



**Gheorghe Asachi
Technical University of Iasi**



**Faculty of Industrial Design
and Business Management**

BOOK OF ABSTRACTS

The 9th International Symposium

Technical Textiles - Present and Future



**Iasi, Romania,
20 November 2025**



„Technical Textiles-Present and Future” International Symposium

online

20 November 2025

BOOK OF ABSTRACTS





Organized by:



[Gheorghe Asachi Technical
University of Iasi, Romania](#)



[Faculty of Industrial Design and
Business Management](#)

With the support of



[Centre for Research and Innovation in
Textiles and Fashion Industry-SMART-TEX-IS](#)



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of Textile – Leather](#)



About the TTPF 2025 International Symposium

Organized by the Faculty of Industrial Design and Business Management of the Gheorghe Asachi Technical University from Iași, Romania, on 20 November 2025 in an online format, the International Symposium "Technical Textiles – Present and Future" TTPF2025 is a scientific event that has become a tradition in the field of textiles since 2009.

Reaching the ninth editions now, the TTPF 2025 Symposium has become a scientific forum in the field of technical textiles. It supports interdisciplinary research areas and provides a real opportunity for participants to share the latest findings and discuss perspectives on the sustainability challenges facing our field of interest.

Over the years and from edition to edition, the symposium has brought together leading researchers, textile experts from industry, teachers from academia and professional training to share their achievements and best practices in the field of technical textiles with relevant stakeholders from the national and international scientific field, including undergraduate and postgraduate students as future professionals.

The topics of TTPF 2025 will focus on the latest scientific advances in the field of technical textiles, but also on companies' needs for innovative solutions to environmental and sustainability issues in the field of technical textiles: Technical Textiles for Agrotech, Buildtech and Geotech Applications; Technical Textiles for Clothtech and Hometech Applications; Technical Textiles for Indutech and Mobiltech Applications; Functional and Smart Textiles for Meditech, Protech and Sportech Applications; Technical Textiles for Oekotech and Packtech Applications; Technical Textiles and Sustainability; Textile Education and Training for the Technical Textiles Field; Management and Entrepreneurship.



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BRIEF PROGRAM

20 November, Eastern European Time (EET)

10:00 -10:30	TTPF 2025 OPENING CEREMONY (1st link)		
	Rodica HARPA , Symposium Chair, Gheorghe Asachi Technical University of Iasi, ROMANIA		
	Savin-Dorin IONESI , Dean of the Faculty of Industrial Design and Business Management, Gheorghe Asachi Technical University of Iasi, ROMANIA		
	Luminița CIOBANU , Coordinator of Centre for Research and Innovation in Textiles and Fashion Industry - SMART-Tex-IS, Faculty of Industrial Design and Business Management, Gheorghe Asachi Technical University of Iasi, ROMANIA		
	Special guests		
	Vincent NIERSTRASZ , President of Association of Universities for Textiles - AUTEX, University of Borås, SWEDEN		
	Andrej DEMŠAR , President of Balkan Society of Textile Engineers - BASTE, University of Ljubljana, SLOVENIA		
10:30- 12:00	PLENARY SESSION I - Keynote Lectures (1st link) CHAIR: Mirela BLAGA , Gheorghe Asachi Technical University of Iasi, ROMANIA		
10:30 -11:00	Ayoub NADI , École Supérieure des Industries du Textile et de l'Habillement, Casablanca, MOROCCO THE TEXTILE INDUSTRY IN MOROCCO: CHALLENGES AND PROSPECTS		
11:00-11:30	Juris BLŪMS , Riga Technical University, LATVIA KEY COMPONENTS OF ENERGY-INDEPENDENT WEARABLES: HUMAN BODY ENERGY HARVESTERS AND SELF-POWERED SENSORS		
11:30 -12:00	António DINIS MARQUES , University of Minho, PORTUGAL HOMO SUSTENTABILIS: DISPOSAL OF FASHION PRODUCTS AND CIRCULAR ECONOMY		
12:00 -12:15	COFFEE BREAK		
12:15 -13:30	PARALLEL SESSIONS (1st link, 2nd link, 3rd link)		
	SESSION 1.1. (1st link)	SESSION 2.1. (2nd link)	SESSION 3.1. (3rd link)
	Chair: Alison GAULT Ulster University, NORTHERN IRELAND	Chair: Manuela AVĂDANEI Gheorghe Asachi Technical University of Iasi, ROMANIA	Chair: Mariana COSTEA Gheorghe Asachi Technical University of Iasi, ROMANIA
13:30 -14:00	LUNCH		
14:00 - 15:00	PLENARY SESSION II - Keynote Lectures (1st link) CHAIR: Radek SOUKUP , University of West Bohemia, CZECH REPUBLIC		
14:00 -14:30	Benny MALENGIER , Ghent University, BELGIUM ELECTRO-TEXTILE STRUCTURES USED FOR PERSONAL THERMAL MANAGEMENT SYSTEMS		
14:30-15:00	Anne-Marie GRUNDMEIER , University of Education Freiburg, GERMANY WHY TEXTILE EDUCATION SHOULD EMBRACE SUSTAINABILITY		
15:00-15:15	COFFEE BREAK		
15:15-16:30	PARALLEL SESSIONS (1st link, 2nd link, 3rd link)		
	SESSION 1.2. (1st link)	SESSION 2.2. (2nd link)	SESSION 3.2. (3rd link)
	Chair: Simona VASILE HOGENT University of Applied Sciences and Arts, BELGIUM	Chair: Cristina PIROI Gheorghe Asachi Technical University of Iasi, ROMANIA	Chair: Adrian VILCU Gheorghe Asachi Technical University of Iasi, ROMANIA
16:30-16:45	COFFEE BREAK		
16:45-18:00	PARALLEL SESSIONS (1st link, 2nd link, 3rd link)		
	SESSION 1.3. (1st link)	SESSION 2.3. (2nd link)	SESSION 3.3. (3rd link)
	Chair: Ilda KAZANI Polytechnic University of Tirana, Albania	Chair: Irina CRISTIAN Gheorghe Asachi Technical University of Iasi, ROMANIA	Chair: Andreea APETREI KALVERAM Catholic University of Valencia, SPAIN
18:00	TTPF 2025 CLOSING CEREMONY (1st link)		



GENERAL PROGRAM

20 November, Eastern European Time (EET time zone)

10:00 - 10:30	TTPF 2025 OPENING CEREMONY (1st link)		
	Rodica HARPA , Symposium Chair, Gheorghe Asachi Technical University of Iasi, ROMANIA		
	Savin-Dorin IONESI , Dean of the Faculty of Industrial Design and Business Management, Gheorghe Asachi Technical University of Iasi, ROMANIA		
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	Technical Textiles and Sustainability	Functional and Smart Textiles for Meditech, Protech and Sportech Applications	Technical Textiles for Clothtech and Hometech Applications
12:15-12:30	PROCESS OPTIMIZATION IN WOVEN FABRICS: STEP REDUCTION STRATEGIES <i>Aliye AKARSU ÖZENC, Zeynep ATLAS, Semiha EREN</i>	DRUG-ELUTING PCL-BASED ELECTROSPUN VASCULAR GRAFTS: ADVANCES IN PREVENTING INTIMAL HYPERPLASIA AND THROMBOSIS <i>Suzan OZDEMIR, Janset OZTEMUR-SEZGIN, Hande SEZGIN, Ipek YALCIN-ENIS</i>	ANALYSIS OF THE THERMAL AND PROCESSING BEHAVIOR OF PLA AS A PET SUBSTITUTE IN TEXTILE MANUFACTURING – A STATE-OF-THE-ART REVIEW <i>Madeleine EPPINGER, Yordan KYOSEV, Martin LUCCARELLI</i>
12:30-12:45	FROM WASTE FIBERS TO FUNCTIONALITY: WOOL-DERIVED MELANIN FOR ADVANCED TECHNICAL TEXTILES <i>Romeo PRUNEANU, Melinda PRUNEANU, Ingrid-Ioana BUCIȘCANU, Vasilica POPESCU</i>	ANTITHROMBOTIC DRUG-INTEGRATED ELECTROSPUN PCL VASCULAR GRAFTS FOR SMALL-CALIBER VESSELS: A MINI-REVIEW <i>Janset OZTEMUR-SEZGIN, Suzan OZDEMİR, Hande SEZGIN, Ipek YALCIN-ENIS</i>	THE WORKWEAR AESTHETIC IN MENSWEAR: SHAPING COORDINATED SETS FOR FUNCTION AND STYLE <i>Özgür CEYLAN, Nesliqül KILIÇ, Emel AYDIN, Irmak TAŞ, Karin ZENCEFİL, Tanya CANKAR</i>
12:45-13:00	EMBROIDERED STRUCTURES IN TECHNICAL TEXTILES <i>Andreea Madalina TALPĂ, Carmen LOGHIN, Irina IONESCU</i>	PROPERTIES OF STAINLESS STEEL/COTTON BLENDED ROTOR SPUN YARNS FOR ANTISTATIC APPLICATIONS <i>Mariana ICHIM, Irina ARNĂUTU,</i>	ANALYSIS OF FABRIC SURFACE TEXTURE BASED ON 3D CONTACTLESS MEASUREMENT <i>Małgorzata MATUSIAK</i>



		<i>Doina CAȘCAVAL, Simona BĂCĂIȚĂ, Marius Răzvan ZVONARU</i>	
13:00-13:15	CLOSING THE LOOP: DESIGN-DRIVEN STRATEGIES FOR TACKLING TEXTILE FABRIC WASTE <i>Irina-Elena MARIN, Manuela-Lăcrămioara AVĂDANEI, Elena-Andreea VASILE, Mălina-Ioana ROȘCA</i>	DYNAMIC DIGITAL PROTOTYPING IN GARMENT FUNCTIONALITY: USING CLO3D AVATAR JOINTS FOR INCLUSIVE PATTERN DESIGN <i>Valentina FRUNZE, Elena FLOREA-BURDUJA, Daniela FĂRÎMĂ</i>	TENSILE PROPERTIES OF SILK BLEND KNITTED FABRICS <i>Živa ZUPIN, Sabina GABROVŠEK</i>
13:15-13:30	GREEN CHEMISTRY APPROACHES TO TEXTILE DYEING USING PLANT WASTE EXTRACTS <i>Iuliana PETCU, Nicoleta TOFĂNESCU, Angela DĂNILĂ, Romeo PRUNEANU, Vasilica POPESCU</i>	WAYS OF IMPROVING THE QUALITY OF MILITARY FOOTWEAR <i>Liliiia CHERTENKO, Natalia KUZINA, Andrii LIPSKYI, Kateryna RESHETNIAK</i>	INFLUENCE OF STRUCTURAL PARAMETERS ON THE PROPERTIES OF KNITTED FABRICS FOR SLEEP MASKS <i>Crina-Mădălina SPASENIE, Ana-Ramona CIOBANU, Mirela BLAGA, Mihaela PERDEVARĂ, Rodica HARPA</i>
13:30 -14:00	LUNCH		
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15:15-15:30	AEROGELS AND XEROGELS IN DRUG DELIVERY: ADVANCES, OPPORTUNITIES, AND FUTURE DIRECTIONS <i>Handan PALAK, Aslı GÜRBÜZ YURTSEVER, Özlem İpek KALAOGLU-ALTAN, Meryem Sedef ERDAL, Burçak KARAGÜZEL KAYA OGLU</i>	SUSTAINABLE 3D-PRINTED BIOCOMPOSITES: EFFECT OF COTTON FABRIC REINFORCEMENT ON FLEXURAL PROPERTIES <i>Radu FIRICEL, Constantin-Eugen AILENEI, Irina-Elena MARIN, Savin-Dorin IONESI, Emil-Constantin LOGHIN</i>	THE ART OF CONNECTION: HOW MULTIDISCIPLINARY DESIGN AND BRAND COLLABORATIONS DRIVE ORIGINALITY AND EMOTIONAL ENGAGEMENT IN FASHION <i>Özgür CEYLAN, Irmak TAŞ, Nesliqül KILIC, Emel AYDIN, Sinan KILINÇ, Nail ÇIRAK, Elif Gökçe ÖZKULAK</i>
15:30-15:45	BALLISTIC PERFORMANCE OPTIMIZATION OF PARA-ARAMID COMPOSITES THROUGH STRATEGIC BINDER SYSTEM SELECTION <i>Niki Vlad MANCAȘ, Irina Niculina CRISTIAN, Savin Dorin IONESI, Eugen Constantin AILENEI</i>	LIFE CYCLE AND DURABILITY ASSESSMENT OF COTTON AND RECYCLED COTTON T-SHIRTS: IMPLICATIONS FOR SUSTAINABLE CONSUMPTION <i>Irina-Elena MARIN, Eugen Constantin AILENEI, Radu FIRICEL, Emil Constantin LOGHIN</i>	STRATEGIC MODELS FOR TRANSITIONING TOWARDS SUSTAINABLE ORGANISATIONS IN THE CONTEXT OF INDUSTRY 5.0 <i>Petrina-Delia VAGIUC, Marius PÎSLARU, Ionuț-Viorel HERGHILIGIU</i>



15:45-16:00	DIGITAL MODELLING OF CONDUCTIVE YARN PERFORMANCE IN BRAIDED FABRIC STRUCTURES <i>İlkay Özsev YÜKSEK, Andrei DANIELESCU, Alper GÜRARSLAN, Özgür ATALAY, Yordan KYOSEV</i>	STUDY ON NATURAL ANTIMICROBIAL SOLUTIONS FOR THE PRESERVATION OF SILK TEXTILE ARTIFACTS <i>Cristina PASCAL, Sergiu SCUTARU, Irina-Niculina CRISTIAN</i>	MODELS FOR MEASURING THE INFORMATION SYSTEM SUCCESS: A THEORETICAL SYNTHESIS APPROACH <i>Stefana-Cătălina POHONTU-DRAGOMIR, Adrian VÎLCU, Marius PÎSLARU, Ionuț-Viorel HERGHILIGIU</i>
16:00-16:15	THE „WEAR-RISK-STANDARD” TRIAD AS AN ANALYTICAL MODEL FOR THE REDESIGN OF PERSONAL PROTECTIVE EQUIPMENT FOR WELDERS USING ELECTRIC AND GAS-BASED PROCESSES <i>Ana TOPOR, Stela BALAN, Manuela AVADANEI</i>	LEAN IN TEXTILE SMES: A CONTEXT-SENSITIVE FRAMEWORK AND PROGRESSIVE ROADMAP WITH LEAN 4.0 ENABLERS <i>Nicoleta-Mihaela CASANEANU (DASCALU), Laura-Crina MIRAUTE (COCA), Marius PISLARU</i>	EVIDENCE ON THE DYNAMICS OF THE TEXTILE AND CLOTHING INDUSTRY AND MARKET IN ROMANIA <i>Mihaela Brîndușa TUDOSE, Raluca Irina CLIPA</i>
16:15-16:30	FUNCTIONAL AND ERGONOMIC DESIGN OF PROTECTIVE GARMENTS FOR WELDERS USING ELECTRIC AND GAS-BASED PROCESSES TO ENHANCE DURABILITY AND SAFETY <i>Ana TOPOR, Stela BALAN, Manuela AVADANEI</i>	INFLUENCE OF METEOROLOGICAL FACTORS ON THE PHYSICO-MECHANICAL CHARACTERISTICS OF FIBRILLATED YARNS <i>Cristina RACU, Marius Răzvan ZVONARU, Odelia Iuliana HERCIU</i>	A DESCRIPTIVE APPROACH TO PERCEPTIONS REGARDING THE CONCEPTUAL MODEL OF MAINTENANCE CONTRACTS MANAGEMENT <i>Mădălina-Laura VELESCU, Ion VERZEA, Adrian VÎLCU</i>
16:30-16:45	COFFEE BREAK		
16:45-18:00	PARALLEL SESSIONS (1st link, 2nd link, 3rd link)		
	SESSION 1.3. (1st link)	SESSION 2.3. (2nd link)	SESSION 3.3. (3rd link)
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	Textile Education and Training for the Technical Textiles Field	Technical Textiles and Sustainability	Management and Entrepreneurship
16:45-17:00	3D4U - COLLABORATION BETWEEN UNIVERSITIES/RESEARCH CENTRES AND INDUSTRY IN UKRAINE <i>Evriddiki PAPACHRISTOU, Nataliia PERVAIA, Liliia CHERTENKO, Oksana MYKHAILOVSKA, Tetiana NADOPTA, Tetiana IVANSHENA, Mykola RIABCHYKOV, Liudmyla NAZARCHUK, Golda VYNOGRADSKA, Mariana COSTEA, Olena KYZYMCHUK, Stamatoula BILALI</i>	TEXTILES IN TRANSITION: EU REGULATION ON WASTE MANAGEMENT <i>Andreea Nistorac, Luminița CIOBANU</i>	FROM CONSUMER TO PROSUMER: A QUANTITATIVE STUDY OF SOLAR ENERGY INTEGRATION IN NORTHEASTERN ROMANIA <i>Adrian VÎLCU, Ionuț-Viorel HERGHILIGIU, Laurențiu GHERASIM, Ștefana-Cătălina POHONTU-DRAGOMIR, Cătălin-Ioan BUDEANU, Nicoleta-Mihaela DASCĂLU</i>
17:00-17:15	AN EXAMPLE OF SUPPORTING TEXTILE EDUCATION IN UZBEKISTAN AND KAZAKHSTAN: THE CASE OF TEX4FUTURE PROJECT <i>Luminița CIOBANU, Savin Dorin IONESI</i>	APPLICATION OF ECODESIGN PRINCIPLES IN THE DYEING OF NATURAL FIBRE TEXTILES <i>Andreea TIMOFTE, Alina Mihaela PALCU, Valentina-Gabi STANECU, Romeo PRUNEANU, Ioana Roxana CORDUNEANU, Vasilica POPESCU</i>	EXPLORING PERSONALITY-BASED PREDICTORS OF ENVIRONMENTAL ATTITUDES AND BEHAVIORS IN TECHNICAL ACADEMIC CONTEXTS <i>Raluca Petronela LAZARESCU, Adrian VILCU, Catalin VILCU, Elena AVRAM</i>



17:15-17:30	<p>THE IMPACT OF THE ERASMUS+ DIGITAL FASHION PROJECT</p> <p><i>Irina IONESCU, Emil LOGHIN, Manuela Lăcrămioara AVĂDANEI, Andreea Madalina TALPA</i></p>	<p>RESEARCH ON SUSTAINABLE AND MODULAR DESIGN IN WOMEN'S TRENCH COATS: FROM TRADITION TO INNOVATION</p> <p><i>Manuela-Lăcrămioara AVĂDANEI, Irina-Elena MARIN, Ana-Diana VATRĂ, Nicoleta POPAC</i></p>	<p>GOVERNANCE, STRATEGY AND RISK MANAGEMENT: A COMPARATIVE ANALYSIS OF LEADING INTERNATIONAL FRAMEWORKS</p> <p><i>Mihai-Doru BULIGA, Stejărel BREZULEANU, Ion VERZEA</i></p>
17:30-17:45	<p>A DIGITAL APPROACH TO TEXTILE EDUCATION FOR PROGRAMMING KNITTED FABRICS VIA TECHNICAL MODULES</p> <p><i>Ana-Ramona CIOBANU</i></p>	<p>TEXTILE MATERIALS ENNOBLING USING EMBROIDERY TECHNIQUES</p> <p><i>Irina IONESCU, Andreea Madalina Talpă, Mihaela POPANU</i></p>	<p>CAREER-MAKING, A MOTIVATION FACTOR IN PRIVATE ROMANIAN COMPANIES</p> <p><i>Diana Geantimir, Luminița Mihaela LUPU</i></p>
17:45-18:00		<p>LINKING TECHNOLOGICAL ADVANCES AND CULTURAL HERITAGE: THE CASE OF CRAFT-IT4SD PROJECT</p> <p><i>Savin Dorin IONESI, Aura MIHAI, Antonela CURTEZA, Radu FIRICEL, Iuliana STREBA, Raluca LUPU</i></p>	<p>ANALYSIS OF THE DETERMINANTS OF CORPORATE PERFORMANCE. RESEARCH CARRIED OUT ON A SAMPLE PILOT IN THE GARMENT INDUSTRY</p> <p><i>Mihaela Brîndușa TUDOSE, Corina ȘUȘNEA (TROFIN)</i></p>
18:00	<p>TTPF 2025 CLOSING CEREMONY (1st link)</p>		



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SESSION 1.1.

Technical Textiles and Sustainability

Chair: **Alison GAULT**, *Ulster University, NORTHERN IRELAND*

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SESSION 1.1.
Technical Textiles and Sustainability

Chair:

Alison GAULT, Ulster University, NORTHERN IRELAND



PROCESS OPTIMIZATION IN WOVEN FABRICS: STEP REDUCTION STRATEGIES

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Abstract

This study investigates the effect of removing the wet pre-treatment (wet finish) step used in the finishing process of 100% viscose woven fabrics on fabric quality characteristics. Two different process routes were established for the experimental study: (i) the traditional eight-step route (including wet pre-finishing) and (ii) the seven-step optimized route (excluding wet pre-finishing). The fabrics were dyed under the planned dyeing conditions and then finished under different finishing conditions. Physical and mechanical tests (break strength, seam strength, tear strength, seam slippage), as well as color fastness tests (washing, rubbing, water, perspiration) were performed according to relevant ISO standards to evaluate the performance of the fabrics. Furthermore, SEM was used to examine the surface morphology, and FTIR was used for chemical structure analysis. The results showed that fabrics subjected to the wet pre-treatment step exhibited a more compact fiber arrangement at the microscopic level; however, this difference did not affect mechanical strength and fastness performance at the macro scale. Both routes yielded similar strength values and high color fastness results (range 4–4/5). Overall, eliminating the wet pre-treatment step does not negatively affect fabric quality; it provides optimization in terms of time and cost in the production process.

Keywords: viscose, pre-treatment, wet-end process, dyeing, SEM, FTIR.



FROM WASTE FIBERS TO FUNCTIONALITY: WOOL-DERIVED MELANIN FOR ADVANCED TECHNICAL TEXTILES

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Abstract.

Melanin is a natural biopigment widely recognized for its multifunctional properties, including broad-spectrum ultraviolet (UV) radiation absorption, antioxidant and redox activity, free radical scavenging capacity, metal ion chelation, excellent electric-ionic and thermal conductivity, and hydrophobicity. These characteristics make it a promising candidate for developing functional and sustainable technical textiles. In this study pigmented waste wool was explored as a renewable source of melanin. Prior to extraction, wool fibers underwent ultrasound-assisted degreasing with trichloroethylene solvent to remove fatty substances and impurities, thereby improving accessibility to the fibrous matrix and facilitating pigment release. Ultrasound treatment enhanced solvent penetration and accelerated the removal of residual lipids, providing a cleaner substrate for efficient extraction. Melanin was subsequently extracted through a two-stage extraction method that consisted in treating the degreased fibers with alcoholic potassium hydroxide (KOH) solution in the first stage, followed by controlled acid neutralization with sulfuric acid (H₂SO₄), in the second stage. The recovered melanin pigment was characterized by Fourier Transform Infrared (FTIR) spectroscopy, a widely used technique for structural identification of natural polymers. The FTIR spectra exhibited absorption peaks and bands assigned to aromatic, indolic, and phenolic groups, which are specific to the chemical structural features of melanin. Integrating such bioactive pigments into textile materials aligns with the current demand for eco-friendly, high-performance products. Overall, this study demonstrates the feasibility of extracting melanin from wool fibers through a combined degreasing and alkali–acid extraction process, highlighting its potential in wool waste valorization and the development of advanced technical textiles.

Keywords: *biopigment, ultrasound-assisted degreasing, alkali–acid extraction, FTIR spectroscopy, functional textile finishes.*



EMBROIDERED STRUCTURES IN TECHNICAL TEXTILES

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Abstract

Recent advances in tailored fibre placement (TFP) employ automated embroidery to produce near-net-shape composite preforms with precisely oriented carbon or aramid tows. By stitching continuous rovings directly onto a substrate in line with load paths, this technique minimises cutting waste typical of conventional woven fabrics while enabling highly efficient reinforcement layouts. Technical embroidery systems, such as TFP from ZSK machines, are increasingly established in automotive, aerospace, sports equipment, and personal protection, where design flexibility and mechanical performance are critical. Compared with woven textiles, embroidered preforms allow fibre orientation to be consciously tailored to local stress distributions, thereby enhancing tensile and flexural stiffness, impact resistance, and overall structural reliability. The incorporation of aramid fibres alongside carbon not only improves energy absorption and toughness but also yields hybrid systems suitable for demanding applications such as crash structures, helmet shells, and aerospace panels. Furthermore, three-dimensional embroidered architectures have been shown to increase interlaminar strength and mitigate delamination, addressing one of the long-standing limitations of laminated composites. Beyond their mechanical advantages, embroidery enables complex geometries that are difficult to achieve with weaving or braiding, significantly expanding the design potential of technical textiles. In addition to their mechanical and design benefits, embroidered composites contribute to sustainability in technical textiles. The precise deposition of fibres significantly reduces material offcuts, while the possibility of incorporating thermoplastic matrices opens pathways for recyclability and reprocessing. Recent research also demonstrates that reclaimed carbon and aramid fibres retain much of their original performance, enabling their reintegration into new composite structures. These findings align with current industry goals of reducing the carbon footprint of advanced materials. Future developments are likely to couple embroidery with recyclable fibres and advanced digital design tools, thereby supporting a faster transition towards circular and resource-efficient composite manufacturing. This paper presents a literature-based review of recent progress in embroidered fibre-reinforced composites. The sources examined include peer-reviewed journal articles, experimental studies presented in conference proceedings, and industrial reports from the automotive and aerospace sectors. Selection focused on contributions published within the past decade that address mechanical characterisation, process optimisation, sustainability considerations, and practical end-use applications.

Keywords: *Embroidered composites, TFP, technical textile, sustainability, technical embroidery*



CLOSING THE LOOP: DESIGN-DRIVEN STRATEGIES FOR TACKLING TEXTILE FABRIC WASTE

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Abstract.

The fashion industry faces a significant challenge in managing textile waste, driven by unsustainable production and consumption patterns. While circular economy principles offer a holistic framework for addressing this issue, this paper specifically investigates the critical role of efficient cutting and pattern-making techniques in minimizing fabric waste during garment production. This focused approach aims to reduce waste at its source, contributing to a more sustainable and resource-efficient industry. Optimizing pattern layout is paramount. By strategically arranging pattern pieces on fabric, manufacturers can significantly reduce the amount of unusable scrap. This involves considering factors like fabric width, pattern piece shapes, and potential for nesting. Moreover, innovative cutting strategies, such as utilizing computer-aided design (CAD) software for precise pattern placement and automated cutting systems, can further enhance fabric utilization. The study explores the influence of dividing line orientation on clothing products, showcasing how optimized dividing lines can lead to a lower loss rate and maximize material use. At the same time, this research focuses on analysing and investigating nesting optimization possibilities of wide pattern pieces, thus examining the number of products that can be produced with the least amount of waste. Effective cutting and pattern-making practices not only minimize waste but also contribute to cost savings and improved production efficiency. By reducing the demand for raw materials, these techniques support a more circular approach to textile manufacturing. While broader waste management strategies, such as upcycling and recycling, are essential components of a circular economy, optimizing fabric utilization during the initial stages of production remains a crucial step towards a more sustainable and responsible fashion industry. This study showcases that prioritizing efficiency in cutting and pattern-making is essential for minimizing environmental impact and moving towards a circular model.

Keywords: *layplan efficiency, optimal pattern nesting, pattern drafting, pre-consumer waste reduction, optimal fabric consumption.*



GREEN CHEMISTRY APPROACHES TO TEXTILE DYEING USING PLANT WASTE EXTRACTS

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Abstract

Corn silk (*Maydis stigma*) is a plant product obtained from the female inflorescence of the corn plant, available in large quantities as a result of the intensive cultivation of this cereal. Romania is among the main European producers of corn. Although this plant material has long been treated as an agricultural residue, modern research has demonstrated that it has an important biological and technological value. Phytochemical analyses have shown that corn stigmas contain a wide range of active compounds, due to which corn silk has multiple beneficial effects on health. Studies highlight antioxidant, anti-inflammatory, antidiabetic, diuretic and hepatoprotective properties. Some research has shown that flavonoids and other polyphenols, concentrated especially in the upper part of the stigmas exposed to the sun, are responsible for the intense antioxidant activity. In addition, luteolin, a compound present in silk extracts, has been shown to play a significant role in reducing inflammatory processes. In addition to therapeutic and pharmaceutical uses, interest in the exploitation of corn silk has also extended to the industrial field. One of the innovative directions is the use of its extracts for dyeing textile fibres. Natural silk pigments can be used to obtain various shades. In addition, due to the high antioxidant content, these extracts not only colour, but can also give textiles additional functional properties, such as improved resistance to oxidative degradation and increased biocompatibility. Thus, corn silk is emerging as a sustainable resource with multidimensional applications. The use of corn silk in textile dyeing could contribute to reducing agricultural waste and promoting environmentally friendly textile technologies.

Keywords: *corn silk, dyeing, textiles, uniformity.*



SESSION 1.2.

Functional and Smart Textiles for Meditech, Protech and Sportech Applications

Chair:

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AEROGELS AND XEROGELS IN DRUG DELIVERY: ADVANCES, OPPORTUNITIES, AND FUTURE DIRECTIONS

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Abstract.

One of the leading strategies for delivering bioactive molecules involves the design and development of drug delivery systems that can precisely control drug release, have low side effects, and ensure high patient compliance. Topical drug delivery has gained attention owing to its advantages such as ease of self-application, targeted drug delivery, and reduced total dose. The extensive surface area of the skin presents a promising opportunity for drug delivery. Therefore, topical drug delivery systems must penetrate the specific skin layers where the active pharmaceutical ingredient exerts its pharmacological effects. Extra drug carriers can be employed in drug release studies primarily to enhance drug delivery efficiency, control release kinetics, and protect the drug from degradation. Aerogels are ultra-light porous nanomaterials with a complex three-dimensional structure. Silica aerogels remain the most widely used due to their characteristics such as high porosity, large specific surface area and low density. These unique features make them highly beneficial in drug delivery. However, the fabrication of aerogels requires supercritical drying technique, which is highly expensive, low in scalability and energy-intensive. Xerogels are porous materials that can be synthesized via ambient pressure drying of any wet gel precursor, which is a cheaper and easier method. They have lower porosity and surface area than aerogels due to the drying difference; however, they have better mechanical stability and higher density than aerogels. In addition, the ease of fabrication, large surface area, and high porosity of electrospun nanofibrous webs make them particularly attractive for use as drug delivery systems. In recent years, there has been a growing research interest in the development of composite systems capable of achieving controlled drug release. This review highlights the applications of xerogels and aerogels in nanofibrous drug delivery systems, discusses their respective advantages and limitations, and identifies potential gaps for future studies.

Keywords: drug delivery systems, carrier, xerogel, aerogel, electrospinning.



BALLISTIC PERFORMANCE OPTIMIZATION OF PARA-ARAMID COMPOSITES THROUGH STRATEGIC BINDER SYSTEM SELECTION

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Abstract

Ballistic protection materials require optimal balance between energy absorption, structural integrity, and weight efficiency. Para-aramid woven fabrics represent the gold standard for soft body armour applications, yet their performance is significantly influenced by the binder system used in composite construction. Understanding the relationship between different binder systems and ballistic performance is crucial for advancing protective material design. Existing literature predominantly focuses on epoxy-based aramid composites, with limited comparative studies examining thermoplastic and phenolic resin alternatives. Current research gaps include insufficient understanding of how different binder chemistries affect energy dissipation mechanisms, delamination resistance, and failure modes under ballistic impact. Most studies evaluate single binder systems without systematic comparison across different resin types, leaving practitioners without clear guidance for optimal binder selection. This study employs a controlled experimental design comparing two distinct binder systems: thermoplastic matrix and phenolic resin (thermoset) applied to 100% para-aramid woven fabric substrates to a panel made of sewn only panel made of the same fabric, but without resin. Composite panels are manufactured using press lamination techniques with varying layer configurations (high-layer and low-layer variants). Ballistic testing is conducted using consistent testing conditions and parameters, with performance assessment based on penetration resistance, back-face deformation, and visual damage assessment. Statistical analysis compares performance metrics across binder types whilst controlling for layer count variations. This study aims to identify optimal binder-layer combinations that maximize ballistic performance whilst maintaining structural integrity. This research provides a comprehensive systematic comparison of multiple binder systems in para-aramid ballistic composites using uniform testing methodology. The contribution lies in establishing evidence-based selection criteria for binder systems in protective material applications. Future work will expand testing to multiple calibres and investigate hybrid binder systems combining thermoset and thermoplastic properties.

Keywords: *para-aramid composites, ballistic protection, binder systems, epoxy resin, thermoplastic matrix, phenolic resin.*



DIGITAL MODELLING OF CONDUCTIVE YARN PERFORMANCE IN BRAIDED FABRIC STRUCTURES

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Abstract

The increasing demand for smart and wearable textiles give rise to the use of conductive yarns in textile structures. Conductive yarns tailored to use in diverse applications, can be obtained by using metallic, nano-based, coated or composite materials. Currently, conductive yarns have been incorporated textile fabrics -woven, knitted, and braided- to produce wearable electronic systems. A great number of experiments have been performed to analyze the effect of conductive yarn incorporation on electrical properties of fabrics, which is a time and material consuming stage. The prediction of conductive yarn performance as a part of different textile structures is still limited. In this study, to analyze the electrical properties of braided fabrics via simulation-based approach, braided fabrics were simulated via TexMind, BraiderFlat software. Each fabric was structured with different geometry and yarn arrangement. Afterwards, the fabrics were transformed into electrical circuits and electrical resistances were determined by using Falstad-Circuit-Simulator. The main advantages of applying simulation to conductive fabrics is to diminish the need for unnecessary sample production, material usage and ease of prediction of fabric performance especially before experimental design stages.

Keywords: *conductive yarns, braided fabrics, simulation, TexMind, BraiderFlat, electrical resistance.*



THE „WEAR–RISK–STANDARD” TRIAD AS AN ANALYTICAL MODEL FOR THE REDESIGN OF PERSONAL PROTECTIVE EQUIPMENT FOR WELDERS USING ELECTRIC AND GAS-BASED PROCESSES

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Abstract

Welders using electric and gas-based processes are exposed daily to extreme thermal, mechanical and chemical stressors, resulting in rapid wear and functional degradation of personal protective equipment (PPE). This deterioration significantly reduces protective efficiency in critical situations and raises concerns regarding the adequacy of current designs aligned only partially with existing international standards. This paper introduces the **Wear–Risk–Standard triad**, a novel analytical framework designed to bridge the gap between normative performance, real wear patterns and operational risk. The model integrates three interdependent dimensions — material degradation, risk exposure, and standardized requirements — offering a unified basis for PPE evaluation and redesign. The research methodology combines a comparative analysis of EN ISO, ASTM and GOST standards with systematic field inspections in welding workshops, focusing on high-risk zones such as the knees, elbows and chest. A critical literature review reveals that most previous studies address material performance, occupational risk or standardization separately, lacking an integrated perspective. Findings highlight significant misalignments between certified and real performance, particularly in areas subjected to combined thermal and mechanical stress. The proposed triad provides a structured tool for diagnosing protection gaps, prioritizing design interventions and supporting risk-based standardization. This transferable analytical concept advances current approaches to PPE development by promoting ergonomic, durable and sustainable solutions aligned with EU and ILO occupational safety objectives. It strengthens the interface between research, industry and regulatory frameworks, enabling more intelligent and adaptable protective systems.

Keywords: *personal protective equipment (PPE) re-engineering, user-centred design, risk-based design, functional textiles, international standards, ergonomics, durability.*



FUNCTIONAL AND ERGONOMIC DESIGN OF PROTECTIVE GARMENTS FOR WELDERS USING ELECTRIC AND GAS-BASED PROCESSES TO ENHANCE DURABILITY AND SAFETY

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Abstract

Protective clothing for welders using electric and gas-based processes is fundamental to occupational safety, yet existing equipment often demonstrates premature wear, insufficient ergonomic adaptation, and inadequate protection against thermal and mechanical stress. This paper presents an innovative functional-ergonomic approach aimed at enhancing both the durability and safety of protective garments, with direct applicability to industrial practice. A review of international standards and recent academic contributions reveals persistent challenges in the field of protective equipment design. Studies have shown that many current models prioritise either durability or comfort, but rarely achieve a balance between the two. Moreover, there is limited integration of advanced ergonomic principles and digital simulation tools in the development of welding apparel. Building on these identified gaps, this research proposes a methodological framework that combines functional requirements, ergonomic optimisation, and material performance assessment in a coherent design process. The methodology was structured in several stages. First, international regulatory documents were analysed to define the essential safety requirements for protective garments. Second, anthropometric measurements of welders were collected to ensure appropriate fit and ergonomic mobility. Third, the physical-mechanical and thermal properties of candidate materials were tested to identify the most suitable fabric for withstanding extreme working conditions. Finally, three-dimensional digital simulation using CLO 3D was employed to prototype and visualise garment models, enabling early evaluation of ergonomic and constructive solutions. Five prototypes of protective jackets were developed and tested, integrating modular components for rapid replacement of worn sections, ergonomic pocket positioning for operational convenience, a high collar to protect the cervical area, and a reinforced closure system. The use of natural leather velour as the main fabric, complemented by segmented sleeves, reinforced joints, and dynamic allowances, significantly improved protection against sparks, abrasion, and high thermal loads. Experimental tests indicated a 25% increase in service life compared to conventional models, along with measurable gains in mobility and comfort. The main contribution of this research is the establishment of a methodological framework for functional-ergonomic garment design, tailored to the specific needs of welders but with potential extension to other categories of protective equipment. Beyond its practical industrial relevance, the study also demonstrates the value of integrating digital prototyping and modular repair strategies into protective clothing design, thereby advancing sustainability through extended product lifecycles. Future work will expand on these results by exploring the integration of smart textiles and sensor-based monitoring systems, as well as refining predictive models further to improve safety and performance in hazardous working environments.

Keywords: *occupational safety, ergonomic optimisation, thermal resistance, modular garment design, material performance, wear resistance, 3D virtual prototyping.*



SESSION 1.3.

Textile Education and Training for the Technical Textiles Field

Chair:

Ilda KAZANI, Polytechnic University of Tirana, ALBANIA



WHY TEXTILE EDUCATION SHOULD EMBRACE SUSTAINABILITY: OPERATIONALISING ESD THROUGH SERVICE LEARNING ON TECHNICAL TEXTILES

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Abstract

Due to its extensive material use, complex supply chains, and diverse social impacts, the textile sector plays a pivotal role in global sustainability transitions. The current discourse underscores the necessity of embedding sustainability deeply into textile education using the UNESCO Education for Sustainable Development (ESD) concept. Based on contemporary key policy developments – such as the EU Strategy for Sustainable and Circular Textiles (SSCT), Digital Product Passports (DPPs), and Extended Producer Responsibility (EPR) – this paper proposes the integration of advanced technical textiles as a foundation for transformative learning on sustainability. Recent research highlights the substantial challenges posed by the textile industry, as the production of textiles and clothing generates millions of tons of waste annually, contributing considerably to environmental degradation. In response, EU policies focus on promoting durability, circularity, and transparency. This requires a skilled workforce with expertise in systemic thinking and ethical design — competencies that are fostered by the ESD approach when integrated into the curriculum as a guiding principle. Through service learning (SL), the curriculum bridges cognitive, socio-emotional, and behavioral dimensions of learning, emphasizing the real-world applications of technical textiles. Preliminary results from the EU project TexUnite demonstrate how textiles could provide a valuable context for SL in higher education, enabling hands-on engagement with sustainability issues. Due to their interdisciplinary nature – combining materials science, engineering, and environmental ethics – technical textiles are particularly well-suited for SL initiatives. Students can engage in community projects and collaborate with stakeholders to address real-world issues, such as developing sustainable medical solutions and promoting responsible waste management. The paper concludes that systematically incorporating SL into textile curricula can significantly enhance students' competencies in designing for sustainability. The TexUnite framework illustrates how SL can foster critical thinking, civic engagement, and foresight, thereby preparing students to act as change agents in a sector undergoing profound transformation. Future research should focus on empirical studies that evaluate the effectiveness of these educational strategies and their impact on students' readiness to engage with sustainability in technical textile careers. Additionally, sustained policy support and industry collaboration are crucial to aligning these educational approaches with broader sustainability objectives, thereby contributing to the development of a circular textile economy.

Keywords: *Education for Sustainable Development (ESD), Higher Education, Service Learning, Technical Textiles.*



3D4U – RESULTS OF COLLABORATION BETWEEN UNIVERSITIES, RESEARCH CENTRES, AND INDUSTRY IN UKRAINE

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Abstract

3D4U addresses the lack of skilled talent in 3D Concepts for fashion education in Ukraine by establishing 3 hubs in 3D concepts at 3 Ukrainian Universities. This project has been funded by the Erasmus+ Programme of the European Union and is a transnational cooperation project between higher education institutions (HEIs) from Programme countries and eligible Partner Countries, facilitated through structured cooperation, the exchange of experiences, good practices, and individual mobility. Transmitting the knowledge around 3D technologies to improve the level of competencies, skills and future employability of Ukrainian students to increase the capacity of Ukrainian HEIs by supporting the definition and implementation, is a key priority of the 3D4U project. These objectives aim to be realistic and address issues relevant to the participating organisations, aligning with EU priorities regarding the Green Deal, Digital Transformation, Integration of Ukrainian migrants, Governance, peace, human development, and Sustainable growth and jobs. Through rigorous data collection, the report identifies the essential competencies crucial for individuals working within these sectors. It elucidates the intricate mix of competencies required to navigate the dynamic landscape of centre-based work in Ukraine. By synthesising insights from the questionnaires, it offers actionable recommendations to enhance professional development initiatives in Ukraine's centres and institutions. The article serves as a comprehensive roadmap for stakeholders, highlighting areas for strategic intervention and capacity building within the sector. Its conclusions are grounded in empirical evidence, providing a robust foundation for informed decision-making and resource allocation. Overall, it underscores the importance of aligning training initiatives with the evolving needs and competencies of professionals in Ukrainian centres and institutions. The strong commitment of the Ukrainian partners yielded 73 responses, providing an extensive dataset that offered deeper insights into the collaboration dynamics between universities, research centres, and industry stakeholders.

Keywords: 3D Design, Competencies, Training Methods, 3D4U Centres, Fashion industry.



AN EXAMPLE OF SUPPORTING TEXTILE EDUCATION IN UZBEKISTAN AND KAZAKHSTAN: THE CASE OF TEX4FUTURE PROJECT

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Abstract.

TEX4FUTURE is an ERASMUS CBHE project that aims to update and modernize capacities and services offered by universities with textile engineering programs in Uzbekistan and Kazakhstan by creating four R&D centers designed to link the research to the main beneficiaries in the textile sector. For this purpose, the project included a work package intended to confirm the data gathered during the needs' analysis study during the project proposal preparation, compile the final training curricula as specified by the needs of the centers and train potential experts and trainers of the Textile Centers. The consortium EU partners developed five learning units, each with three lessons, on textile technologies and advanced / smart materials and products, entrepreneurship in the textile industry, sustainability and circularity in the textile industry, digitalization in fashion and laboratory techniques. The paper summarizes the content of these lessons and the innovative aspects of these topics. The transfer of relevant knowledge and teaching approaches concerning textile engineering education, with reference to the subjects included in the training materials was ensured by three training events organized by the EU partners where academics from Uzbekistan and Kazakhstan participated to theoretical practical activities, as well as visits to textile companies.

Keywords: Capacity building, ERASMUS project, training materials, train-the-trainer events



THE IMPACT OF THE ERASMUS+ DIGITAL FASHION PROJECT

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Abstract.

Erasmus+ projects are a great opportunity for students, lecturers and researchers from the Technical Universities to gain new experiences, increase their knowledge level and establish connections with people with similar interest. All these are the fundament of future collaborations. The "Gheorghe Asachi" Technical University from Iasi was part of the PROJECT "Collaborative Online International Learning in Digital Fashion", acronym DigitalFashion, agreement n° [2021-1-RO01-KA220-HED-000031150], finished on the 31-st of January 2025. The project focused first of all on an analyze of the digitalization level in the clothing companies in all te partners countries, establishing the necessity of the project. Next, a library of knowledge for virtual fashion design and technology and a Training platform of fashion design by personalized 3D virtual garment fitting were developed. The necessary knowledge for using the results of the project were in the end cumulated in the Curricula for Collaborative Online International Learning in the field of Digital Fashion. In the end of the project all the technical results were fulfilled, but a real challenge was the dissemination of the results. The aim of the paper is to present the means of dissemination, as interviews, questionnaires, published articles, multiplier event and the final results of the dissemination process, assuring the impact of the project. Although all the partners were involved in the dissemination process, only the results of TUIasi partner are presented in the paper.

Keywords: *Erasmus+ project, Digital Fashion, dissemination strategies, multiplier event, fashion education.*



A DIGITAL APPROACH TO TEXTILE EDUCATION FOR PROGRAMMING KNITTED FABRICS VIA TECHNICAL MODULES

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Abstract

In the knitwear industry, CAD system M1 Plus® offer visual support to the user, enhancing the precision and efficiency of knitted fabric programming. Designing a knitted structure is a complex process that involves understanding of both the yarn evolution within the structure and the knitting machine capabilities. This paper presents a digital framework for textile education, focused on how to build structured technical modules within M1 Plus®. The goal is to create a progressive, step-by-step learning process that fosters autonomy while deepening comprehension of the concept. Mainly focused on how to design knitted structures by creating technical modules, the lesson guide users from basic to advanced programming concepts, using clear visual instructions and practice-based learning. Quizzes are strategically placed at the end of the lesson, to encourage reflection, reinforce knowledge retention and enable flexible self-evaluation. Available in HTML format, the interactive content can be accessed both online and offline, supporting classroom integration and independent study. By adapting to different learning rhythm and personal schedules, this approach promotes inclusivity and engagement. This educational approach bridges conventional textile instructions with digital technologies, equipping users with the confidence, skills and technical literacy needed to effectively operate CAD systems in modern knitwear design development.

Keywords: *digital framework, interactive content, knitted structure, textile instructions.*



SESSION 2.1.

Functional and Smart Textiles for Meditech, Protech and Sportech Applications

Chair:

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DRUG-ELUTING PCL-BASED ELECTROSPUN VASCULAR GRAFTS: ADVANCES IN PREVENTING INTIMAL HYPERPLASIA AND THROMBOSIS

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Abstract

Cardiovascular diseases remain the leading cause of mortality worldwide, and vascular graft implantation is a widely adopted treatment for occluded or damaged vessels. However, the clinical success of small-diameter synthetic grafts is still limited due to complications such as intimal hyperplasia and thrombosis, which often lead to graft failure. In recent years, electrospun poly(ϵ -caprolactone) (PCL)-based biodegradable vascular grafts have gained significant attention as promising alternatives to conventional materials such as ePTFE and Dacron. Their tunable mechanical properties, controlled degradation behavior, and ability to mimic the extracellular matrix structure provide a favorable microenvironment for cellular infiltration and tissue remodeling. Moreover, incorporation of pharmacological agents within electrospun scaffolds has emerged as an effective strategy to address the major biological challenges of graft implantation. Antithrombotic and antiproliferative drugs have been successfully integrated into PCL-based electrospun grafts through surface immobilization, coaxial electrospinning, or direct blending. These approaches aim to achieve localized, sustained release of therapeutic agents, thereby reducing platelet adhesion, smooth muscle cell proliferation, and inflammatory responses. This review highlights recent progress in the design and fabrication of drug-loaded electrospun PCL vascular grafts, with a particular focus on their biological performance, drug release kinetics, and in vivo outcomes. The discussion emphasizes in vitro and in vivo evaluations of drug release kinetics, hemocompatibility, and graft patency, which provide essential insights for guiding the development of multifunctional vascular grafts. Overall, drug-eluting PCL-based electrospun grafts represent a promising pathway toward clinically viable small-diameter vascular substitutes.

Keywords: vascular grafts, coaxial electrospinning, thrombosis, intimal hyperplasia, antithrombotic drugs, antiproliferative drugs.



ANTITHROMBOTIC DRUG-INTEGRATED ELECTROSPUN PCL VASCULAR GRAFTS FOR SMALL-CALIBER VESSELS: A MINI-REVIEW

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Abstract

Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide, mainly due to complications related to thrombosis and vascular occlusion. Small-diameter vascular grafts (SDVGs) are particularly prone to thrombus formation and intimal hyperplasia, which significantly limit their long-term patency and clinical success. To overcome these challenges, recent advances in tissue engineering have focused on developing bio-functional vascular substitutes that mimic the structure and function of native vessels. Among fabrication techniques, electrospinning has emerged as a powerful and versatile method for producing fibrous scaffolds with controlled morphology, high surface area, and tunable porosity properties that closely replicate the natural extracellular matrix and support cellular integration. Among various polymers employed in this approach, poly(ϵ -caprolactone) (PCL) has gained considerable attention due to its excellent mechanical stability, elasticity, and biodegradability. However, its hydrophobic nature necessitates further functionalization to enhance hemocompatibility and biological performance. In this context, the incorporation of antithrombotic agents, such as heparin, aspirin, and dipyridamole, into electrospun PCL scaffolds has demonstrated outstanding potential to improve graft patency and endothelialization. This review summarizes recent developments in electrospun PCL-based vascular grafts incorporating antithrombotic drugs. It categorizes existing studies into anticoagulant- and antiplatelet-based systems, analyzes the influence of different drug-loading strategies on release behavior and biological response. Overall, this work highlights the potential of drug-integrated electrospun PCL grafts for creating bioactive, non-thrombogenic, and clinically translatable small-diameter vascular substitutes.

Keywords: *vascular graft, electrospinning, PCL, antithrombotic drug*



PROPERTIES OF STAINLESS STEEL/COTTON BLENDED ROTOR SPUN YARNS FOR ANTISTATIC APPLICATIONS

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Abstract.

Electrostatic charges can accumulate on clothing through friction or induction charging and may be transferred to electronic devices by touch, potentially causing damage. In environments containing flammable or explosive materials, electrostatic discharges also pose a serious risk of fire or explosion. To mitigate these risks, conductive textile materials are used in the production of antistatic protective equipment. One method to enhance conductivity of fabrics is by incorporating electrically conductive yarns made from blends of metallic and conventional fibers. This study aims to investigate the influence of the proportion of metal fibers on the properties of rotor spun yarns produced from cotton/stainless steel blends for use in antistatic protective clothing. The proportion of stainless steel fibers was varied at three levels: 4%, 8%, and 12%. Yarns with a linear density of 29.4 tex were produced under identical spinning conditions using a rotor spinning machine. The physical, mechanical, and electrical properties of the resulting yarns were evaluated to assess the effect of metallic fiber content. Yarn tensile strength increased with the increase in stainless steel fiber proportion, while the yarn diameter decreased. As the proportion of stainless steel fiber in the yarn increased, the yarn resistivity decreased, thereby enhancing its charge dissipation capacity.

Keywords: *stainless steel fiber proportion, stainless steel/cotton blend, conductive rotor spun yarn, yarn resistivity.*



DYNAMIC DIGITAL PROTOTYPING IN GARMENT FUNCTIONALITY: USING CLO3D AVATAR JOINTS FOR INCLUSIVE PATTERN DESIGN

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Abstract.

Adaptive fashion has gained increasing attention as a means of providing autonomy, comfort, and social inclusion for people with different special conditions. Traditional prototyping approaches, often based on static mannequins or flat patterns, are insufficient for predicting garment behaviour under dynamic postures. This limitation highlights the necessity of integrating digital technologies capable of reproducing both morphological variations and movement scenarios specific to users with mobility challenges.

Recent research in digital fashion technologies has demonstrated the potential of 3D simulation platforms such as CLO3D for improving garment fit and inclusivity. However, most studies focus on static avatars, neglecting the importance of joint mobility and posture in determining the functional performance of clothing. The Avatar Joints feature in CLO3D, which allows manipulation of the virtual skeleton using Forward Kinematics (FK) and Inverse Kinematics (IK), offers a valuable but underexplored opportunity for dynamic prototyping in adaptive fashion design.

In this study, two avatars were developed: one representing a standard female body and another incorporating morphological modifications typical of neurological conditions. Using the Show Avatar Joints function, postures such as sitting, bending, and arm elevation were simulated through FK and IK joint control. These movements allowed the observation of garment deformation, seam stress, and comfort zones in real time, with direct reflection on the associated 2D patterns. The methodology demonstrates how digital joint manipulation can anticipate functional limitations and suggest design modifications prior to physical prototyping.

The findings confirm that dynamic simulations enhance both accuracy and efficiency in adaptive garment development. They enable designers to identify critical pressure areas, reduce trial-and-error sampling, and tailor clothing to individual morphological and mobility needs. Beyond practical implications, this approach supports sustainability by reducing material waste and costs.

The study contributes to the field by introducing a systematic framework for joint-based digital prototyping in adaptive and functional fashion.

Keywords: *adaptive fashion, digital prototyping, CLO3D, avatar joints, Forward Kinematics, Inverse Kinematics.*



WAYS OF IMPROVING THE QUALITY OF MILITARY FOOTWEAR

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Abstract.

The study is aimed at a comprehensive analysis of the quality of military footwear and the identification of ways to improve it in accordance with modern requirements for safety, ergonomics, and functionality. Military footwear is one of the most important elements of a soldier's equipment. Today, the requirements for training and tactical footwear used in the Ukrainian Army are determined both by the needs for comfort and convenience of the personnel, and by the realities of modern combat operations, as well as global experience in the production and improvement of specialized footwear. Based on a survey of more than 100 servicemen from various units, the priority criteria for assessing the quality of military footwear were identified as low weight, ease of donning and wearing, and a high level of foot comfort. Modern Ukrainian military footwear is manufactured in accordance with the Technical Specification of the Ministry of Defense of Ukraine and relevant regulatory documents. The study examined the performance characteristics of footwear samples currently supplied to the Armed Forces of Ukraine. Natural leather (nubuck) demonstrated high tensile strength and water resistance; Cordura showed exceptional abrasion and tear resistance, albeit with limited breathability; EVA (ethylene-vinyl acetate) proved effective in shock absorption, lightweight structure, and thermal insulation, making it a promising material for winter footwear; Kevlar insoles improved puncture and impact protection without significantly increasing the weight of the product. Membrane materials such as Gore-Tex were also analyzed, combining waterproofness with high vapor permeability, thus ensuring an optimal microclimate inside the footwear. Dual-layer soles made of polyurethane and rubber demonstrated a combination of lightness, cushioning properties, abrasion resistance, and resistance to the chemical effects of petroleum products. To assess the conformity of footwear lasts to the anatomical forms of the feet of military personnel and mobilization reserve members, selective studies of the feet of individual representatives of the aimed group were conducted. The results were compared with the existing shoe last shape used in the production of training military footwear at one of the Ukrainian enterprises. Based on the obtained data, promising directions for improving domestically manufactured tactical footwear were outlined, in particular the introduction of an improved shoe last shape, the use of anatomical insoles with cushioning inserts, and the integration of environmentally safe materials such as hemp textiles. The results confirm that the synergy of innovative materials, modern manufacturing technologies, and consideration of the anthropometric features of servicemen foot provides a foundation for improving the quality and competitiveness of Ukrainian military footwear, as well as creates prerequisites for the development of new standards in the field of tactical equipment.

Keywords: *military footwear, ergonomics, cushioning, durability, tactical boots, quality requirements, shoe last shape.*



SESSION 2.2.

Technical Textiles and Sustainability.

Technical Textiles for Agrotech, Buildtech and Geotech Applications

Chair:

Cristina PIROI, Gheorghe Asachi Technical University of Iasi,
ROMANIA



SUSTAINABLE 3D-PRINTED BIOCOMPOSITES: EFFECT OF COTTON FABRIC REINFORCEMENT ON FLEXURAL PROPERTIES

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Abstract.

This study investigates the potential of cotton fabric-reinforced polylactic acid (PLA) composites, fabricated via desktop fused deposition modelling (FDM), to enhance flexural performance and enable the production of functional, load-bearing parts using biodegradable materials. Additive manufacturing of fibre-reinforced polymers has seen rapid development, yet the incorporation of biodegradable reinforcements into accessible FDM workflows remains largely overlooked. Improving flexural stiffness and strength using low-cost, readily available materials could help bridge the gap between conceptual prototyping and real-world functionality, while supporting the principles of a circular economy. Although extensive research has been conducted on polymer composites reinforced with glass or carbon fibres, there is a notable absence of studies focused on PLA reinforced with embedded cotton fabric. To date, no systematic evaluation of the flexural behaviour of such biocomposites - produced without the use of specialised continuous-fibre equipment - has been reported. The practical relevance of this material system is considerable. The combination of PLA and cotton results in a fully compostable composite, providing a sustainable alternative to conventional fibre-reinforced polymers. Enhancements in flexural stiffness and strength could allow for thinner cross-sections, reduced material usage, and shorter print times, without compromising structural integrity under bending loads. In this context, PLA/cotton-fabric biocomposites were fabricated using an insertion-based FDM approach and tested under standardised three-point bending. Comparative results between reinforced and unreinforced PLA specimens highlight the mechanical advantages of this simple yet effective reinforcement method. The findings support the feasibility of producing stiffer, stronger, and more durable components within a biodegradable materials system, offering a practical route toward sustainable, function-oriented additive manufacturing.

Keywords: *PLA biocomposites, cotton fabric reinforcement, flexural properties, sustainable materials, 3D printing applications.*



LIFE CYCLE AND DURABILITY ASSESSMENT OF COTTON AND RECYCLED COTTON T-SHIRTS: IMPLICATIONS FOR SUSTAINABLE CONSUMPTION

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Abstract

The environmental footprint of textiles has become a central concern in sustainable consumption and production strategies, with cotton garments representing one of the most resource-intensive product groups. Cotton cultivation requires large amounts of water, fertilizers, and pesticides, while subsequent manufacturing processes such as spinning, dyeing, and finishing are highly energy- and chemical-demanding. Moreover, the use phase of garments, particularly repeated washing, drying, and ironing, contributes significantly to their life cycle impacts. Considering this, a series of pilling tests have been conducted, using the M235 Martindale Abrasion Testing Machine, in order to identify which of the two products is more prone to develop pilling on their surface, and thus give informations about the product's durability. In order to receive clear information about the environmental efficiency of the analyzed products, this study also compares the life cycle performance of the two functionally equivalent T-shirts: one produced from 100% virgin cotton and another containing 30% mechanically recycled cotton blended with 70% virgin cotton. The assessment was carried out using a footprint calculator to evaluate cradle-to-grave environmental impacts. System boundaries included raw material production, textile manufacturing, distribution, consumer use, and end-of-life. Impact categories considered included climate change, water consumption, eutrophication, and energy demand. The functional unit was defined as one T-shirt worn until the end of its usable life, with results normalized by the number of wears. To complement the LCA model, fabric samples from the two products were subjected to a standard pilling resistance test. The 100% cotton T-shirt exhibited visible pilling earlier than the recycled cotton blend, suggesting a shorter effective lifespan. This empirical evidence was integrated into the functional unit definition to reflect differences in garment durability. The combined results indicate that incorporating 30% recycled cotton reduces environmental burdens in the production phase while also improving performance in the use phase through enhanced durability. When impacts are calculated per wear, the recycled cotton T-shirt outperforms the virgin cotton alternative. These findings highlight the dual role of recycled fibers in both resource efficiency and lifespan extension, supporting their broader adoption in sustainable textile strategies.

Keywords: *carbon footprint, durability, pilling, recycled cotton blend, product lifespan.*



STUDY ON NATURAL ANTIMICROBIAL SOLUTIONS FOR THE PRESERVATION OF SILK TEXTILE ARTIFACTS

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Abstract

The preservation of textile artifacts represents one of the most challenging aspects of cultural heritage conservation due to the organic nature of these materials and their inherent susceptibility to biodeterioration. Textile artifacts preservation methods often rely on synthetic biocides and chemical treatments that, while effective, raise concerns regarding environmental sustainability, human health and long-term material compatibility. Natural compounds from plants represent suitable options to replace synthetic biocides when employed against microorganisms in various applications. The application of essential oils in heritage conservation has gained significant role as researchers seek sustainable alternatives to conventional preservation methods. This study investigates the antimicrobial properties of essential oils: oregano (*Origanum vulgare*), eucalyptus (*Eucalyptus globulus*), basil (*Ocimum basilicum*) and rosemary (*Rosmarinus officinalis*) for the elimination of microorganisms, specifically focusing on fungal contamination. The research involved silk fabric as the test material due to silk's historical significance in heritage collections and its known susceptibility to fungal attack. Silk samples were initially contaminated with fungal proliferation to simulate real-world biodeterioration scenarios. The contaminated samples were covered at a certain distance with polyester fabric impregnated with the essential oils, and microbial growth was monitored over a 16-days period using standardized microbiological assessment techniques. Results demonstrated significant variations in antimicrobial efficacy among the tested essential oils. Oregano essential oil exhibited superior antimicrobial properties compared to eucalyptus, basil and rosemary, showing the most effective inhibition of fungi growth and proliferation on the textile surface. The oregano treatment demonstrated sustained antimicrobial activity throughout the entire monitoring period, indicating its potential as a natural antimicrobial agent for textile applications. These results suggest that oregano essential oil could serve as an effective, natural alternative to synthetic antimicrobial treatments for textile preservation and contamination control. The study contributes to ongoing research into the development of a protective cover for textile artifacts, which would include a middle layer impregnated with essential oils.

Keywords: *textile preservation, silk artifacts, textile heritage, essential oils.*



LEAN IN TEXTILE SMES: A CONTEXT-SENSITIVE FRAMEWORK AND PROGRESSIVE ROADMAP WITH LEAN 4.0 ENABLERS

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Abstract

This study has developed a context-sensitive framework and a progressive pathway for Lean implementation in textile SMEs, combining enterprise diagnostics with cost-effective tool prioritization and Lean 4.0 enablers. Lean implementation by SMEs faces unique challenges, often stemming from limited resources, raw material variability, process complexity, and fast fashion pressures. To address these realities, the study underscores foundational methods—5S, Value Stream Mapping (VSM), and Kaizen to achieve workplace organization, process visibility, and a continuous improvement culture. These can be supplemented by scalable practices such as Just-in-Time (JIT), Kanban, and root cause analysis to enable incremental progress as resources allow. The proposed framework advocates strategies tailored to specific sector constraints and organizational enablers, emphasizing contextual customisation and supportive leadership. A structured roadmap organizes framework components diagnosing and identifying waste, pilot development, capability building, and digital adoption into phased sequences for decision-making under uncertainty. The integration of Lean 4.0 enablers (such as QR tracking, digital dashboards, and lightweight alarms) supports data-driven management and resource optimization suitable for SMEs operating in emerging economies. This study directly addresses four major literature gaps: the lack of frameworks designed for SMEs, the limited attention to textile sector realities, insufficient integration of diagnostics with improvement strategies, and minimal critique of Lean's potential downsides. By offering a practical, adaptable, and phased pathway, the framework supports sustainable Lean transformation in textile SMEs, benefiting both academia and industry by clarifying sequencing rules, providing tailored Lean 4.0 guidance, and embedding risk and ethical safety measures. This contribution lays the foundation for more robust, resilient, and contextually aligned Lean adoption in the textile sector.

Keywords: *textile SMEs, customisation strategies, pilot implementation, sustainable Lean transformations.*



INFLUENCE OF METEOROLOGICAL FACTORS ON THE PHYSICO-MECHANICAL CHARACTERISTICS OF FIBRILLATED YARNS

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Abstract.

Polyolefin fibrillated yarns have a lower density compared to other synthetic fibers, high tensile strength, durability, good resistance to degradation caused by chemical reactions with the environment, being suitable for use in agriculture, geotextiles, packaging, construction, sports, marine and fisheries, as well as other technical industrial applications. To obtain fibrillated tape yarns, a series of steps are carried out, which involve extrusion of a polymer film, slitting the film into narrow tapes, drawing to increase the orientation of the macromolecular chains and strength, annealing at a controlled temperature, tapes fibrillation, and yarn winding. Additives, dyes or UV stabilizers can be added in the first step. Recently, research has been focused on improving fibrillation methods, on additives that can be added in the extrusion stage, as well as on polymers that can be mixed to improve the yarn's properties. In this study, the physical and mechanical characteristics of fibrillated polypropylene yarns with different linear densities were comparatively analyzed. The yarns were exposed for a period of time in the outdoor environment in order to follow the influence of meteorological parameters on the characteristics of the fibrillated yarns. The breaking force and elongation decrease with the duration of exposure, the breaking force decreasing to a greater extent compared to the breaking elongation.

Keywords: *polypropylene, tape yarn, fibrillated, breaking strength.*



SESSION 2.3.
Technical Textiles and
Sustainability

Chair:

Irina CRISTIAN, Gheorghe Asachi Technical University of Iasi,
ROMANIA



TEXTILES IN TRANSITION: EU REGULATION ON WASTE MANAGEMENT

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Abstract

The European textile industry is undergoing a profound transformation as new European Union regulations seek to promote circularity, sustainability, and transparency throughout the textile value chain. This paper examines the cumulative impact of key policy instruments - including the Waste Framework Directive, the Ecodesign for Sustainable Products Regulation, the Extended Producer Responsibility schemes, and the forthcoming Digital Product Passport - on both the traditional and technical textile sectors. Together, these legislative measures redefine how textiles are designed, produced, marketed, and managed at the end of their life, shifting the industry from a linear model toward a circular, value-oriented economy. The analysis demonstrates that, although compliance with new regulatory obligations initially raises costs and administrative complexity, it also acts as a starting point for innovation and technological advancement. The introduction of eco-modulated responsibility fees encourages sustainable product design and recyclability, while the digital passport enhances material traceability and consumer transparency. For technical and smart textiles, the integration of electronic components introduces additional regulatory overlap with the Waste Electrical and Electronic Equipment Directive and Restriction of Hazardous Substances directives, requiring new strategies for material recovery, product disassembly, and responsible end-of-life management. Merging sustainability with digitalization, and regulation is structurally redefining the European textile landscape. The transition demands substantial investment in infrastructure, research, and cross-sector collaboration, but also opens opportunities for green innovation, circular business models, and regional competitiveness. The long-term success of Europe's textile and technical textile industries will depend on their capacity to align regulatory compliance with innovation, transforming environmental responsibility into a strategic advantage and positioning Europe as a global standard for sustainable and technologically advanced textile production.

Keywords: *sustainability policy, resource efficiency, product traceability, industrial innovation, smart textiles*



APPLICATION OF ECODESIGN PRINCIPLES IN THE DYEING OF NATURAL FIBRE TEXTILES

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Abstract.

In the context of the global environmental crisis and the depletion of natural resources, the concept of ecodesign has become essential in redefining industrial processes, particularly within the textile sector. The industry is under increasing pressure to adopt sustainable practices, especially in the highly polluting phase of chemical finishing. Ecodesign, grounded in green chemistry principles and the use of renewable resources, plays a key role in the transition toward a more responsible textile system. While recent research has promoted natural fibres and ecological dyes, traditional extraction and dyeing techniques still raise concerns regarding efficiency and environmental impact. In this framework, hemp (a natural fibre with excellent ecological and technical properties) and curcumin (a plant-derived pigment from turmeric) form a promising basis for dyeing processes aligned with ecodesign principles. This study explores the feasibility of using curcumin extracted via ultrasound-assisted extraction (US) to dye hemp textiles. The US method was selected for its high extraction efficiency and alignment with environmentally friendly practices. The research assesses the dyeing performance, extract stability, and fibre behaviour throughout the process, eliminating the need for mordants or chemical auxiliaries. The results demonstrate effective, uniform, and functional dyeing with minimal environmental impact, validating the practical application of ecodesign in textile finishing. The originality of this research lies in the integration of two sustainable materials through a fully green, innovative process. The main contribution of the study is the validation of an applied ecodesign model that combines technological efficiency with ecological responsibility. Future work will explore the extension to a wider range of natural dyes, improved colour fastness, and industrial scalability.

Keywords: *curcumin, green chemistry, hemp, dyeing, sustainability, turmeric.*



RESEARCH ON SUSTAINABLE AND MODULAR DESIGN IN WOMEN'S TRENCH COATS: FROM TRADITION TO INNOVATION

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Abstract

The trench coat has long been recognized as an iconic piece of outerwear, combining functionality with timeless elegance. This research advances its traditional role by applying innovative design principles to develop a women's trench coat collection that is both sustainable and personalized. The study situates the trench as a transitional garment whose reinvention can address contemporary needs for versatility, eco-responsibility, and individual expression. The analysis first focused on evaluating quality criteria, including comfort, material durability, reliability, and maintainability. Special attention was given to how fabric properties, construction methods, and seam finishes influence both performance and aesthetic outcomes. This technical evaluation ensured that the designed models could maintain their functional and visual qualities during extended use. Building on these findings, two styles have been developed. Using Lectra/Modaris CAD software, digital 2D patterns were generated to refine precision in pattern-making and garment assembly. A key innovation lies in the modular character of the designs: detachable sleeves, that enable easy transformation between styles, from full-length coats to vests. This adaptability fosters user personalization while extending garment usability across diverse contexts. Modular design strategies were shown to significantly increase product longevity, reducing environmental impact while enhancing value for the wearer. The results demonstrates that classic garments can be reimagined to meet modern requirements of sustainability and individuality, highlighting the massive potential of how modular design can be integrated and be the base principle of developing an entire collection in the near future. By merging historical elegance with innovative, modular solutions, the trench coat becomes not only a fashion statement but also a model for responsible and adaptable design in the contemporary clothing industry. Thus, the research demonstrates that iconic garments can be innovatively redesigned to align with principles of sustainable fashion.

Keywords: *CAD pattern making, modular design, sustainable fashion, trench coat design, versatile apparel.*



TEXTILE MATERIALS ENNOBLING USING EMBROIDERY TECHNIQUES

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Abstract

Embroideries are used from ancient times to enrich the textile materials. During the years a lot of technical methods were developed both for increase the productivity or to increase the type of the embroidery. From basic sewing machines to very modern ones, this field is developing very fast. In recent years, smart textiles have been increasingly developed, offering enhanced functionality compared to traditional textiles and embroidery machines are frequently used for this purpose. This paper is focusing, first of all, on the techniques used for developing different embroidery models for clothing, using state of the art embroidery machines. There are presented: design of the embroidery with elements of fashion, how to programme a specific model using two different software, Brother Design Center and ZSK, and a comparison between the used software. On the second part are presented basic principles for technical embroidery. Starting with the destination of the technical textile fabrics and moving to the technologies used on the state of the art embroidery machine ZSK - JCZA 0109-550-700. In the paper it is made a short presentation of the characteristics of fashion embroidery versus technical embroidery. The presentation starts with the textile material used, embroidery principle and software for the two embroider technics.

Keywords: *embroidery design, fashion emboidery technics and machines, technic embroidery materials and principle, software for embroidery.*



LINKING TECHNOLOGICAL ADVANCES AND CULTURAL HERITAGE: THE CASE OF CRAFT-IT4SD PROJECT

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Abstract

The CRAFT-IT4SD project (Craft Revitalization Action for Future-proofing the Transition to Innovative Technologies for Sustainable Development) has as main objective to reconnect European cultural heritage and traditional crafts with the new technological innovation, in order to sustain the green and digital transition of the textile and fashion industries. Following the directions of the European Green Deal and the EU Strategy for Sustainable Textiles, the project responds to challenges such as overproduction, waste and non-transparent value chains, proposing new models of work that combine cultural values, sustainability and digital instruments. The cultural and creative sectors are considered important drivers of change, and crafts are understood not only as elements of identity but also as resources for innovation. The project uses an interdisciplinary approach where immersive media, extended reality, additive manufacturing and life cycle assessment are combined to explore new ways of design, production and consumer interaction. The activities involve a large ecosystem of artisans, SMEs, designers, researchers and policy makers, encouraging collaboration and capacity building. Among the four European pilot clusters, one is developed in Romania and is particularly illustrative for the project's approach. Its theme can be expressed shortly as: Blending traditional Romanian craftsmanship with additive manufacturing and 3D printing to create sustainable, heritage-inspired fashion collections. Through three iterations, capsule collections were created, combining cultural symbols with technological experimentation, in collaboration with students, artisans, SMEs and high-end brands. Workshops, prototyping and demonstrations offered not only innovative designs but also experience for future technology transfer to local enterprises. By connecting crafts with new technologies, CRAFT-IT4SD proposes replicable solutions for including intangible heritage into modern design practices. The project promotes circular economy, digital literacy and community participation, transforming heritage-inspired fashion into a cultural and creative resource with global potential. In this way, it shows that tradition and innovation can co-exist and develop together, placing sustainability in the center of fashion and redefining it as a living archive, inclusive, innovative and environmentally responsible.

Keywords: *craft, cultural heritage, additive technologies, creative sectors.*



SESSION 3.1.

Technical Textiles for Clothtech and Homotech Applications

Chair:

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ROMANIA



ANALYSIS OF THE THERMAL AND PROCESSING BEHAVIOR OF PLA AS A PET SUBSTITUTE IN TEXTILE MANUFACTURING – A STATE-OF-THE-ART REVIEW

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Abstract.

By replacing the conventional synthetic fiber polyethylene terephthalate (PET) with bioplastics, the amount of harmful microplastics entering the world's oceans can potentially be reduced. Microplastics released during washing and disposal of PET-based textiles represent a growing environmental concern. Another environmental challenge is the reliance on the finite reserves of fossil-based raw materials and the plastic disposal problem. Therefore, the bio-based, biodegradable polyester polylactic acid (PLA) with excellent material properties for textile application is considered as one of the most promising biopolymers, as it exhibits many properties similar to PET. However, its relatively poor thermal stability and its lower glass transition temperature remain limiting factors when considering large-scale substitution. This review paper deals with the thermal requirements for synthetic fibers in the industrial production of clothing textiles. Furthermore, current developments for modifying the thermal properties of PLA fibers are researched to enable their application in textile manufacturing. The glass transition temperature of PLA is close to the temperatures used in textile finishing and subsequent care, which leads to degradation of the material. There are already promising approaches to increasing the glass transition temperature of PLA through targeted material modifications. Further development is required to establish PLA fibers as a viable alternative to PET fibers to reduce microplastic pollution in the ocean.

Keywords: *biopolymers, PLA fibres, PET substitution, PLA modification, clothing textiles, biodegradable polyester.*



THE WORKWEAR AESTHETIC IN MENSWEAR: SHAPING COORDINATED SETS FOR FUNCTION AND STYLE

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Abstract.

The contemporary fashion landscape has witnessed a significant evolution of work garments, transcending their original functionality-based origins to profoundly influence diverse styles and design approaches. This trajectory demonstrates a convergence of functional imperatives with aesthetic considerations, extending its impact beyond traditional workwear to everyday and occasion wear. Originally conceived for comfort, safety, and unrestricted movement, these garments have been reinterpreted in recent years through the pervasive "workwear" trend, which blends utilitarian attributes with sophisticated design, thereby securing a prominent position in contemporary fashion. As the increasing permeability between professional and social spheres continues to reshape dressing practices, consumer expectations regarding the performance properties and versatility of apparel have intensified. Notably, the post-pandemic period has underscored the salience of speed, practicality, and adaptability, particularly within menswear, where designs infused with workwear aesthetics now address both pragmatic needs and users' pursuit of distinctive style. Within this context, coordinated set garments - including twin sets, co-ords, and "one-look" ensembles - have gained considerable traction, offering coherent visual appeal alongside enhanced functional benefits. This study employs a qualitative case study approach to examine how the global brand Mavi has strategically reconfigured set designs that integrate functionality and aesthetics within modern wardrobes, specifically through the lens of the prevailing workwear trend. It further investigates how design philosophies emphasizing functionality, versatility, and structured elegance are integrated into Mavi's product groups, with a focus on its Spring/Summer 2025 season. Accordingly, this research critically discusses the position of innovative products—those adept at delivering both sophistication and comfort in response to evolving consumer expectations—within the dynamic fashion industry.

Keywords: *workwear, menswear, functionality, aesthetics, co-ord sets, twin set.*



ANALYSIS OF FABRIC SURFACE TEXTURE BASED ON 3D CONTACTLESS MEASUREMENT

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Abstract

Geometrical product specification (GDP) concerns both a macro-geometry including size, form, orientation and location as well as a micro-geometry called also surface texture of products. The micro-geometry of textile materials is significant from the technological and functional point of view. It influences such fabric properties as wettability, light reflection, heat radiation, contact thermal resistance, handle and appearance. In textile engineering the surface roughness is usually measured by the KES-FB4 instrument. It is a part of Kawabata Evaluation System (KES) and belongs to a group of contact measurement methods. It provides the value of one parameter (SMD – Surface Mean Deviation) measured both in the warp and weft direction. The information is insufficient for complex characterization of surface texture and functionality of textiles. In metrology of solid objects, the 3D contactless measurement of surface texture is widely applied providing a wide range of surface data in the form of numbers and graphs. The measurement can be performed in a profile and also areal method providing complex data for whole area of measured surface. In presented work the woven fabrics of different structure were measured in the range of their surface topography. Measurement was performed by means of the MicroSpy® Profile profilometer based on optical principles. On the basis of obtained results the complex characterization of surface texture of fabrics diversified in the range of their weave and tightness were presented. Additionally, the relationships between the surface geometry parameters and fabrics' structure parameters were analyzed and described. Obtained results confirmed the influence of weave and tightness of the woven fabrics on their surface texture.

Keywords: *woven fabrics, profilometry, surface, texture, roughness, waviness, measurement.*



TENSILE PROPERTIES OF SILK BLEND KNITTED FABRICS

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Abstract

The use of silk and silk blends is increasing, particularly for everyday wear and various types of sportswear. Silk blends are used to improve aesthetic, comfort, and mechanical properties. The tensile strength of 100% silk is not very good and can be improved in blends. Different blends, and knitting structures can have very different mechanical properties, such as breaking force and elongation. For our research, 16 different knitted fabrics were used. Four silk blends were selected: silk/wool, lyocell/silk, cotton/acrylic/silk and cotton/silk. Four different types of single jersey fabrics were also chosen: single jersey, single piqué, single fang, and honeycomb. All fabrics were washed five times under the same conditions. After washing, the dimensional stability of the fabrics was measured, as well as tensile properties, breaking force, and breaking elongation. The results show that the greatest change in dimensional stability – shrinkage – occurred in the silk/wool samples, followed by the cotton/silk samples. The highest breaking force in the vertical and longitudinal directions was achieved with knitted fabrics made from cotton/silk and cotton/acrylic/silk blends. The lowest breaking force in both directions was found in knitted fabrics made from silk/wool blends. The highest breaking elongation in both directions was observed in knitted fabrics made from silk/wool blends, followed by cotton/silk and acrylic/cotton/silk, while the lowest breaking elongation was found in lyocell/silk blends. The knitted structure also has a slight influence on breaking force and breaking elongation.

Keywords: *silk blends, tensile properties dimensional stability, knitted structures, breaking force, breaking elongation.*



INFLUENCE OF STRUCTURAL PARAMETERS ON THE PROPERTIES OF KNITTED FABRICS FOR SLEEP MASKS

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Abstract.

This study aims to determine and analyse the key physical properties of two-layer knitted fabrics intended for sleep mask applications, focusing on the influence of structural parameters. All knitted structures were developed using 100% cotton yarn, selected for its natural softness, breathability, and skin compatibility – qualities essential for prolonged contact with facial skin during sleep. The research investigates how variations in stitch density, fabric thickness, and loop configuration affect critical performance indicators such as mass per unit area, porosity, extensibility, and dimensional stability after wet-heat treatment. Four experimental knitted structures (Pique Poplin, Swiss Pique, Interlock, and Tubular) were developed using controlled knitting parameters and systematically tested under standardised laboratory conditions. The results revealed that stitch density and fabric thickness play a decisive role in determining the mechanical behaviour and comfort-related characteristics of the fabrics. Additionally, dimensional stability after washing is strongly influenced by the type of fabric structure and the compactness of the knitted fabric. These findings provide valuable insights for the development of textiles in the field of sleepwear and personal wellness products. They also offer practical input for the creation of high-comfort, breathable sleeping masks, aligning with current trends in sustainable and user-centred textile design.

Keywords: *knitted fabrics, structural parameters, physical properties, sleep mask, personal wellness product.*



SESSION 3.2.
Management and Entrepreneurship

Chair:

Adrian VILCU, Gheorghe Asachi Technical University of Iasi,
ROMANIA



THE ART OF CONNECTION: HOW MULTIDISCIPLINARY DESIGN AND BRAND COLLABORATIONS DRIVE ORIGINALITY AND EMOTIONAL ENGAGEMENT IN FASHION

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Abstract.

Rapidly evolving global aesthetic sensibilities have transformed design from a mere production practice into a profound cultural narrative. This shift necessitates a multidimensional design approach, shaped by the interplay of diverse disciplines. This study investigates the pivotal role of multidisciplinary design approaches in fostering originality and emotional depth in product design, using the domestic brand Kaft as a case study. Kaft's conceptual production philosophy and narrative-driven visual language are examined through its collaborations with globally recognized brands, Fender and Fujifilm. The analysis evaluates the impact of storytelling, colour, and imagery on cultivating emotional connections with audiences. Furthermore, the paper explores Kaft's environmentally conscious production practices, specifically its use of Better Cotton Initiative materials and certified dyes to minimize harmful Volatile Organic Compounds, contextualizing the relationship between aesthetic creativity and ecological awareness. Storytelling in design is thus interpreted as a communication modality that elevates garments beyond mere consumer objects, transforming them into silent narrative carriers. The research ultimately aims to demonstrate how interdisciplinary interactions strengthen brand identity, enrich user experience, and generate cultural value within the global creative economy.

Keywords: *multidisciplinary approach, t-shirt design, brand storytelling, emotional connection, sustainable production.* TM



STRATEGIC MODELS FOR TRANSITIONING TOWARDS SUSTAINABLE ORGANISATIONS IN THE CONTEXT OF INDUSTRY 5.0

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Abstract

The emergence of Industry 5.0 marks a paradigm shift from automation-focused production towards a human-centered, resilient, and sustainable industrial environment. Within this context, organisations face increasing pressure to integrate sustainability into their strategic and operational frameworks. This paper explores strategic models that facilitate the transition towards sustainable organisations aligned with Industry 5.0 principles, highlighting the relationship between technological innovation, human values, and environmental responsibility. While digital transformation has been extensively studied within Industry 4.0, strategic sustainability in Industry 5.0 remains conceptually underexplored. This study adopts a conceptual approach, combining insights from sustainability management, digital transformation, and organisational strategy to propose an integrated framework for sustainable transition. Future research will focus on empirically validating the proposed framework through case studies across various sectors.

Keywords: *Industry 5.0, organisational sustainability, strategic management, sustainable transition, human-centric innovation, circular economy*



MODELS FOR MEASURING THE INFORMATION SYSTEM SUCCESS: A THEORETICAL SYNTHESIS APPROACH

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Abstract

This paper provides a structured theoretical synthesis of the most influential and widely adopted models for measuring IS success. It critically examines key frameworks, including the DeLone and McLean IS Success Model, the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Task-Technology Fit (TTF) model, and others. Through a qualitative literature review and comparative analysis, the study identifies the core constructs across these models, explores their conceptual overlaps and distinctions, and traces their evolution in response to emerging technological and organizational trends. The findings reveal that while models differ in scope and emphasis, several common dimensions recur across frameworks, such as system quality, user satisfaction, usage intention, and net benefits, indicating a convergence around certain critical success factors. The paper proposes an integrative conceptual framework that synthesizes these recurring elements, offering a more comprehensive and flexible basis for evaluating IS success across various contexts. This synthesis not only clarifies the relationships between existing models but also highlights gaps and underexplored dimensions, such as dynamic user contexts and evolving stakeholder expectations. By unifying diverse theoretical perspectives, this paper contributes to the ongoing effort to standardize IS success evaluation and supports researchers and practitioners in selecting or designing models best suited to their specific environments. The proposed framework serves as a foundation for future empirical testing, cross-industry benchmarking, and model refinement. Future work will involve validating the integrated model in different organizational and technological settings, with an emphasis on adaptability to emerging technologies such as AI-driven systems and cloud-based platforms.

Keywords: *IS success, DeLone and McLean, Technology Acceptance model, UTAUT model, TTF model.*



EVIDENCE ON THE DYNAMICS OF THE TEXTILE AND CLOTHING INDUSTRY AND MARKET IN ROMANIA

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Abstract.

The textile and clothing industry is considered the third largest manufacturing industry in the world, with increasing research interests over time. The research directions were diverse, considering micro, macro and mondo economic approaches. Different from previous studies, the present study aims to evaluate, from a macroeconomic perspective, the textile and clothing industry and market in Romania. The research methodology was based on the use of a descriptive case study. The data were collected from secondary sources, provided by the National Institute of Statistics of Romania and the World Bank. Based on the data collected (covering the period 2018-2023) and the analyses performed, the following conclusions were drawn. At the industry level, the industrial production index declined. The share of value added in total production was 6.7%, with Romania surpassing countries such as Germany, Croatia and Estonia. The analysis from the domestic market perspective revealed that the specific market of this industry is poorly concentrated, with 80% of the companies registered in Romania having on a average market share of less than 1%. Regarding the external market, the results highlight both a decrease in imports and exports. On the other hand, the results indicated that the gap between imports and exports was reduced. For the analyzed period, the research carried out highlighted changes in consumption and production behaviors in a less favorable economic context, marked by economic, financial, political, military and pandemic crises. The results of this study may have practical implications because they provide reference frameworks for entrepreneurs looking for investment opportunities in this industry.

Keywords: *textile and clothing industry, market concentration, production, imports, exports, value added.*



A DESCRIPTIVE APPROACH TO PERCEPTIONS REGARDING THE CONCEPTUAL MODEL OF MAINTENANCE CONTRACTS MANAGEMENT

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Abstract

Maintenance contracts management is a system that governs the entire outsourced maintenance activity of a company, from the moment the contracts are created until they have achieved their purpose, involving a multidisciplinary approach to ensure success in a company. Considering the importance of maintenance contract management in a company, a conceptual contracts management model was designed that follows the following dimensions: Start-up Management; Team; Communication and Relationship; Execution; Intelligent Component; Performance Monitoring and Reporting; Integration; Completion. In order to find out the perceptions of professionals in this field regarding the proposed maintenance contracts management model, the online questionnaire research tool was used. The questionnaire was structured in two parts: the first part included nominal demographic questions that analyzed membership of the respondents in one category or another and the second part used interval level questions (from 1 "irrelevant" to 5 "essential") that analyzed the importance of the identified dimensions from the perspective of 52 items. The aim of this paper is to perform a descriptive analysis of the perceptions captured through the questionnaire used in order to find out if the identified dimensions have the potential to lead to an efficient management of maintenance contracts. Future work will focus on conducting a quantitative analysis of the results obtained.

Keywords: *framework, dimensions, questionnaire, items, analysis.*



SESSION 3. 3.
Management and Entrepreneurship

Chair:

Andrea APETREI KALVERAM, Catholic University of Valencia,
SPAIN



FROM CONSUMER TO PROSUMER: A QUANTITATIVE STUDY OF SOLAR ENERGY INTEGRATION IN NORTHEASTERN ROMANIA

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Abstract

As the global energy sector transitions from centralized fossil fuel dependence to decentralized renewable energy systems, the role of the prosumer—an individual who both consumes and produces energy - has become increasingly relevant. This study presents a quantitative assessment of solar energy prosumer adoption in Northeastern Romania between January 2022 and March 2024. Using both linear and polynomial regression models, we analyze growth patterns across six counties (Iași, Suceava, Bacău, Botoșani, Neamț, and Vaslui). Results indicate a consistent upward trend in prosumer adoption, with linear growth in Iași and Suceava, and polynomial trends observed in the remaining counties. Key influencing factors include seasonal variability, government incentive programs, and the lingering effects of the COVID-19 pandemic. In addition, we assess the operational impact on technical personnel responsible for the deployment of smart meters. Despite the growing number of installations, workload analyses show that staffing requirements remained within regulatory thresholds, indicating effective resource planning. The findings offer valuable insights into how local infrastructure, policy frameworks, and human capital interact to facilitate grassroots-level energy transitions. This research highlights Romania’s potential to expand decentralized renewable systems sustainably, without overburdening the existing technical workforce.

Keywords: *solar energy integration; prosumer adoption; quantitative analysis; regression modeling; smart grid infrastructure; energy policy impact.*



EXPLORING PERSONALITY-BASED PREDICTORS OF ENVIRONMENTAL ATTITUDES AND BEHAVIORS IN TECHNICAL ACADEMIC CONTEXTS

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Abstract

This research proposes a conceptual and experimental model to explore the relationship between personality traits (PT) and environmental responsibility (ER), the latter measured through environmental attitudes (EA) and behaviours (EB). The study is conducted among university students in Engineering and Management at TUIASI, aiming to understand better how personality dimensions influence students' sustainable practices and mindset. By focusing on a statistically significant sample of 394 respondents, this research employs a structured questionnaire as the primary data collection instrument, followed by rigorous analytical techniques, linear regression, and correlation analysis. The literature review synthesises key findings on personality assessment tools, environmental responsibility constructs, and existing studies evaluating the PT-ER connection. The results confirm the existence of statistically significant correlations between specific personality traits—such as Conscientiousness and openness—and components of environmental responsibility. These findings validate the applicability of the proposed PT-ER model in the targeted student population. Furthermore, the model demonstrates moderate generalizability across gender subgroups, suggesting both universal and context-specific psychological mechanisms behind environmental engagement. However, this research is subject to several limitations, including geographic and demographic constraints (limited to TUIASI students), potential response biases in self-reported data, and the cross-sectional nature of the study, which prevents causal inference. Future research could expand the model to include cross-cultural comparisons and longitudinal analysis to understand changes over time and contextual effects better.

Keywords: *personality traits (BIG Five), environmental responsibility, environmental attitudes, pro-environmental behaviour, engineering and management students, statistical techniques (regression, correlation), statistical modelling.*



GOVERNANCE, STRATEGY AND RISK MANAGEMENT: A COMPARATIVE ANALYSIS OF LEADING INTERNATIONAL FRAMEWORKS

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Abstract

Risk management frameworks represent critical tools for organizations navigating complex and uncertain environments. This study provides a comparative analysis of several leading models: COSO ERM, FERMA/ISO 31000, as well as complementary approaches such as the Basel II/III framework in the financial sector and the Three Lines of Defense model in governance. Together, these frameworks shape a diversified landscape of methodologies for identifying, assessing, and managing risks across industries. This study aims to compare leading risk management frameworks, analyzing their advantages, limitations, and relevance for governance, strategy, and organizational resilience. Current research highlights that COSO ERM integrates risk with strategy and performance, offering a holistic approach suited for large corporations with advanced governance needs. FERMA/ISO 31000 emphasizes flexibility and universality, being adaptable to organizations of various sizes and sectors. Basel standards, developed for the banking industry, provide strict regulatory guidelines for credit, market, and operational risks, while the Three Lines of Defense model clarifies responsibilities in risk oversight through operational management, control functions, and internal audit. The methodology applied in this study is a comparative review of literature and institutional reports, enabling a structured assessment of the principles, strengths, and limitations of each framework. Findings indicate that no single model is universally applicable: FERMA ensures accessibility, COSO ensures strategic integration, Basel enforces compliance and resilience in finance, while the Three Lines of Defense ensures clarity in accountability structures. This study contributes by mapping complementarities among these models and suggesting that organizations increasingly adopt hybrid approaches, combining process-oriented and governance-oriented frameworks. Future research should explore the impact of digital transformation, sustainability challenges, and global crises on the evolution of risk management methodologies.

Keywords: COSO ERM, FERMA / ISO 31000, Basel II/III, Three Lines of Defense.



CAREER-MAKING, A MOTIVATION FACTOR IN PRIVATE ROMANIAN COMPANIES

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Abstract

The present paper examines the components of career management policies within four Romanian private companies, focusing on their impact on employee motivation, engagement, and productivity. Career management is increasingly recognised as a strategic dimension of organisational sustainability, bridging the gap between business performance and social responsibility. This perspective arises from the understanding that long-term competitiveness is no longer attainable solely through profit maximisation, but rather through the integration of ethical, motivational, and socially responsible practices into human resource strategies. A review of the literature indicates that employee motivation and career development are interrelated fields of study, addressed by both classical theories of motivation (Maslow, Herzberg, Alderfer) and contemporary approaches linking career growth with organisational justice and corporate social responsibility. While international research has documented the contribution of transparent promotion, professional training, and participatory decision-making to employee retention and satisfaction, empirical evidence from Romania remains scarce, particularly across diverse industries. The methodology combined documentary analysis with a survey-based empirical study. A questionnaire was administered to a sample of 100 employees drawn from four sectors: tobacco, cosmetics, soap, and waste management. The instrument was structured around six dimensions: recognition of merit, participation in company life, skills development, employment policies, working conditions, and remuneration. Respondents included managers, supervisors, white-collar and blue-collar workers, thereby ensuring a diverse perspective on the career management practices under scrutiny. The findings revealed significant gaps in career management policies. Recognition and promotion were perceived as opaque and unfair; employee participation in decision-making was minimal; skills development programmes lacked effective translation into promotion opportunities; job descriptions and performance evaluations were often inadequate; and working conditions and remuneration were considered unsatisfactory. These shortcomings undermine employee motivation, foster disengagement, and increase the risk of turnover, with direct implications for organisational performance. The study contributes to the field by providing empirical evidence from the Romanian private sector, linking deficiencies in career management with employee demotivation and reduced organisational effectiveness. It highlights the importance of adopting transparent, participatory, and socially responsible policies as prerequisites for sustainable competitiveness. Future research should expand the sample size, explore sector-specific dynamics in greater detail, and integrate comparative analyses with other European contexts.

Keywords: *career management, employee motivation, human resource management, organisational performance, sustainability.*



ANALYSIS OF THE DETERMINANTS OF CORPORATE PERFORMANCE. RESEARCH CARRIED OUT ON A PILOT SAMPLE IN THE GARMENT INDUSTRY

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Abstract.

In an economic environment marked by intense competition, uncertainties and rapid changes, managers are constantly concerned with identifying, evaluating and supervising the factors on which the success of the business they manage depends. To support managers, this study focuses on assessing the impact of financial performance drivers. The analyses were carried out at the level of a pilot sample, represented by companies in the garment sector in Romania. For the selected companies, data from 2014-2023 were collected. Financial performance (measured by return on assets, return on equity and return on sales) was the dependent variable. Econometric correlation and regression models have been applied both at the level of the entire period and at the level of subperiods, to capture the impact of the imbalances induced by the pandemic crisis. The independent variables, representing performance determinants, were selected from both the internal and external environments of the analysed companies. The results of the study indicated that, at the level of the entire period, the volume of sales and labour productivity had a positive and statistically significant influence on performance. In contrast, the degree of indebtedness and the size of the company had a negative impact. The analyses carried out at the level of sub-periods largely confirm these results. As for the impact of external factors, only the growth rate of the gross domestic product proved to have a significant influence only on the return on sales. This study can be useful to managers (as it provides evidence on the impact of different determinants on performance, facilitating the achievement of business objectives) but also to investors (who are looking for investment opportunities).

Keywords: *financial performance, Romanian companies, micro and macroeconomic variables, correlation and regression analyses, retrospective and prospective analyses*