs.

PROCESS

GOOD PRACTICES

6. Lectures about advanced textile materials with electroconductive properties (Workshop)

The objectives of the workshop "Innovative achievements and development perspectives of the advanced materials with electro-conductive properties," was to:

- Transfer knowledge to internal staff involved in research activities and SMEs in order to increase the interest in advanced materials and co-creation of the advanced textile material with electro-conductive properties.
- Create links with Erasmus+ projects (TEXSTRA and FOSTEX, Skills4Smartex), which have similar objectives in helping the creation of the advanced textile material and boosting the textile industry through new targets.

7. PRACTICE for competence (Project)

The project is financed by the Human Capital Operational Program 2014-2020 Priority Axis 6 - Education and Skills, Thematic Objective 10 - Making investments in the field of education, training and professional training in order to acquire skills and lifelong learning.

The general objective of the project aims to develop the practical skills for students from the fields of Industrial Engineering and Engineering and management, specializations specific to the field of textiles and clothing, through internships at top companies in the North-East and South-East regions, in order to integrate successfully in the labor market. Students will benefit from guided internships, conducted both in the technological laboratories of the faculty and in prestigious companies in the field, modern learning methods, scholarships in case of students from rural areas, attractive prizes for competitions organized within the project.

OPEN CHALLENGES

8. Acceleration of the innovation in advanced textile materials through advanced technologies and processes (New product)

The open challenge is to develop 3D smart hybrid composites and systems by research, testing, and optimization of the physical-mechanical, electrical, physical-chemical performances for 3D composite materials designed for the niche fields (electronics, material physics, electro-technical and medicine).

9. Implementing Virtual Internship in Higher Education curricula at TUIASI, Faculty of Industrial Design and Business Management (Project)

The nature of the proposed open challenge is educational. The projects developed in the Virtual Internships in collaboration with T&C companies will target technological and non-technological issues that companies will consider important. The main aims are:

- Improve the internship experience for students and develop their transversal skills.
- Better communication between companies, students and academic staff.
- Raising awareness regarding the need for qualified workforce for the T&C industry.

SUSTAINABILITY

GOOD PRACTICES

10. Substitution of hazardous chemicals in textile finishing (New environmental practice)

The main aim of this new environmental practice is to contribute to the mitigation of the environmental and health impacts on European ecosystems caused by toxic compounds used in the textile finishing sector that are under the scope of the potential restrictions by REACH.

Many well-known high performance textile finishing active principles have proved over time to be either toxic or hazardous for the environment. These problems are being address by European institutions through the REACH legislation by limiting their use and even with bans of the substance use.

11. Fibersort - Closing the loop in the textiles industry (Project)

FIBERSORT is an INTERREG North-West Europe project. It seeks to address two main challenges: the environmental need to reduce the impact of virgin textile materials, as well as the development of new business models and open markets for the growing amounts of recyclable textiles in North-West Europe (NWE).

To enable this shift, the project expects to realise the implementation of Fibersort technology as the new industry standard and key value adding step to enable high value textile-to-textile recycling in the region.

The Fibersort is a technology that automatically sorts large volumes of mixed post-consumer textiles by material composition. This allows them to be recycled into new, high quality textiles. Once sorted, these materials become reliable, consistent inputs for high-value textile-to-textile recyclers. High value recycling technologies can transition low value waste into new, high value textiles and they are a critical link in the circular supply chain. Therefore, the Fibersort is a key technology that will enable textile resources to cycle repeatedly through the supply chain.

OPEN CHALLENGES

12. Circular economy and eco-design (New business model)

Currently, many products are not recyclable due to design constrains and due to the lack of accounting the end-of life aspect during design.

The main aim of this open challenge is to convert the textile industry from a linear cradle-to-grave industry to circular model starting from the design with eco-design to enable circularity of the textile products.

13. RESYNTEX - A New Circular Economy Concept for Textiles and Chemicals (Project)

RESYNTEX was funded by the EU Horizon 2020 Research and Innovation Programme. It is a research project which aims to create a new circular economy concept for the textile and chemical industries. Using industrial symbiosis, it aims to produce secondary raw materials from unwearable textile waste. It is a new approach to Design a complete value chain from textile waste collection through to the generation of new

feedstock for chemicals and textiles. In particular they looked at replacing Ammonia with value-added chemicals based on polyamide oligomers of textile origin, Phenol-formaldehyde with protein-based components in adhesives, Petrochemicals for packaging with recycled terephthalic acid recovered from polyester, Fossil-based transportation fuels with bio-based ethanol.

RESYNTEX failed to validate the viability of the proposed concepts using LCA and LCC analysis. The calculated environmental impacts and costs of the RESYNTEX were compared with the conventional value chain (incineration) applying combined LCA and LCC Analysis. Attractiveness of the originally proposed products was ranked using the combined analysis, and none was really viable.

The proposed processes need to identify the main contributors to the impact and costs of each route, and these can be used to improve the performance of the system and its optimization.

MARKETING

GOOD PRACTICES

14. ExtroSkills: Developing new skills for the extroversion specializations of fashion industry in Europe (Project)

Fashion industries need a flexible workforce that responds to the development of the globalized market and the trend and need for internationalization. The workforce needs to be well qualified and ready to face the increased competition and rapid technological changes. To be able to compete in the global market, fashion industries have to be smarter and able to adapt to changes. To achieve this, fashion industries need new education and training systems and tools for their existing and potential workforce in order to respond to the demands of the labour market and the global competition. In a framework of global competition, innovation and development are crucial elements to provide fresh impetus to a sustainable and competitive industry.

In this context, the EXTRO SKILLS project has designed and developed an innovative and comprehensive training protocol for export personnel of fashion industries, using ICT-based learning approaches and methodologies that offer essential transversal skills for enabling them be ready to respond to international trade and market demands and enhancing the extroversion and the competitiveness of the industry as a whole. Bringing together the different sectors of fashion industries, the training protocol follow a comprehensive learner-centred approach and is coupled with an integrated certification framework, based on acquired knowledge, skills and competences, in line with the European Qualification Framework (EQF).

15. Vintage for a cause (sustainable fashion brand)

“Vintage for a cause” is a Portuguese brand that combines environmental concern with social responsibility. It makes clothing and fashion accessories, based on principles of environmental sustainability, but with the purpose of promoting social sustainability.

It design and manufacture the majority of theirs limited-edition collections are made by responsible manufacturing partners in Portugal or abroad using sustainable methods and materials. It source *dead-stock* and sustainable fabrics incorporating better practices throughout or supply chain to make beautiful vintage inspired styles at a fraction of the environmental impact of conventional fashion. It is their mission to lead and inspire a sustainable way to do fashion.

It started as a project in the area of social sustainability that promotes the interaction and conviviality of women over 50, in the redesign of *vintage* garments.

Today it became a clothing production space with principles of environmental sustainability (working in *up cycling*), it counts with the collaboration of prestigious Portuguese designers, which contribute voluntarily with their knowledge and talent so that the transformations of the old clothes are made in team with de senior women. Everything is done with existing materials and often two pieces result in a completely different one. The end result is unique *vintage* pieces, which are sold at markets and stores. Each product gets a hand-embroidered tag that is accompanied by a short text that tells the story of the piece, where it came from, who transformed it and an invitation to the future owner to share the continuity of its route on the Internet.

The challenge today is the replication of this business model is scheduled for other cities in the country. Also the challenge is search for new textile partners (with textiles *dead-stocks*), in order to obtain material donations to be able to work new garments always in the process of *up cycling*.

OPEN CHALLENGES

16. FOSTEX: Fostering innovation in the Jordan and Moroccan textile industry (Project)

The idea of the FOSTEX project is a local ecosystem of innovation in textile sector. The main objective of this initiative is to foster the university-industry collaboration, to support the development of innovation in the textile sector in Morocco and Jordan and to generate an ecosystem of advanced textile materials.

The upgrading of existing centers in Morocco and the creation of new innovation centers in Jordan will become a valuable ally for the local textile sector and its further development.

FOSTEX project complies with the national Jordan industrial policy for the years 2017 – 2021 that aims to develop competitiveness in the area of production cost, quality, certification, export and innovation, encouraging applied research and technology transfer from universities to industry.

Similarly, the Moroccan Government established an industrial acceleration plan for the years 2014 – 2020, in which a dedicated strategic line aims to create different industrial ecosystems to promote an integrated development of the sectors. For the textile sector 6 ecosystems are identified, indicating Technical Textiles as one of them.

The initiative aims to set up two advanced textile innovation centres in Jordan and upgrading two textile innovation centres in Morocco, in addition:

- to promote the centres making them the focal points in the textile industry of each country;
- to promote entrepreneurial activities in the four centres to make them regional catalysts of innovation;
- to showcase FOSTEX results and encourage Moroccan and Jordanian governments to replicate the initiatives in other universities.

BUSINESS

GOOD PRACTICES

17. TEXTAILOR EXPO (Exhibition)

The exhibition TEXTAILOR EXPO is highly appreciated for daring to combine and present in one place textile machines and fashion, mass-produced products and hand-made items, established brands and start-ups, meet pupils, students and young designers with world-renowned stylists to transfer experience and skills at Creative Lab, to shelter business conversations and professional training.

The specialized international exhibition for fashion, textile equipment and products TEXTAILOR EXPO is of the "Business-to-Business" (B2B) type. It unites representatives of the entire supply chain. It is a business forum for manufacturers, subcontractors and traders, which has established itself as a significant center of fashion industry on the Balkan Peninsula.

TEXTAILOR EXPO demonstrates modern technologies, machines, materials, accessories for the textile and clothing industry, ready-made garments from fabrics and knitwear, fashion lines. This exhibition shows the two faces of fashion industry - the aesthetic quests and the technological innovations, so the exhibition is useful for professionals and interesting for the general public.

18. Specialized cluster institute for apparel and textile - SCIAT (Cluster)

The SCIAT cluster is set in Bulgaria. It is a business structure for manufacturers, subcontractors and traders.

The team behind the Specialized Cluster Institute for Apparel and Textile has been working together since 2005 when it founded the Specialized Institute for Apparel and Textile. It offers consultancy services in the field of the textile and tailoring industries; providing training in all stages of production, planning of the production cycle, the management and marketing of enterprises operating in the above mentioned or other related fields.

In the course of its long active presence, the organization has gained valuable experience and expertise related to the textile industry in Bulgaria and the problems and prospects of this field.

19. Po.in.tex. (Cluster)

Textile Innovation Cluster, an association of companies, consortiums and research centers, established in Biella by the Piemonte Region and managed by Città Studi. This Cluster is especially focused on one of the most important sectors of the Italian economy, the textile industry.

Since its foundation, the goal is to promote the values of cooperative innovation and competitiveness, while encouraging a constant exchange between the innovation supply and demand. There is a particular calling in a territorial sphere that strongly connects this Cluster, its mission and its activities, to the textile industry that still marks the district of Biella and the entire Piemonte Region. The Textile Innovation Cluster includes and serves various members belonging to each part of the textile production and manufacturing sector.

OPEN CHALLENGES

20. TCBL Textile & Clothing Business Labs (Project)

TCBL Textile & Clothing Business Labs is a European Union's Horizon 2020 Programme for research, technology development and innovation. It aims to built a multi-faceted business ecosystem of sector enterprises, innovation labs, service providers and advisors who are working together to transform the Textiles and Clothing industry. The common objective is to build alternative, sustainable paths to over-production and diminishing value.

The goal of the TCBL Project has been to create a transformational business ecosystem capable of constantly innovating the business and process models of the European Textile and Clothing industry. As customers are showing increasing attention to ethical and environmental sustainability in the clothes they wear, significant opportunities for meeting this challenge are emerging based on new production and distribution technologies, innovative organizational models, and new creative energies. If these opportunities are adequately captured through business model innovation, these trends have the promise of radically re-structuring one of the globe’s most consumption-oriented and environmentally unfriendly industries.

ANNEX I: LIST OF GOOD PRACTICES & OPEN CHALLENGES

PRODUCT

1. Smart Orthopaedic Support to Encourage Activity of Elderly People

☒ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	Product
Year/Duration	01.10.2017 - 31.12.2019
Type	Project is financed by Research Council of Lithuania
Web Address	NA
Responsible Organisation	KTU and Lithuanian Sports University
Contact Details	daiva.mikucioniene@ktu.lt
Countries participating	Lithuania and Latvia
Other Organisations involved	Riga Technical University, industrial company of orthopaedic supports manufacturing
Summary of Good Practice	To develop orthoapedic knitted support with warming element and power harvesting during walking.
Target groups	Elderlies and other people who would like to support their physical activities.
Impact	Results of the project is used for new orthopaedic knitted support development and promotion them for elderly people or other people who have some difficulties with walking.
Innovation	The new product is under patenting.
Constraints	To develop new earlier do not used product, to combine a knowledge of different peoples in different fields of science and industrial manufacturing into one object, understanding a full complex of problems and challenges.
Success Factors	Financial support of new product development, understanding of problem from different points of view, contribution of peoples with different knowledge and experience in various fields of science and industrial manufacturing.
Lessons learned	Life learning, contribution of peoples from various fields of activities and working in a group are the key factors for absolutely new product development.
Sustainability	Total budget of project implementation is approx. 100 000 EUR. International, interdisciplinary research institutions and industrial companies contribution, dissemination of project results in conferences and research papers, practical usage of research results, involvement of students into practical research, new product development and patenting

2. Trash-2-Cash: utilising zero-value waste textiles and fibres with design-driven technologies to create high quality products

☒ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	Product
Year/Duration	June 2015 – December 2018
Type	Trash-2-Cash was an EU funded research project which aimed to create new regenerated fibres from pre-consumer and post-consumer waste. It was also pioneering a whole new way of developing materials.
Web Address	www.trash2cashproject.eu
Responsible Organisation	RI.SE - Research Institutes of Sweden
Contact Details	For research enquiries contact, RI.SE: emma.ostmark@ri.se For media enquiries contact, Centre for Circular Design: ccd@arts.ac.uk
Countries participating	18 partners from 10 EU countries: Denmark, Finland, Germany, Italy, Slovenia, Spain, Sweden, The Netherlands, Turkey, UK.
Other Organisations involved	Aalto University (AALTO), Copenhagen Business School (CBS), Fundacion Cidetec, Grado Zero Innovation (GZI), Maier, Material ConneXion Italia (MCI), Reima, SCA Obbola, SOEX, SO.F.TER, Soktas Dokuma, Swerea IVF, TEKO, Tekstina, University of the Arts London (UAL), VanBerlo, VTT Technical Research Centre of Finland
Summary of Good Practice	One resource that's becoming more abundant is waste. The idea of recycling textile waste has been popular for decades, but current mechanical methods give poor quality fabrics suitable only for industrial applications like insulation, and upcycling of pre-consumer textile waste into products is impossible to scale. Trash-2-Cash proposed a new model where paper and textile waste is recycled chemically - resulting in fabrics that are the same quality as new materials, to make products that are industrially replicable and infinitely recyclable.
Target groups	Stakeholders of the textile value chain: material R&D (engineering/design), product development (design). Designers, design researchers, scientists, raw material suppliers and product manufacturers from across Europe made up a cross-disciplinary consortium representing the whole product supply chain.
Impact	T2C has achieved high quality materials and product prototypes from waste, offering companies in various industries (fashion, interiors, automotive and other luxury goods) new eco-fibre options.
Innovation	T2C consortium partners also hope to influence how all novel materials are developed in the future through Design-Driven Material Innovation (DDMI) methodology. This new way of working will outline how science, design and industry can input into the process from beginning to end.
Constraints	Availability for collaboration in a cross-disciplinary and inter-sectorial context.
Success Factors	Need to facilitate communication and collaboration between the different involved professions in order to achieve the pre-set goals.
Lessons learned	Open and constant communication flow between all partners is key for an interdisciplinary collaboration initiative.
Sustainability	The initiative has been co-financed under the European Commission's Horizon 2020 Programme NMP 18-2014, with a budget of over € 9 mln.

3. Development of structure of 3D textile

☒ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	Product
Year/Duration	One semester
Type	Structure of new product
Web Address	NA
Responsible Organisation	Prof. dr. Rimvydas Milašius
Contact Details	rimvydas.milasius@ktu.lt
Countries participating	Lithuania
Other Organisations involved	Textile companies
Summary of Open Challenge	Aims: – to improve students skills in textile designing and communication with industrial partners; - to develop new structures of textile for industrial manufacturing. Context – to develop new structures of textiles according needs and possibilities of industrial company.
Target groups	Students and industrial textile companies
Impact	Students obtains additional skills in textile designing, communication with industrial partners, working in a group. Industrial partners obtains new design of product for their manufacturing.
Innovation	Innovation in new 3D product development.
Constraints	Challenges for student to use their theoretical knowledge in practice and challenges for companies to adapt new view on product designing and new kind of product manufacturing.
Success Factors	Willingness of industrial company and student to implement project.
Lessons learned	Practical internship for students.
Sustainability	The results of project can be used for industrial manufacturing as well as for student's thesis preparation.

4. Datemats - Knowledge & Technology Transfer of Emerging Materials & Technologies through a Design-Driven Approach

☒ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	Product (Design and Development – R&D activity)
Year/Duration	January 2019 – December 2021
Type	Datemats project aims to transfer and implement a unique design-led teaching method for students with a mixed background - design and engineering - in the field of Emerging Materials and Technologies (EMTs), and to boost knowledge and technology transfers from academia and research centres to industry.
Web Address	https://www.datemats.eu/
Responsible Organisation	Datemats is an Erasmus+ Knowledge Alliances - Cooperation for innovation and the exchange of good practices. Project Coordinator: Politecnico di Milano - Scuola di Design (POLIMI), Italy
Contact Details	info@datemats.eu
Countries participating	10 partners from **6** EU countries: Denmark, Italy, Finland, Portugal, Spain, Sweden.
Other Organisations involved	Aalto University - CHEMARTS (AALTO) Barcelona Design Center (BCD) Centro Italiano per l'Apprendimento Permanente (CIAPE) Industrial Design Development Center West Sweden (IDC) Instituto de Soldadura e Qualidade (ISQ) Copenhagen School of Design and Technology - Material Design Lab (KEA) Fostering Arts and Design - Barcelona Materials Centre (MATERFAD) Material ConneXion Italia (MCI) University of Navarra - Faculty of Engineering (TECNUN)
Summary of Open Challenge	New materials and technologies represent a key-factor not only to obtain better performances and innovative solutions, but also to enhance the product language in terms of new experiences and original expressive-sensorial dimensions. Emerging Materials and Technologies (EMTs), are at the leading edge in several sectors and are one of the key-elements through which industries stimulate innovation processes and foster creativity. The landscape of EMTs requires new interdisciplinary and transdisciplinary approaches in education, industry and business. By focusing on design methods, entrepreneurial skills, socio-cultural factors, and innovation potentials of EMTs, Datemats project contributes to fulfil the university's third mission, strengthening the 'knowledge triangle' by linking education with research and innovation, stimulating the social and economic development.
Target groups	The Datemats activities are open to faculty, students and enterprises and will offer several occasions in which the involved universities will share their best practices for knowledge and technology transfers. The mentioned stakeholders will be involved in several activities aimed to transfer new knowledge and methodologies to learn to detect and exploit the potentials of emerging materials and technologies gaining new skills, methods, expertise, competitiveness.
Impact	The project aims to support cross-fertilisation, exchange of good practices and mutual learning and to foster the definition of new interdisciplinary methods for EMTs. This means to work on the implementation of the new design teaching method during the project lifetime, but mainly to build up interest and a critical mass on the subject and to develop an active community after the project closure, for continuous training of the future and existing workforce, that will enable the European industrial workforce to

	develop new skills and competences in a quick and efficient way. Faculty from HEIs will have the largest impact, ensuring sustainability and longevity for the project. This is because the academy will provide a unique, high quality process for cross-institutional teams to develop and implement change programmes in the curriculum.
Innovation	New teaching methods for higher education applying an interdisciplinary and trans-sectorial design-driven approach.
Constraints	Difficulties in reaching out to industry for an active involvement and contribution.
Success Factors	Thanks to dedicated workshops involving design and engineering students, the Datemats consortium will be able to verify if and how the students learnt and applied both the design and the entrepreneurial skills addressing business needs.
Lessons learned	The results of the workshops will be useful to stress the pros and the cons of the method and, if necessary, how and what to improve for further development.
Sustainability	The initiative is co-financed under the European Commission's Erasmus+ Programme, Key Action 2 – Knowledge Alliances, with a budget of over € 900'000.

5. DESTEX - Industrial and creative design in advanced textile manufacturing

☒*Product* ☐*Processes* ☐*Sustainability* ☐*Marketing* ☐*Business*	Product (Textiles)
Year/Duration	September 2019 – April 2022
Type	DESTEX project will foster the implementation of innovation through the development of the tools necessary for skills enhancement in order to support higher education students to acquire skills in transdisciplinary innovation, based on creative and industrial design applied to the textile sector.
Web Address	n.a.
Responsible Organisation	DesTex is an Erasmus+ Strategic Partnerships for higher education - Cooperation for innovation and the exchange of good practices Project Coordinator: University of Borås (UB), Sweden
Contact Details	Communication Manager, email: projectes@textils.cat
Countries participating	8 partners from **5** EU countries: Denmark, Greece, Italy, Spain, Sweden.
Other Organisations involved	Associacio Agrupacio d'Empreses Innovadores Textils (AEI) Centro Italiano per l'Apprendimento Permanente (CIAPE) Creative Thinking Development (CRETHIDEV) Design School Kolding (DSKD) Escola Superior de Disseny Felicidad Duce - Barcelona (LCI) Material ConneXion Italia (MCI) Politecnico di Milano - Scuola di Design (POLIMI)
Summary of Open Challenge	The advanced textile materials sector is an emerging sector within the textile industry, driven by transdisciplinary innovation in several end-markets, focusing on the technical aspects and contribution of textile materials rather than on the aesthetics. In order to foster the innovation growth within companies operating in those sectors, higher education systems need to transfer the creative approach applied in industrial and product design to textile higher education programs.
Target groups	HEI students (Design and Textiles), technical textiles' companies and their managers, other stakeholders from the textile ecosystem.
Impact	DESTEX will generate an impact within the different target groups.
Innovation	Applying design-driven methods combined with a transdisciplinary approach in training the future professionals of the textile sector will unlock the innovation potential of the advanced textile manufacturing industry.
Constraints	Difficulties in reaching out to industry for an active involvement and contribution.
Success Factors	The Stakeholders are expected to benefit from the outputs generated during the project lifetime by participation to multiplier events, direct surveys and different activities, virtual hackathons, and by using the virtual training materials that will be made openly accessible online.
Lessons learned	In particular the involved HEIs will be able to exploit the insight gained through this initiative implementing training courses targeted to the needs of the raising advanced textile manufacturing sector.
Sustainability	The initiative is co-financed under the European Commission's Erasmus+ Programme, Key Action 2 – Cooperation for innovation and the exchange of good practices, with a budget of almost € 400'000.

PROCESS

6. Lectures about advanced textile materials with electroconductive properties

☐ *Product* ☒ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	The selected Good Practice addresses the Theme Processes. More specifically, the best practice presents the advanced technical conductive textiles development by using advanced processes and technologies and provide skills in Advanced Textile Engineering
Year/Duration	The best practice has been hosted by INCDTP on 22 October 2019.
Type	WORKSHOP "Innovative achievements and development perspectives of the advanced materials with electroconductive properties," 22 October 2019, INCDTP. -The workshop was developed in order to increase the degree of interest of the research staff and SMEs
Web Address	N/A
Responsible Organisation	INCDTP
Contact Details	Dr. Eng. Aileni Raluca Maria
Countries participating	Romania
Other Organisations involved	The host of the event was INCDTP, Bucharest, Romania, and the funds were received through National Research Project "Composite materials with electroconductive properties, based on 3D polymeric array for sensorial monitoring system and electromagnetic waves attenuation (3D – ELECTROTEX)", contract PN 19 17 01 01, funded by Ministry of Research and Innovation (http://www.research.gov.ro) in 2019
Summary of Good Practice	**The objectives of the good practice are:** - to transfer the knowledge to internal staff involved in research activities and SMEs in order to increase the interest in advanced materials and co-creation of the advanced textile material with electroconductive properties. - to create links with Erasmus+ projects (TEXSTRA and FOSTEX, Skills4Smartex), which have similar objectives in helping the creation of the advanced textile material and boosting the textile industry through new targets. **Provided skills:** -advanced knowledge in the field of electroconductive materials obtained by classical technologies and advanced technologies (3D printing, RF plasma, and microwave); -knowledge about polymers used for electroconductive materials; **Some of the lectures are**: ○ 3D Electrotex –perspectives in developing advanced textile materials and intelligent textile prototypes with integrated circuits for sensors or actuators –Aileni Raluca Maria ○ Research concerning the electromagnetic shield development based on textile materials –Surdu Lilioara ○ Polymers with electroconductive properties, used in printing, padding, and coating –Aileni Raluca Maria ○ Conductive textile materials based on CNT – Chirila Laura ○ e-Learning training modules in the field of textiles – Radulescu Razvan ○ Best practices for developing advanced textile materials research centers (FOSTEX Erasmus +) - Aileni Raluca Maria ○ Perspectives for creation of the course supports for advanced textile materials (Texstra Erasmus +) - Aileni Raluca Maria

Target groups	The best practice presented was addressed to: - Scientific group: researchers, assistant researchers, and Ph.D. students from INCDTP. - To target group from business: engineers and scientific managers from SMEs.
Impact	The positive impact of this good practice on target groups (academia, research, and business) consists of an understanding of the actual dynamic of the textile industry and to boost the interest in a research collaboration between the research organizations and SMEs. Also, the involvement of the internal research team (assistants, technologists, researchers) in this workshop was positively appreciated and have been generated several exciting discussions about the co-creation of new advanced textiles products.
Innovation	The best practice contributes to innovation by: - more understanding of the project, co-interesting the research team; -clarifications about advanced materials, technologies, processes, and final products; -discussions and co-creation of the possible solutions to improve or optimize the final products
Constraints	Difficulties consisted of impossibility for some of the participants to be present in the workshop for 1 day because of the busy program in SME.
Success Factors	All participants declared that it was an excellent experience to understand new researches and to understand the importance of the advanced materials developed in the final system. Besides, SMEs were very enthusiastic concerning the new possibility to know and to be involved in future research projects with INCDTP. The conditions are: - To organize a seminar/workshop for advanced materials; - To presents several aspects which already are connected with ongoing research or Erasmus+ projects; - To get funding for organizing the event (workshop/seminar) and generate a significant impact and disseminate the results. - To establish the appropriate date for the event in order to allow the participation of a broad public from science, business, and academia. - To have the necessary logistics infrastructure (notebook, video projector, smart table, and .pptx presentations) and available chairs, keynote speakers, and speakers (researchers involved in the research/Erasmus+ projects).
Lessons learned	The key message from the best practice is that co-creation and coaching in advanced textile development can be used by meeting all interested stakeholders (SMEs, research organizations, academia, and students). The lessons learned to take away from the best practices are: -knowledge about raw materials and conductive polymers for advanced textiles -processes and technologies used for advanced textiles development -information about courses on advanced textile development provided by TEXSTRA Erasmus+ -information about main aspects concerning the development of advanced textile centers (FOSTEX Erasmus+).
Sustainability	The total costs incurred for the implementation of the best practice was around 500 EUR. The institutional, social, economic and/or environmental benefits compared to total costs consist of: - improving the communication of the work team in research and developing new advanced textiles with electroconductive properties; -increasing the interest of SMEs in new researches and collaboration in research/innovation projects with research institutes; -brainstorming about new advanced textiles and research projects; -dissemination of the project results (3D-Electrotex, TEXSTRA) and communication about project activities (FOSTEX, Skills4Smartex).

7. PRACTICE for competence

☐*Product* ☐ *Processes* ☐*Sustainability* ☐*Marketing* ☐*Business* ☒*Other: Education*	Education and skills (higher education)
Year/Duration	Duration: 2 years. Period of implementation: 2.09.2018 - 11.09.2020
Type	The project PRACTICE for competence! (Ro: Practică si vei fi competent!, Contract POCU/90/6.13/6.14/108886) is financed by the Human Capital Operational Program 2014-2020 Priority Axis 6 - Education and Skills, Thematic Objective 10 - Making investments in the field of education, training and professional training in order to acquire skills and lifelong learning.
Web Address	http://www.practica.tpmi.tuiasi.ro/
Responsible Organisation	"Gheorghe Asachi" Technical University of Iasi - TUIASI, Faculty of Industrial Design and Business Management
Contact Details	lbuhu@tex.tuiasi.ro
Countries participating	Romania
Other Organisations involved	ASTRICO Nord-Est Association, PANDORA's PROJECTS Association
Summary of Good Practice	**The general objective** of the project aims to develop the practical skills for students from the fields of Industrial Engineering and Engineering and management, specializations specific to the field of textiles and clothing, through internships at top companies in the North-East and South-East regions, in order to integrate successfully in the labor market. Students will benefit from guided internships, conducted both in the technological laboratories of the faculty and in prestigious companies in the field, modern learning methods, scholarships in case of students from rural areas, attractive prizes for competitions organized within the project,
Target groups	220 BSc students from the Faculty of Industrial Design and Business Management enrolled in the 2-nd, 3-rd and 4-th year of study in the fields of Industrial Engineering and Engineering and Management.
Impact	Increasing the number of tertiary and non-university tertiary education graduates who find a job as a result of access to learning activities at a potential job / research / innovation, focusing on the sector of Textiles & Clothing. Establishing a minimum of 15 sustainable partnerships between the university and economic agents in the field of textiles and clothing. Creation of an online learning platform for the development of workplace learning programs. Creating a network of practice partners with an impact on the development of the practice component of the curricular offer.
Innovation	Students in the last year of study can prepare their graduation thesis at prestigious companies in the field that can propose themes / new products / challenges / to be developed within their thesis.
Constraints	The project allows the inclusion of companies located only in the NE and SE regions, although the textile and clothing sector is widespread throughout the country and the faculty is the most important provider of higher educated workforce.
Success Factors	Accessing new funds / new calls to finance the students' practice Creating a stable network of practice partners throughout the country.
Lessons learned	Awareness of the demand for knowledge and skills in industry. Use the internship as a tool for adapting the content of the curricula and activities to the specific needs of the industry.

Sustainability	-Total budget for the project implementation: approx. 421000 EUR -Efficiency indicators (selection): 15 partnership agreements; 220 framework conventions for practice; 15 groups of students per practice centers; -Benefits: 220 students will use the online platform; 1 coordinated information network; guided internships; modern methods of learning; scholarships for students from rural areas; access to prestigious companies in the field; higher chances of employment.

8. Acceleration of the innovation in advanced textile materials through advanced technologies and processes (RF plasma, microwave, and 3D printing)
(3D-Electrotex)

☐ *Product* ☒ *Processes* ☐ *Sustainability* ☐ *Marketing* ☐ *Business*	The proposed open challenge addresses the theme 'Processes'.
Year/Duration	2019-2022. The open challenge is ongoing.
Type	The open challenge includes technological interventions such as material functionalization by RF plasma and microwave and 3D printing. The objective is to obtain new advanced textile products with electroconductive properties that could be used in systems based on sensors/actuators and magnetic shielding.
Web Address	N/A in 2019. The information will be available on the project website in 2020. Also, some approaches and results are presented in scientific papers, such as: 1.Aileni R. M., Chiriac L., Research on designing composite techniques for obtaining the 3D hybrid composites with conductive and semiconductive properties for sensors and actuators, TEXTEH 2019, Bucharest, Romania 2.Aileni R. M., Chiriac L., Composed techniques for obtaining of the 3D hybrid composites for attenuation of the electromagnetic field, TEXTEH 2019, Bucharest, Romania 3.Aileni R. M., Chiriac L., Perspectives in using of the 3D textile composites to produce rechargeable batteries, TTPF 2019, Iasi, Romania 4.Aileni R. M., Chiriac L., Multivariate analysis of the parameters that the EMR absorption/shielding of the textile surface coated using nickel/graphite/copper microparticles, TTPF 2019, Iasi, Romania
Responsible Organisation	INCDTP
Contact Details	Dr. Eng. Aileni Raluca Maria
Countries participating	Romania
Other Organisations involved	Ministry of Research and Innovation (http://www.research.gov.ro) The scientific actions were funded in 2019 by the Ministry of Research and Innovation, Romania. The scientific actions will be funded in 2020 by the Minister of Education and Research, Romania.
Summary of Open Challenge	**The objectives of the open challenge are:** -to provide research and innovation actions about 3D rapid prototyping, RF plasma and microwave for 3D smart textiles based on a polymeric matrix -to study the context and the best practice for use, apply and recycle the materials used in smart textile (textile surface, metal micro/nanoparticles, electronic parts). -to foster the development of the hybrid textiles with electroconductive properties and to attract the SMEs in this research; -to evaluate the impact of the smart textile by life cycle assessment (LCA) and life cycle inventory (LCI) -to study, learn and disseminate the aspects concerning smart material performance and development (properties (chemical, physic-mechanical, chemical and electrical), durability, resistance, reusing, recycling and disposal with a low impact on the environment). -to study and disseminate to the external stakeholders (SMEs, research organizations, universities) and internal stakeholders (INCDTP) the aspects concerning the potential of using the advanced processes (RF plasma, microwave, and 3D printing) and aspects concerning potential toxicity of the micro/nanoparticle based on ferrous/non-ferrous metals used in smart textiles.

	The context : Today, in the context of textile industry 4.0, because of the technological developments advances in the fields of processes (RF plasma, microwave, and 3D printing) and the increased environmental challenges, for key domains (electronics, medicine/wellbeing, space, and electrical engineering), it is necessary to redefine the textile industry and reorient toward new development directions such as production systems, advanced textile materials, and products development. In this sense, it is necessary to use advanced processes, techniques, and methods for defining new textile innovative products such as smart textiles to be used in electronic systems and electromagnetic shielding. **Open challenge description:** The open challenge is to develop 3D smart hybrid composites and systems by research, testing, and optimization of the physical-mechanical, electrical, physical-chemical performances for 3D composite materials designed for the niche fields (electronics, material physics, electrotechnical and medicine).
Target groups	The main target groups of stakeholders are from different areas, such as: ➔business: SMEs, textile clusters ➔academia/research: Representatives of professional associations and certification bodies, teachers and students from academia, researchers in the fields related to the textile industry ➔policymakers: Representatives of national and governmental authorities
Impact	**The positive socio-economical impact of the open challenge** will be in generating innovation, redefining the textile business strategy, and increasing the European market share in smart materials. Also, it will generate increasing the European economy competitiveness, growing new companies, jobs, and increasing the employment rate. **The negative impact of the open challenge** to the stakeholders, especially to the SMEs, can occur because the proposed challenge involves new advanced types of equipment, processes, and approaching new markets. Because of the development of new products, innovation and exploitation involve new business plans, new funding resources for purchasing the equipment, and new market strategies, and this can generate perhaps a negative impact at the beginning.
Innovation	The open challenge will contribute to innovation by generating new advanced materials based on textiles appropriate to be used in the monitoring systems or electromagnetic shielding screens. In addition, in the field of products and materials with electromagnetic properties, textiles can be integrated due to the flexibility and ability to integrate other materials (metallic particles, polymers doped with nanoparticles). By the versatile combination of materials with hydrophobic, oleophobic, hydrophilic, conductive, semiconductive, and insulating properties can be obtained components for sensors, actuators, and electromagnetic shielding necessary for the development of monitoring systems and flexible electromagnetic shielding screens.
Constraints	In applying the open challenge, several predictable risks are on the industrial area (insufficient funds, delays in funding of the activities), social (human resources - personnel fluctuations), and technological risks. Interdisciplinary research in the field of advanced textiles (physics, chemistry, engineering, materials science, computer science, mathematics, etc.) is a necessary field that illustrates the shift from economic activities based on the intensive exploitation of resources to activities based on knowledge, predictivity and time/resources economy.
Success Factors	The conditions (institutional, economic, social, technological, environmental, etc.) that need to be in place in SMEs in order to be a successfully

	technological transfer and to generate innovation are: -patents (national, EPO, International); -sufficient funding; -human resource high qualified (researchers); -the adequate technical infrastructure (types of equipment for advanced material manufacturing, types of equipment for textile functionalization, 3d printers, and testing types of equipment for testing (physic-mechanical, chemical, and electrical). -logistical infrastructure (performant ICT systems).
Lessons learned	The key messages and lessons learned to take away from the OC are that it will be possible to generate the innovation and progress by multidisciplinary approaches in the textile industry, VET, HEI, and other education providers.
Sustainability	The total cost of the elements (industrial equipment, logistics, personnel costs) that need to be put into place for the open challenge to be institutionally, socially, technologically, economically, environmentally, etc. sustainable could be around 2 - 3 million of euros. The institutional, social, economic, and/or environmental benefits compared to total costs are: -increasing the quality of the research within INCDTP and of the external visibility of the research results; - development of international collaborations within the theme of the project; - raising the level of qualification and specialization of masters, doctoral students, and young researchers; - project proposals within the EU programs and other internationally funded programs; - improving the scientific dissemination of the results through publications in international journals; - increasing the market share of 3D composite textile products with electroconductive properties, EM shielding systems, wearable sensor, and actuator systems; - increasing the performance of the products manufactured in SMEs by system production optimization, upgrading products by new functionalities, design for a sustainable society.

9. Implementing Virtual Internship (VI) in Higher Education curricula at TUIASI, Faculty of Industrial Design and Business Management (IDBM)

☐*Product* ☐ *Processes* ☐*Sustainability* ☐*Marketing* ☐ *Business* ☒ *Other: Education*	Higher education
Year/Duration	The estimated duration for the implementation of VI in TUIASI, faculty of IDBM is minimum two years.
Type	The nature of the proposed open challenge is educational. The projects developed in the Virtual Internships in collaboration with T&C companies will target technological and non-technological issues that companies will consider important.
Web Address	NA
Responsible Organization	TUIASI, Faculty of Industrial Design and Business Management (IDBM)
Contact Details	Contact person: Assoc. prof. dr. Luminița Ciobanu,luminita.ciobanu@tuiasi.ro
Countries participating	Romania
Other Organizations involved	Romanian T&C companies and clusters
Summary Open Challenge	**Aims**: - Improve the internship experience for students and develop their transversal skills; - better communication between companies, students and academic staff - raising awareness regarding the need for qualified workforce for the T&C industry. **Context**: At the moment all internships take place in the companies for short fixed period of time. Such internships are constrained by imposed calendar, duration and costs for travel and living.
Target groups	Students from HEIs and companies in the T&C sector
Impact	The implementation of Virtual Internships will: - enlarge the period in which the students work with the companies; - reduce the internship costs; - increase the number of companies willing to accept student for internships.
Innovation	The innovation refers to a new way of approaching how the internships are designed and managed by the university.
Constraints	1. Efficient Integration of Virtual internship in the syllabus for practical activities for 3-rd and 4-th year curricula; 2. Finding relevant and project subjects relevant and adequate for companies, students and teaching staff. These constrains will be addressed by the existing network between the faculty and the T&C industry environment.
Success Factors	Willingness of HEIs and companies to implement the Virtual Internship.
Lessons learned	Stronger links with the industry; Changing from a regional to national approach for students internships, enlarging the area for the companies involved.
Sustainability	The inclusion of Virtual Internship in the syllabus for practical activities is, by itself, the guarantee for its sustainability. The implementation of Virtual Internship not only does not adds to the internship costs but diminishes them significantly. The Virtual Internship can contribute to increasing employment rate.

SUSTAINABILITY

10. Substitution of hazardous chemicals in textile finishing

☐ *Product* ☐ *Processes* ☒ *Sustainability* ☐ *Marketing* ☐ *Business*	Sustainability
Year/Duration	Since 2015 and partly ongoing
Type	New environmental practice
Web Address	www.midwor.life.eu www.life-flarex.eu
Responsible Organisation	AEI Tèxtils
Contact Details	info@textils.cat
Countries participating	Spain, Italy, Czech Republic, Belgium
Other Organisations involved	LEITAT, Centexbel, CETIM, ATEVAL, CLUTEX, POINTEX, CSIC-IQAC
Summary of Good Practice	The main aim of this GP is to contribute to the mitigation of the environmental and health impacts on European ecosystems caused by toxic compounds used in the textile finishing sector that are under the scope of the potential restrictions by REACH. Many well-known high performance textile finishing active principles have proved over time to be either toxic or hazardous for the environment. These problems are being address by European institutions through the REACH legislation by limiting their use and even with bans of the substance use.
Target groups	European textile clusters and their SME members, with particular focus on finishing companies but also for the sector at large for better understanding of the problems behind.
Impact	Positive impact to finishers by comprehensively assessing and testing different alternative products at both lab scale and industrial scale, reducing their costs to substitution and implementation of safer alternatives. For the sector at large, this means better access to knowledge, more information available and also to identify a point that many people is unaware,
Innovation	This good practice was launch by a group of clusters along with technological centers in order to de-risk the substitution initiative to their members, enabling the testing and assessment of significant amount of alternatives and producing a benchmark of the different products for water and oil repellence and flame-retardants.
Constraints	The main constrains in substitution of hazardous chemicals relies on two major aspects: - **Higher price** of safer alternatives, caused by currently low production volumes as new products. This price gap can be closed with the scaling up of the substitution to bring production costs down by factor of scale. - **Performance** between different products. In some cases the performance is critical and no substitutes are available, whereas in some other applications current products used are over-engineered with performance not required that could be safely switch to lower performance without notice by the final user but with a much friendlier impact to environment.

Success Factors	End-users needs to increase their awareness on the different products they use which might contain hazardous products or have a large impact to the environment. This needs to be link with policy to provide better information to consumers and more easily understandable labels to ensure safer and low environmental impact of the different products. Producers of additives for textile finishing needs to educate the different value chain stakeholders to raise awareness on the more sustainable alternative products and scale them up in production to lower the prices.
Lessons learned	There are many sustainable alternatives to current products used for the textile finishing that many companies are unaware of and some products currently used are an overkill for the actual envisioned use and could be easily substituted cost effectively.
Sustainability	Many times substitution is not a matter of economics but rather on awareness. In the MIDWOR-LIFE project, it was demonstrated that substitution of PFOA and other perfluorinated products to paraffin, silicon and event dendrimers was similar or even cheaper for applications only targeting water repellence as a property with same performance. Environmentally, the impact of substituting PFOA and other perfluorinated products mitigates the environmental impact by a factor 10 as demonstrated in the MIDWOR-LIFE project Life Cycle Assessment.

11. Fibersort – Closing the loop in the textiles industry

☐ *Product* ☐ *Processes* ☒ *Sustainability* ☐ *Marketing* ☐ *Business*	Circular Economy
Year/Duration	Duration: 4 years, Start date: 2016, Duration 48 months, Finish 2020
Type	FIBERSORT is an INTERREG North-West Europe project
Web Address	https://www.nweurope.eu/projects/project-search/bringing-the-fibersort-technology-to-the-market/undefined#tab-1
Responsible Organisation	Lead partner organization: Circle Economy - NL,
Contact Details	In the web site of the project, and also Cirvle Economy
Countries participating	other partners: Procotex Corporation S.A. – BE, Smart Fibersorting B.V. – NL, Stichting Leger des Heils Reshare – NL, Valvan Baling Systems – BE, Worn Again Technologies Ltd. - UK
Other Organisations involved	
Summary of Good Practice	The Fibersort Project seeks to address two main challenges: the environmental need to reduce the impact of virgin textile materials, as well as the development of new business models and open markets for the growing amounts of recyclable textiles in North-West Europe (NWE). To enable this shift, the project expects to realise the implementation of Fibersort technology as the new industry standard and key value adding step to enable high value textile-to-textile recycling in the region. The Fibersort is a technology that automatically sorts large volumes of mixed post-consumer textiles by material composition. This allows them to be recycled into new, high quality textiles. Once sorted, these materials become reliable, consistent inputs for high-value textile-to-textile recyclers. High value recycling technologies can transition low value waste into new, high value textiles and they are a critical link in the circular supply chain. Therefore, the Fibersort is a key technology that will enable textile resources to cycle repeatedly through the supply chain.
Target groups	Textile collectors, sorters, and recyclers Brands, retailers, and manufacturers
Impact	A new way of processing textile waste. Reduce textile waste and bring them into the circular economy concept.
Innovation	Demonstration of a Circular Economy Model, based on Textile Waste and use it for a textile – to – textile mose.
Constraints	Efficiently connecting with collectors, sorters and recyclers.
Success Factors	It is based on the Fibersort Project, which started as Textiles 4 Textiles in 2010 continues until now, and it still seeks business case validation. The Fibersort process needs to be optimised with consideration for key parameters, such as fibre composition of inputs, production capacity, transport, waste and inputs costs, revenue streams, virgin resource prices, and market demand.
Lessons learned	Government and brand/retailer play a crucial role in supporting the transition towards circularity; governments can act as policy levers, encourage investment and sourcing of recycled, while brand/retailer has the power to influence the purchase of recycled fibers.
Sustainability	Today, valuable pure fabric is down cycled during the textile recycling process. The FIBERSORT allows to automatically sort this pure fabric, based on fiber type into different categories. It uses scanning technology - NIR Spectroscopy. This is a spectroscopic technique based on molecular absorptions measured in the Near Infrared part of the spectrum. This

technique is sensitive to organic constituents and since all textile is organic, there is no limit to the types of fiber that can be recognized. Since this process requires a feed of one piece at a time, the supply of the textiles to the system must also be piece by piece. This can be done manually by an operator that takes the items from a pile and puts them piece by piece on a conveyor belt. A color scanner on the same system, can separate specific colors or light colors from dark colors.

12. Circular economy and eco-design

☐ *Product* ☐ *Processes* ☒ *Sustainability* ☐ *Marketing* ☐ *Business*	Sustainability
Year/Duration	Ongoing
Type	Circular economy and new business models
Web Address	https://www.ellenmacarthurfoundation.org/ https://textils.cat/ecodistex/ https://www.trash2cashproject.eu/
Responsible Organisation	Textile industry at large
Contact Details	n/a
Countries participating	All countries
Other Organisations involved	Industry, European Commission, associations, SMEs, consumers organizations
Summary of Open Challenge	The main aim of this open challenge is to convert the textile industry from a linear cradle-to-grave industry to circular model starting from the design with eco-design to enable circularity of the textile products. Currently, many products are not recyclable due to design constrains and due to the lack of accounting the end-of life aspect during design.
Target groups	Society at large, SMEs, textile companies, designers
Impact	Circularity of the textile industry will impact all society and industry, generating new business models, opportunities and products.
Innovation	Current efforts in circular economy and eco-design brings in innovation at its core, since new approaches are needed to enable this open challenge success.
Constraints	There are many challenges, from sourcing of end-of-life products, mixtures that complicates the recyclability, the global aspects of the textile value chain, and societal lack of awareness. Fast fashion is currently a major constrain as it produces more and more waste product that is not recovered.
Success Factors	All stakeholders needs to go together and address the challenge from a global value chain perspective as it involves not only recovery and recycling at the end of the value chain but also designers at the beginning in order to design products that are better fit for end of life and re-use or upcycle.
Lessons learned	Cooperation is growing in the field of eco-design and circular economy and partnerships across value chain and within other value chains are needed to tackle the different aspects involved.
Sustainability	Textile industry and fashion is considered the second more pollutant industry globally and increasingly impacting the environment due to the raise of fast fashion models. The circularity and eco-design can have a massive positive impact mitigating major waste waster production and release.

13. RESYNTEX - A New Circular Economy Concept for Textiles and Chemicals

☐ *Product* ☐ *Processes* ☒ *Sustainability* ☐ *Marketing* ☐ *Business*	Circular Economy
Year/Duration	Duration: 4 years, Start date: 1 June 2015, Duration 48 months, Finish date: May 2019
Type	RESYNTEX was funded by the EU Horizon 2020 Research and Innovation Programme.
Web Address	http://www.resyntex.eu/
Responsible Organisation	RESYNTEX is a consortium of 20 partners from across 9 different EU member states. Partners include industrial associations, businesses, SMEs and research institutes. Project Leader: SOEX TEXTILVERMARKTUNGS GESELLSCHAFT MBH (http://www.soex.com/), Scientific Coordinator IOS, INSTITUT ZA OKOLJEVARSTVO IN SENZORJE, DOO (http://www.ios.si/), Partners from Germany, Slovenia, France, Austria, Belgium, Italy, Switzerland, Greece, UK.
Contact Details	In the web site of the project, and also Sustainability Consult media@resyntex.eu
Countries participating	10 different EU member states. DE,FR. EN, GR, SL,ES, LU,
Other Organisations involved	
Summary of Open Challenge	RESYNTEX is a research project which aims to create a new circular economy concept for the textile and chemical industries. Using industrial symbiosis, it aims to produce secondary raw materials from unwearable textile waste. It is a new approach to Design a complete value chain from textile waste collection through to the generation of new feedstock for chemicals and textiles. In particular they looked at replacing Ammonia with value-added chemicals based on polyamide oligomers of textile origin, Phenol-formaldehyde with protein-based components in adhesives, Petrochemicals for packaging with recycled terephthalic acid recovered from polyester, Fossil-based transportation fuels with bio-based ethanol. RESYNTEX failed to validate the viability of the proposed concepts using LCA and LCC analysis. The calculated environmental impacts and costs of the RESYNTEX were compared with the conventional value chain (incineration) applying combined LCA and LCC Analysis. Attractiveness of the originally proposed products were ranked using the combined analysis, and none was really viable. The proposed processes need to identify the main contributors to the impact and costs of each route, and these can be used to improve the performance of the system and its optimization.
Target groups	Textile and clothing companies and Companies within the Chemical sectors
Impact	A new source of feedstock for the chemical sector. Reduction of incineration of textile waste. Validation of the LCA/LCC analysis.
Innovation	Demonstration of a Circular Economy Model, based on Textile Waste
Constraints	Chemical industry has an established and optimized operation model, based on conventional feedstock sources. New feedstock production methods must be well studied and optimized in order to be viable.
Success Factors	Improve the environmental and cost performance of proposed circular economy routes for textile waste by performing several LCA and LCC iterations.
Lessons learned	Apply a product-based approach in order to compare from the LCA/LCC point

	of view alternative routes for the end-product. The combined LCA and LCC results allows the identification of the most promising routes, as it was with the case of the RESYNTEX programme. i.e. the transformation of protein-based textile material and PA textile material into respectively resin for wood panel and high-value chemicals, and in a lesser extent the depolymerisation of PE textile material to produce secondary PET. For cellulosic material, the hydrolysis into glucose juice to produce then bioethanol is not interesting from an environmental and cost point of view. The results allowed also to identify the main contributors to the impacts and costs of each route, which served as a basis for improving the environmental and cost performances of the RESYNTEX system and could serve also for optimisation beyond RESYNTEX.
Sustainability	LCA Analysis of the new methods. *This was a European Union funded project; its cost was high and no other company from the forefront of textile waste treatment could afford the development of the processes that were developed. In addition, its chemical intense knowledge requires specializations within the sector which are not available and most companies cannot afford.*

MARKETING

14. Extroskills: Developing new skills for the extroversion specializations of fashion industry in Europe

☐ *Product* ☐ *Processes* ☐ *Sustainability* ☒ *Marketing* ☐ *Business*	Skills development for exports in fashion industry
Year/Duration	1 October 2015 till 31 March 2018
Type	Training in exports management in the fashion sector, by using an innovative training protocol. Mainly non technological.
Web Address	www.extroskills.eu
Responsible Organisation	A consortium of partners: The Hellenic Fashion Industry Association The Huddersfield and District Textile Training Company TEXFOR GNOSI ANAPTIXIAKI NGO "Gheorghe Asachi" Technical University EURATEX
Contact Details	Theofilos Aslanidis, info@extroskills.eu
Countries participating	Greece, Romania ,UK, Spain and Belgium.
Other Organisations involved	*The Hellenic Fashion Industry Association* *The Huddersfield and District Textile Training Company* *TEXFOR* *GNOSI ANAPTIXIAKI NGO* *"Gheorghe Asachi" Technical University* *EURATEX* This project was co0funded by *Erasmus+ Program of the European Union*.
Summary of Good Practice	Fashion industries need a flexible workforce that responds to the development of the globalized market and the trend and need for internationalization. The workforce needs to be well qualified and ready to face the increased competition and rapid technological changes. To be able to compete in the global market, fashion industries have to be smarter and able to adapt to changes. To achieve this, fashion industries need new education and training systems and tools for their existing and potential workforce in order to respond to the demands of the labour market and the global competition. In a framework of global competition, innovation and development are crucial elements to provide fresh impetus to a sustainable and competitive industry. In this context, the EXTRO SKILLS project has designed and developed an innovative and comprehensive training protocol for export personnel of fashion industries, using ICT-based learning approaches and methodologies that offer essential transversal skills for enabling them be ready to respond to international trade and market demands and enhancing the extroversion and the competitiveness of the industry as a whole. Bringing together the different sectors of fashion industries, the training protocol follow a comprehensive learner-centred approach and is coupled with an integrated certification framework, based on acquired knowledge, skills and competences, in line with the European Qualification Framework (EQF).
Target groups	SME's and individual Professional in Textiles and Clothing sector

Impact	Direct impact is the development of skills I designing export strategies, which leads to promotion of employment opportunities. These will enable the trainees to be ready to respond to international trade and market demands, enhancing the extroversion and the competitiveness of the industry as a whole.
Innovation	By the use of a proprietary ICT based training protocol that has been developed in the framework of the project and is specific to the fashion industry sector.
Constraints	Access and expertise of fashion industry professionals with e-learning methods and platforms. This was addressed with a co
Success Factors	Engagement of fashion industry in life long learning Multidisciplimany development team and approach Modern efficient and attractive curriculum Flexible delivery method and modular design Interesting and useful training material and methods
Lessons learned	1. The majority of the companies in EU level, need help to the following fields: • Creating overseas sales team (53%) • Finding trading partners (33%) • Intellectual property protection (30%). 2. Companies from Belgium, Portugal, Hungary, Bulgaria, France, Italy, Lithuania and Croatia are at 70% confident at e-learning which is the highest percentage. In general, the answer "Confident" is the most popular among the majority of the companies in every country except the UK where the majority of the companies answered that they are Not Confident at e-learning. Also, we have to mention the very high percentage of the answer "Very Confident" in Romania and the fact that none of the companies participated in the survey, answered that they are not confident at e-learning. 3. Exports are important for companies of the T&C sector, for the following reasons: • in order to Attract more consumers • New business model (14 companies) • Lessen competition & seasonal market • Development of New Business Model • Improve Cash Flow
Sustainability	Total cost of the project was 238 379 EUR, funded from ERASMUS +. The main parameters that will assure the sustainability of the project, are: • the updating of the learning content with examples and case studies. • Possibility to apply on the job training and hands on experience. • The enrichment of the learning experience with content in multimedia and other active methods and tools. • Further exploitation of the outcomes, in collaboration with other training initiatives and actions. In order to overcome the cost issues that these parameters need in order to be arranged, the project partners should examine the possibility to deliver the training program through a MOOC platform and/or other training programs.

15. Vintage for a cause *(a sustainable fashion brand)*

☐*Product* ☐*Processes* ☐*Sustainability* ☒*Marketing* ☐*Business*	It is a Portuguese brand that combines environmental concern with social responsibility. It is business case of Good Practice (GP), which makes clothing and fashion accessories, based on principles of environmental sustainability, but with the purpose of promoting social sustainability.
Year/Duration	Created in 2012, as a "Sewing Clubs" of occupational therapy for women who are no longer in an active professional life, today is a business model of sustainable fashion with social responsibility.
Type	It design and manufacture the majority of theirs limited-edition collections are made by responsible manufacturing partners in Portugal or abroad using sustainable methods and materials. It source *dead-stock* and sustainable fabrics incorporating better practices throughout or supply chain to make beautiful vintage inspired styles at a fraction of the environmental impact of conventional fashion. It is their mission to lead and inspire a sustainable way to do fashion.
Web Address	https://vintageforacause.pt/
Responsible Organisation	Helena Silva the responsible for implementation of the VINTAGE FOR A CAUSE
Contact Details	info@vintageforacause.pt
Countries participating	Portugal and SKFK Ethical Fashion brand (an international brand).
Other Organisations involved	The brand has the support of the Calouste Gulbenkian Foundation, with the Porto City Council, with several companies that donate textile waste, and with the collaboration of different organizations and partners to replicate social inclusion programs.
Summary of Good Practice	It started as a project in the area of social sustainability that promotes the interaction and conviviality of women over 50, in the redesign of *vintage* garments. At the beginning it was a "Sewing Clubs", with a pilot course with 10 women who might not know how to sew. It took place in the city of Porto, in a convivial space that works as an occupational therapy for women who are no longer in an active professional life, but need a motivation to leave home. Today it became a clothing production space with principles of environmental sustainability (working in *up cycling*), it counts with the collaboration of prestigious Portuguese designers, which contribute voluntarily with they knowledge and talent so that the transformations of the old clothes are made in team with de senior women. Everything is done with existing materials and often two pieces result in a completely different one. The end result is unique *vintage* pieces, which are sold at markets and stores. Each product gets a hand-embroidered tag that is accompanied by a short text that tells the story of the piece, where it came from, who transformed it and an invitation to the future owner to share the continuity of its route on the Internet. The challenge today is the replication of this business model is scheduled for other cities in the country. Also the challenge is search for new textile partners (with textiles *dead-stocks*), in order to obtain material donations to be able to work new garments always in the process of *up cycling*.
Target groups	The target group of the brand is consumers with environmental and social concerns who intend to purchase "limited edition garments" and exclusive pieces, vegan and handmade garments, with urban aesthetics and timeless design. Vintage for a Cause collections want to be timeless, suiting any season, and even gender. The brand also has social concerns promoting the training of women over 50 outside of active life, through the creation of the association "From Granny to Trendy" a sewing clubs, (promoting workshops that culminate in a fashion catwalk), which t creating job opportunities. Also in these initiatives, which promote active aging, the participants discuss techniques for reusing and

	transforming clothes. So far, the brand has integrated more than two hundred women in these circumstances. It also promotes workshops for the general public, as well as tutorials with techniques for reusing and repairing clothes, raising awareness of the importance of adopting behaviors that allow saving and reusing resources.
Impact	Following the principles of circular economy, Vintage for a Cause promotes and encourages the return of clothes at the end of life, for reuse. It thus functions as a collaborative platform for *up cycling*, involving designers, clothing brands and Portuguese industry. With the assumption that each piece can have a new life, the brand creates exclusive designs using textile waste, through sustainable processes and at prices that allow the consumer to be part of the process of transition from fast fashion to sustainability. As a positive impact it has already recovered a ton of textile waste through *up cycling* until now. And in order not to lose the track of its ecological footprint, the brand also registers CO2 and water savings for each piece it produces. So far, the initiative has already saved 3 million litters of water and 7,000 kg of CO2, and it is expected that, with the growth of the brand, these numbers may triple annually.
Innovation	Environmental concerns combined with social responsibility have earned to de brand several innovation awards, including an award from the EDP Foundation (through EDP Solidária, in 2013), and an honorable mention by the Green Project Awards in 2017. The brand has been present on the largest ethical fashion platform and fair.
Constraints	Its great challenges have been the Social Responsibility, because in addition to the issue of sustainability, the project demonstrates social concerns, promoting the training of women over 50 outside of active life, in promoting social entrepreneurship in which to create their own jobs, in promoting active aging. But also in environmental re-education and even in environmental and social activism. Not being a brand with exclusively economic purposes, it was obliged to enable partnerships with other companies to ensure its financial survival.
Success Factors	The brand has been recognized with several awards for its national and international social and environmental role and is increasingly present in the largest ethical and sustainable fashion platform and fair in the world, in Berlin - formerly Ethical Fashion Show and now Neonyt - and, in 2018, started the organization of Fashion Revolution Week in Porto, in partnership with Fashion Revolution Portugal. One of the great success factors of the brand is its activist role in society.
Lessons learned	According to the testimony given by the brand founder, Helena Antónia in an interview to the "Ambiente" Magazine (February 2020): "We feel that the only way to achieve an impact is to involve all parties that make up the value chain of the fashion industry - such as (fashion) schools, fashion professionals, consumers and local decision-makers -, so we designed a collaborative business model and social intervention that we believe distributes responsibility and benefits in the most equitable way possible. Personally, I believe that the only way to sustainability is this: to create models, leadership styles and innovations that bring more humanity to society in general, while preserving the environment in a realistic way and adjusted to today ". (https://www.ambientemagazine.com/vintage-for-a-cause-ja-desviou-uma-tonelada-de-desperdicio-textil-atraves-do-upcycling/
Sustainability	From all of the above, it can be seen that the entire project / brand is of a sustainable nature (environmental and social), with the greatest constraint being the economic sustainability of the brand. Thus, the brand has several government or industrial partnerships for its economic viability however its economical sustainability, is achieved in part by selling the brand's garments, which can be purchased through the official website and in partner stores. Part of the proceeds from the sale of the pieces is used to invest in social inclusion, education and awareness programs for sustainability and conscious consumption.

16. FOSTEX: Fostering innovation in the Jordan and Moroccan textile industry

☐ *Product* ☐ *Processes* ☐ *Sustainability* ☒ *Marketing* ☐ *Business*	The project relates to the whole of the textile and clothing business. It aims to bridge the gap of university-enterprise collaboration in the area of specialized services for the textile sector
Year/Duration	2019-2022
Type	Mainly non technological. The idea is a local ecosystem of innovation in textile sector.
Web Address	www.fostexproject.eu
Responsible Organisation	Universitat Politecnica de Catalunya
Contact Details	Universitat Politecnica de Catalunya Monica Ardanuy, <monica.ardanuy@upc.edu>
Countries participating	(ES) UPC - Universitat Politecnica de Catalunya (ES) AEI TÈXTILS - The Catalan technical textiles' cluster (GR) CRE.THI.DEV - Creative Thinking Development (GR) UNIWA - University of West Attica (IT) CIAPE - Centro italiano per l'Apprendimento Permanente (IT) Material ConneXion Italia (RO) INTDCP - The National Research & Development Institute for Textiles and Leather (HKJ) JUST - Jordan University of Science and Technology (HKJ) BAU - Al-Balqa Applied University (MA) ESITH - Center for Advanced Textiles (HKJ) ACI - Amman Chamber of Industry (MA) UH2C - University Hassan II (MA) AMITH - Association marocaine des industries du textile et de l'habillement
Other Organisations involved	This is a project co-financed by European Union, Erasmus + program.
Summary of Open Challenge	The main objective of this initiative is to foster the university-industry collaboration, to support the development of innovation in the textile sector in Morocco and Jordan, and to generate an ecosystem of advanced textile materials. The upgrading of existing centers in Morocco and the creation of new innovation centers in Jordan will become a valuable ally for the local textile sector and its further development. FOSTEX project complies with the national Jordan industrial policy for the years 2017 – 2021 that aims to develop competitiveness in the area of production cost, quality, certification, export and innovation, encouraging applied research and technology transfer from universities to industry. Similarly, the Moroccan Government established an industrial acceleration plan for the years 2014 – 2020, in which a dedicated strategic line aims to create different industrial ecosystems to promote an integrated development of the sectors. For the textile sector 6 ecosystems are identified, indicating Technical Textiles as one of them. The initiative aims to set up two advanced textile innovation centres in Jordan and upgrading two textile innovation centres in Morocco, in addition: • to promote the centres making them the focal points in the textile industry of each country; • to promote entrepreneurial activities in the four centres to make them regional catalysts of innovation; • to showcase FOSTEX results and encourage Moroccan and Jordanian governments to replicate the initiatives in other universities.

Target groups	The textile and clothing business in Morocco and Jordan
Impact	The advanced textiles' centers created in Morocco and Jordan will play the role of focal points for the textile and clothing sector and relevant stakeholders to bloom innovations and promoting entrepreneurship. The services offered in the centers will enable textile companies of the two countries to be further developed and become more competitive and export oriented by: •improving the quality and design of their products, •improving the quality and cost effectiveness of manufacturing techniques, •developing new products, •learning about requirements for exporting their products, •finding funding opportunities, •cooperating with other companies and •participating in projects. In addition, the centers will allow the participating HEIs in Jordan and Morocco to: •promote entrepreneurship among their students, •strengthen and foster their relationship with companies, •promote collaboration, •find funding opportunities and •participate in projects. Besides the textile sector, the HEIs where the textile centers will be established will have the opportunity to expand the fields of their applied research to topics regarding advanced textiles and innovation. Through the dissemination activities and tools (roundtables, database of contacts, project website and online collaterals, brochures, newsletters and recommendations) that will be developed and implemented in the two countries during the project's lifespan, the following target groups will be reached and informed about the project and its outcomes as well as its potential results: Relevant stakeholders such as companies, BIOs, policy-makers, training centers, investment promotion agencies, corporate executives and investors, International Finance Institutions providing funds for development, researchers and academics and representatives of civil society. Entrepreneurship in the textile sector could generate dignified opportunities for refugees in Jordan.
Innovation	Textile sector in Morocco and Jordan is mostly made up of small and medium sized companies accounting. The enterprises of the sector are characterized by limited technical and financial capabilities regarding innovation and research and development activities. On the other hand, they hold huge latent innovation capacity due to the large amount of employment textile industry has. Jordan, additionally, has a lot of potential manpower coming from the integration of refugees and new EU-Jordan collaborations. FOSTEX project seeks to provide the textile sector of these countries a push toward more added value products or advanced textiles. This will be done with the setting up of 2 advanced textiles centers in Jordan, upgrading 2 centers in Morocco and promoting entrepreneurship on all centers with the goal to become catalysts centers. The laboratories will be equipped with quality control equipment in order to offer testing of advanced textiles and production to improve the quality of the products and become more competitive. In additional, those centers will also be focused for entrepreneurs to facilitate testing on the development of new products. The placement within universities will offer a synergistic effect by closing the gap between academia and industry, promoting entrepreneurship and innovation and facilitating a bridge for university students towards industry. Information about new trends, training in innovative and environmental friendlier manufacturing techniques, innovative ways of organization of

	production, certification of products, ways to lower production costs and increase of productivity, development of quality products, information about investment and funding opportunities are all innovative services that will be offered to the Jordanian and Moroccan textile sector through the establishment of the advanced textiles' centers.
Constraints	• The national textile sectors embrace the venture • The national policymakers support the venture with funds and policies • Students are willing to become entrepreneurs These issues are not expected to cause problems in effective implementation, because: • Partners have strong network of relevant local stakeholders and they also have the will to actively participate in the project. • Funding is ensured for the implementation period-. Furthermore, the project aims, are in line with national policies and priorities in Morocco and Jordan. • Training is implemented through a modern, effective, up to date capacity building program that ensures tangible benefits for the participants. A set of training flexible tools (virtual common work space, website, social media) is employed in this program and the trainers are experts from EU textile sector.
Success Factors	• Number of trainess and companies-SME's participating in the project • Establishment of new companies and partnerships, research and innovation centers • Increase in textile and clothing exports, in the long term • Production of products with better quality and/or more added value in local market, in the long term.
Lessons learned	Not relevant, since the project is on progress
Sustainability	The sustainable business model, adapted to local socioeconomic conditions, for the operation of the 4 advanced textiles, will provide means to reach the target groups after the lifespan of the project. The textile centers with their trained staff will continue to offer the services to companies of the textile sector, entrepreneurs that are developing new solutions using advanced textiles and students aiming to start-up and relevant stakeholders in the two countries. Additionally, new services will be included in the centers for testing of advanced textile products, training, certification, seminars, informative events regarding trends and funding tools for the sector. Researchers will also be given opportunities to work on topics regarding textile and its manufacturing using the already existing new equipment in the textile centers. With the support of the textile centers, the textile companies will be able to participate in various R&D national or international projects. The collaboration website platform that will be set up, will continue its operation even after the end of the project, It will be a collaborative workspace, ground of new projects and joint activities during and after the end of the project. It will have the following tools: will contain chat, space for videos and contents, community, personal profiles of users, etc. This will assure the involvement of participating institutions as well as main stakeholders after the end of the project. Furthermore, all project materials developed during this project (training materials, national reports, etc.) will remain available online after the ending of the project on the project website for stakeholders and key target groups, so that they benefit from it.

BUSINESS

17. TEXTAILOR EXPO

☐ Product ☐ Processes ☐ Sustainability ☐ Marketing ☒Business	Exhibition- marketing and business 2 business
Year/Duration	Once a year
Type	The exhibition is highly appreciated for daring to combine and present in one place textile machines and fashion, mass-produced products and hand-made items, established brands and startups, meet pupils, students and young designers with world-renowned stylists to transfer experience and skills at Creative Lab, to shelter business conversations and professional training.
Web Address	https://www.textailorexpo.com/; https://www.fair.bg/bg
Responsible Organisation	SPEX Ltd; International Plovdiv Fair AD
Contact Details	https://www.textailorexpo.com/contacts
Countries participating	In its second edition TEXTAILOR EXPO attracted 82 exhibitors from 8 countries - Bulgaria, Germany, Greece, Spain, China, Romania, Turkey and the Netherlands. It is open for any organisation from any country.
Other Organisations involved	-
Summary of Good Practice	The specialized international exhibition for fashion, textile equipment and products TEXTAILOR EXPO is of the **"Business-to-Business" (B2B) type.** It unites representatives of the entire supply chain. It is a business forum for manufacturers, subcontractors and traders, which has established itself as **a significant center of fashion industry on the Balkan Peninsula**. TEXTAILOR EXPO demonstrates modern technologies, machines, materials, accessories for the textile and clothing industry, ready-made garments from fabrics and knitwear, fashion lines. TEXTAILOR EXPO shows the two faces of fashion industry - the aesthetic quests and the technological innovations, so the exhibition is useful for professionals and interesting for the general public.
Target groups	It is a business forum for manufacturers, subcontractors and traders, which has established itself as **a significant center of fashion industry on the Balkan Peninsula**.
Impact	TEXTAILOR EXPO demonstrates modern technologies, machines, materials, accessories for the textile and clothing industry, ready-made garments from fabrics and knitwear, fashion lines.
Innovation	TEXTAILOR EXPO shows the two faces of fashion industry - **the aesthetic quests and the technological innovations**, so the exhibition is **useful for professionals and interesting for the general public.**
Constraints	-
Success Factors	-
Lessons learned	-
Sustainability	-

18. SPECIALIZED CLUSTER INSTITUTE FOR APPAREL AND TEXTILE

☐ Product ☐ Processes ☐ Sustainability ☐ Marketing ☒Business	Branch organisation
Year/Duration	active
Type	It is a cluster organisation.
Web Address	http://www.sciat.eu/?cid=3
Responsible Organisation	SPEX Ltd; International Plovdiv Fair AD
Contact Details	http://www.sciat.eu/?cid=21
Countries participating	Bulgaria
Other Organisations involved	-
Summary of Good Practice	The goals of the cluster are the following: • To support and stimulate the development of the international market positions of the textile and clothing sector in world markets • To assist in the process of combining resources among its members in order to increase the sector's export capacities • To assist in the interaction among companies, non-governmental organizations and research centers in order to support the production and technological development of small and medium-sized enterprises from the textile and clothing industries as well as new job creation • To provide guidance on projects for technological renovation and implementation of innovations in order to reduce final product costs • To protect the interests of its members before the legislative, executive and local authorities and unions • To promote the development of a favorable legal and financial environment, to assist in the establishment of a favorable taxation and investment setting which offers an incentive for new job creation • To motivate its members by assisting in the creation of a favorable economic environment for the development of their activities and in the improvement of the competitiveness of the Bulgarian textile and clothing industry on the international market • To support the realization of sales turnover based on ethical and honest market behavior and mutual interest • To improve the system for enhancing education and qualification for its members • To implement programs and projects for improving labor conditions in member companies • To work for the quick and favorable resolution of all issues concerning the interests of the tailoring and textile business in Bulgaria before all public and state authorities and third persons • To realize connections and cooperation with related national and international organizations, associations and commercial companies in order to fulfill mutual objectives; to realize opportunities for exchanging experience in the tailoring and textile field so that all achievements can be studied and effectively used.

Target groups	It is a business structure for manufacturers, subcontractors and traders
Impact	Its focus is to demonstrate modern technologies, machines, materials, accessories for the textile and clothing industry, ready-made garments from fabrics and knitwear, fashion lines.
Innovation	Increasing the importance of eco-products and new technological fabrics, which will lead to greater use of eco-friendly industries. This can be done through a policy to promote eco-products and new technological fabrics produced in Bulgaria.
Constraints	-
Success Factors	-
Lessons learned	-
Sustainability	-

19. Po.in.tex.

☐ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☒ *Business*	Business
Year/Duration	From July 2009 until today
Type	Textile Innovation Cluster, an association of companies, consortiums and research centers, established in Biella by the Piemonte Region and managed by Città Studi. This Cluster is especially focused on one of the most important sectors of the Italian economy, the textile industry.
Web Address	https://www.pointex.eu/about-us
Responsible Organisation	Città Studi Biella
Contact Details	polo.tessile@cittastudi.org
Countries participating	Italy
Other Organisations involved	80 members, divided into 76 companies, 2 research centers and 2 reference associations; representing almost all the provinces in Piemonte with a majority of members from Biella (52 members) and Torino (12). It's now increasing the number of textile enterprises established in other Regions that become member of Po.in.Tex (Lombardy, Tuscany, Abruzzo).
Summary of Good Practice	Since its foundation, the goal is to promote the values of cooperative innovation and competitiveness, while encouraging a constant exchange between the innovation supply and demand. There is a particular calling in a territorial sphere that strongly connects this Cluster, its mission and its activities, to the textile industry that still marks the district of Biella and the entire Piemonte Region. The Textile Innovation Cluster includes and serves various members belonging to each part of the textile production and manufacturing sector: • Apparel • Textile machinery • Technical textile • Leather industry • Shoe industry • Automotive • Furnishing • Medical • Chemical industries • Related research centers
Target groups	The majority of our Cluster's members are small and medium-sized enterprises. However, there is a significant share of the major textile brands.
Impact	Getting to know companies and analyzing their strategic needs, business models, strengths and gaps. It promotes collaboration between companies and between research centers including technology transfer. It also highlights new initiatives and needs of the textile companies, presenting them to policy makers.
Innovation	The Cluster is active in promoting best practices at an international level, as well as end-user research and in establishing partnerships. The Cluster encourages and supports access to Regional and European Calls for product and process innovation projects and also supports innovation through educational programs, always in line with the technological development and the company's needs.

Constraints	The Cluster has to engage with local stakeholders and sometimes it can be difficult.
Success Factors	Since it has been founded, the Cluster has taken part in 13 success projects (at International, European and National level), taking advantage of a wide range of funds programmes.
Lessons learned	Starting from local realities, it can be possible to reach other areas.
Sustainability	-

20. TCBL Textile & Clothing Business Labs

☐ *Product* ☐ *Processes* ☐ *Sustainability* ☐ *Marketing* ☒ *Business*	Business
Year/Duration	From July 2015 to June 2019
Type	TCBL Textile & Clothing Business Labs is a European Union's Horizon 2020 Programme for research, technology development, and innovation under grant Agreement n.646133. Its aim is to built a multi-faceted business ecosystem of sector enterprises, innovation labs, service providers and advisors who are working together to transform the Textiles and Clothing industry. The common objective is to build alternative, sustainable paths to over-production and diminishing value. TCBL was a project funded by the European Union's Horizon 2020 programme.
Web Address	https://tcbl.eu/
Responsible Organisation	City of Prato (Lead Partner)
Contact Details	tcbl@comune.prato.it
Countries participating	Italy, Germany, United Kingdom, Belgium, Greece, France, Spain, Netherlands, Romania, Portugal, Slovenia
Other Organisations involved	German Institutes for Textile and Fiber Research - Center for Management Research (DITF), Istituto Superiore Mario Boella, Skillaware, The Open University, IMEC, Tavistock Institute, Materials Industrial Research & Technology Center S.A., MIRTEC, Waag Society, Huddersfield & District Textile Training Company Ltd, The eInstitute (eZavod), Consorzio Arca, Unioncamere del Veneto (UCV), Hellenic Clothing Industry Association, Sanjotec - Centro Empresarial e Tecnológico, Clear Communication Associates Ltd, Oxford Brookes University, Association Reginnova NE, Centre Scientifique & Technique de l'Industrie Textile Belge, Institut Français de la Mode (IFM), Institut d'Arquitectura Avancada de Catalunya – Fundacio Privada (FabTextiles), Cleviria, Sqetch BV.
Summary of Open Challenge	The goal of the TCBL Project has been to create a transformational business ecosystem capable of constantly innovating the business and process models of the European Textile and Clothing industry. As customers are showing increasing attention to ethical and environmental sustainability in the clothes they wear, significant opportunities for meeting this challenge are emerging based on new production and distribution technologies, innovative organizational models, and new creative energies. If these opportunities are adequately captured through business model innovation, these trends have the promise of radically re-structuring one of the globe's most consumption-oriented and environmentally unfriendly industries.
Target groups	It brings together 22 organisations from 11 EU Member States and it is addressed to enterprises, innovation labs, research centres, universities, FabLabs, sector associations, training centres, software houses, and social and socio-technical research centres, service providers and advisors of Textile and Clothing industry.
Impact	The wealth of value created in the four years of the TCBL Project is being capitalised through the TCBL Foundation, the structure currently being established by key project partners entrusted with carrying forward the network's activities. The TCBL Foundation's Business Plan and a growing number of strategic partnerships bode well the long-term sustainability. TCBL is thus expected to have a widespread impact on the T&C industry in

	Europe, shifting consumer goals, expectations, and even engagement in the processes of designing and making clothes. This in turn will have both social and environmental impacts, as well as significantly improving the prosperity of Europe's diffused systems of production.
Innovation	This in turn aims to bring 5% of production capacity back to Europe and reduce the sector's environmental footprint by 20% by 2025. The needs and ideas of ecosystem participants took concrete form through the activation of innovation projects involving cooperation between and among Labs and Associates. Some were initiated by the research agendas of one or more Labs, some by Associates wishing to collaborate across supply chains to test a market idea, while some were driven by TCBL partners inspired by possible innovation scenarios.
Constraints	One of the main challenges of the TCBL Project has been to engage with external organizations in the role of Lab or Associate, building a value-based community of players wishing to make a difference. Each joined TCBL on the basis of a set of shared principles, and has expressed needs and aspirations for new directions and concretely participated in innovation actions, all with no direct financial support from the project.
Success Factors	This process is supported by federated knowledge, learning and business services that are aggregated through the TCBL Open Platform.
Lessons learned	This process is being driven by a network of over 50 TCBL Labs that freely experiment the implications of potential innovations and their concrete impacts on business operations. A broad range of structures, from materials research laboratories to design collaboratives and social community centres, explore innovation potentials from varying mixes of three perspectives – design, making and place – and engage with other labs, the local community, and T&C businesses – TCBL Associates – through concrete projects. In turn, TCBL Associates capture these innovation potentials and apply them in concrete actions – Innovation Projects – that accompany their shift towards more innovative and competitive business models.
Sustainability	Total budget: over 8 million Euros

EDUCATION TEXTILE STRATEGY

TEXSTRA

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