

Workshop on Smart Textiles / Smart Wearables

Brussels, 30th May 2017

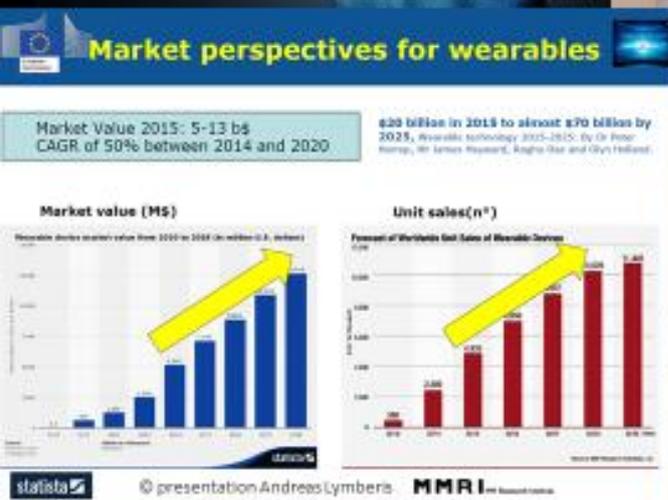


Table of Contents

Introduction	3
Main Findings.....	3
Presentations	4
Breakout Sessions	6
Breakout Session I: <i>Standardization of smart textiles and wearable intelligence - How can standards support developing and marketing your product?</i>	6
Break out session II: <i>Innovation marketing: How to reach industries and sectors for new application opportunities</i>	7
Breakout Session III: <i>How to support the industrial uptake and how to integrate SME? & Who should support this?</i>	8
Results survey about competencies	9
Participants List (by alphabetical order)	12
Background Information and suggested readings.....	14



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Introduction

Smart Textiles and Smart Wearables are subject to a continuous evolution. The topic links different thematic areas (and subsequently ERRIN Working Groups), such as textiles, design, big data/ICT, nanomaterials, microelectronics, sensors, advanced manufacturing, energy storage, and covers a wide range of applications (most of which are probably not even known yet): environment, health and wellbeing, fashion, energy, smart cities and many more.

The workshop was set up to explore interests and competencies within ERRIN regions, linking them to European policy, activities and initiatives and giving them the opportunity to find one another and discuss possible common interests and future collaborations.

Main Findings

The field of Smart textiles/wearables is promising and has opened new market opportunities, however, it cannot yet provide reliable products and stable technology demanded by application industries and customers: Industrial uptake lacks behind expectations.

At this stage, research and innovation, experimenting, knowledge exchange and communication shape to be the most important issues. The mix of technologies, sectors and stakeholders involved in creating and developing smart textiles/wearables displays an impressive variety.

Regional participants highlighted the need for interdisciplinary and multifunctional communication and cooperation schemes. These could be networks, platforms and/or other facilitation initiatives, which that are active in gathering stakeholders and support, to complement competences, work together in applied research projects as well as access (open) research infrastructures. Especially textile manufacturing SMEs express a lack of knowledge and business know-how with regard to the ICT sector. Adding the “smart” to textiles, ICT and electronic components changes the traditional textile/fashion business from finished products to lasting services. Different competences have to be established in SMEs to adapt to the shift in products/service-properties.

The workshop showed that European regions have many competences and use similar approaches to address the need for collaboration. Whereas clusters, universities and research institutions are the drivers for the activities, it was clear that we need to activate more manufacturing SMEs (industry) to participate in these projects. On the European level there are already existing networks (e.g. Regiotex) and interregional initiatives (Vanguard Initiation, S3 Industrial Modernisation Platform) that provide valuable know-how and could form the basis for further developing the multidisciplinary character, while supporting design and business-model thinking.

To accelerate the industrial uptake, regional participants stressed the importance of sufficient room for experimentation through practically oriented (applied) research and R&I projects that aim to develop and test prototypes. Participants repeatedly voiced the need for flexible

and small-scale project funding schemes that support interregional cooperation. An essential message from regional stakeholders to the European Commission concerns the development of flexible instruments and concepts that allow a fast and non-bureaucratic implementation of interregional collaboration projects. The idea of standardised European innovation vouchers was mentioned, which would allow tailored small-scale projects in alignment with regional S3 and using regional structural funds.

Finally, yet importantly, a common understanding is prerequisite for successful cooperation between different sectors as well as in communication between supply and demand sides. Standardisation plays an important role: it provides an environment for mutual understanding by defining a common language, setting quality standards and building consumers' trust for new products. The challenges here lay in integrating the different regulatory settings of the individual sectors and technologies (e.g. Textiles and medical applications, electronics and data protection) and the potentially resulting modifications in regulations. Combining the expertise from sectors and stakeholders involved is essential, but remains challenging.

The workshop was organised as an opportunity to explore the ERRIN regions' interest in the topic of smart textiles/smart wearables. Participants expressed the wish to follow up on the topic and to reflect on further steps. Planned events, which fit this purpose are a) the ERRIN Project Development Week in November, which is set up to facilitate strong consortia and project ideas for the next Horizon2020 calls, b) the European Commission conference on Smart Wearables/Smart textiles in fall 2017.

ERRIN, especially the ICT Working group, invite participants to share ideas and make comments on how the network can support further networking activities, e.g. by organising workshops and/or facilitating contact between interested regions. On regional level, regional stakeholders could collaborate by identifying manufacturing SMEs willing to participate in interregional projects.

Presentations

[*EU-Policy on Smart Wearables: Reflection and Orientation Paper*](#), *Andreas Lymberis, European Commission*

Andreas Lymberis from the European Commission's DG Connect highlighted that while smart textiles and wearables are a dynamic topic covering many different application fields, the market uptake (as evidenced in patent filings) is still limited. As part of the EU's strategy for *Digitising European Industry*, the EU aims to move away from single application fields to creating an overarching ecosystem, while directly funding disruptive technological innovations. Several calls in the 2018-2020 Horizon 2020 ICT work programme are directed at wearable technology.

[*Smart Investments in Textile Innovation - A Partnership within the Industrial Modernization Platform*](#), *Lutz Walter, EURATEX - European Apparel and Textile Confederation*

The RegioTex Initiative aims to enable innovation in smart textiles and wearables by supporting regional ecosystems. It gathers regions from across the EU and plans to generate smart public investment for strategic projects and cross-regional matchmaking.

[Vanguard Initiative - Demo Cases “Adding a dimension to 2D printed textiles”](#), *Michele Malvestiti Clap, Delegation of Confindustria to the European Union*

The Vanguard Initiative is launching a demo case on adopting 3D printing technologies for the textile sector. The demo case will present a demonstration plant for 3D printing on textiles and a 3D library with relevant samples, which can be accessed remotely and printed by any suitable 3D printing device.

[Smart Textiles and Standardisation](#), *Karin EUFINGER, CENTEXBEL*

Standards provide common criteria for the manufacturing and evaluation of products, on the grounds of safety, performance and interoperability. Industry can and should get involved in setting standards, and the adoption of standards makes it easier to bring newly developed products to the market.

[Pitch presentations on Smart Textile / Wearables Competences in Regions:](#)

- **[Uwe Möhring, Institute for Textile Research Thüringen-Vogtland e.V., DE](#)**: The SmartTex network pools Thuringia’s competences in ST. It gathers universities, research institutes and SMEs from different countries. The network is open to new regions joining and is looking to cooperate more with SMEs.
- **[Berit Greinke, Berlin University of the Arts, DE](#)**: UdK Berlin is running several EU-funded projects, among them WEARsustain. This project is holding a competition for designers working together with technologists to develop sustainable wearables.
- **[Poul Erik Jørgensen, VIA University College, DK](#)**: VIA University College is running several projects on wearables, especially with smaller companies. Often, small projects are needed to create workable prototypes, which is why the EU should focus on funding smaller demonstration projects and applied research.
- **[Marcos António Noqueira, IrRADIARE for the City of Guimarães, PT](#)**: The city of Guimarães has several organisations and projects active in the smart textiles field that are organised in creative clusters.
- **[Thomas Gnahn, wear IT Berlin, DE](#)**: The wearIT Berlin Festival is an annual festival aiming to bring together innovative SMEs and established brands in the fashion industry.
- **[Andrew Spink, Noldus Information Technology, NL](#)**: Noldus Information Technology gathers data about user behavior. Wearables could provide a new way of gathering user data, and Noldus plans to establish a platform on sensors and wearables that researchers can access.
- **[Matthew Drinkwater, London College of Fashion - Centre for Fashion Enterprise, UK](#)**: The fashion industry has traditionally been slow to take up technological innovation, even though it is the only way to create new developments in fashion nowadays. The Fashion

Innovation Agency therefore aims to connect established fashion brands with tech innovators.

Breakout Sessions

Breakout Session I: *Standardisation of smart textiles and wearable intelligence - How can standards support developing and marketing your product?*

Moderation: *Karin Eufinger, Centexbel*

In order to understand why standards are of great importance, the same questions as for product development and marketing need to be considered:

- What is your product (idea)?
- How do you want to market your product?
- What are the characteristics of your product? What properties/ functionalities does it have?
- How are you going to prove these properties/ functionalities?

Standards are a means to provide a common basis for manufacturing, testing and evaluation of products. Given this common basis, they can also be used to evaluate the fitness for use and clearance for putting the product on the market as defined by European, national and regional legislation. By defining criteria or classes, products can be categorised for different markets, e.g. consumer, sports, medical, protection, etc. Important issues here are durability, robustness and reliability of the properties/ functionalities. It can be easier to develop standards and criteria for products with lower health and safety requirements first (e.g. consumer products), providing the basis for more strict criteria and requirements – especially towards health and safety (e.g. medical and protective products).

Many smart textiles and smart wearables contain elements from both textile and electronics, which need to be combined and used in a non-conventional manner. This means that the current standards for both textiles and electronics cannot always be used as such, but require modifications. Developing new standards requires the expertise from both sectors, and if data communication (body area networks, internet of things, etc.) is involved, ICT know-how is equally required. Bringing together this expertise to develop the necessary standards is a challenge and requires developing a common language and understanding between these different players. Thus, understanding each other's terminology or defining a common (standard) terminology is vital.

When developing standards and standard terminology, it is important to involve all stakeholders, including manufacturers, designers, users, retailers, (national) authorities, etc. This will ensure that they will provide the necessary common understanding among the different stakeholders.

Break out session II: Innovation marketing: How to reach industries and sectors for new application opportunities

Moderation: *Richard Tuffs, ERRIN*

This topic was discussed by three groups. The first group analysed the problem from a supply-side angle and a demand-side angle (see Figure 1). Generally speaking, the demand side was looking for products and services that could sell and there was a gap with the current offer of the supply side. The group then developed an analogy with a cardigan with a zip (How do we zip the demand and supply side together?) It seems as if there is still a problem in developing models accepted by both sides. The supply side emphasises creativity (fashion), while the demand side requires more robust business models.



Figure 1

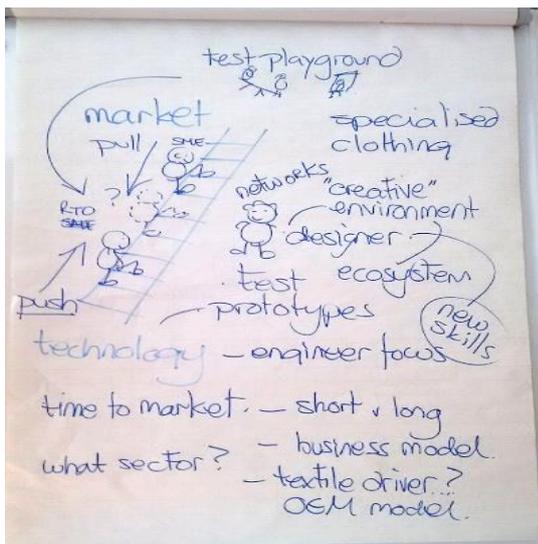


Figure 2

The second group (Figure 2) examined the problems from a supply chain angle. There is a specialised materials supply chain (e.g. fire protection equipment), but few others. In the ladder analogy, there is a need for both sides to develop pull activities from the retail side and push activities from the supply side. However, in the middle to link the two, we need ‘facilitators’ or ‘orchestrators’ to join the two sides together to complete the value chain or ladder.

The third group approached the task from a more linguistic perspective. How do we develop a common language between the supply side and the demand side? The concept of interpretation came up as a barrier, but also as an opportunity. At the local level, interpretation can be costly and intrusive, however, at a global level it can help expand the market. Discussions also centered on the role of communication between different partners and their distinctive cultures.

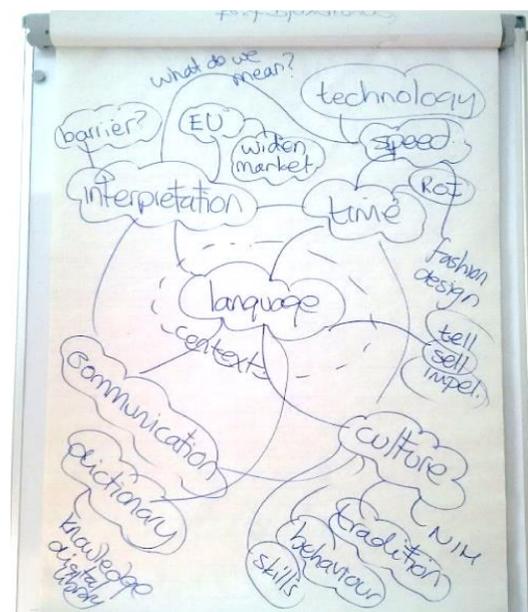


Figure 3

Breakout Session III: How to support the industrial uptake and how to integrate SMEs? & Who should support this?

Many studies predict a fast-growing market for smart textiles / wearables. Nevertheless, market uptake is still slow. Considering the three perspectives of SMEs, R&D and the market side, participants were discussing the following key questions:

- What are the **expectations** of smart textiles / wearables?
- What are the **obstacles** of smart textiles / wearables?
- Who are the player?
 - o SMEs / Start-Ups / Global player and
 - o which cooperation is useful
- Which competences are necessary and needed for the SMEs, R&D partner?
- What we need at first?
 - o Product idea
 - o Technology which TRL?

The results of the discussion of the Breakout session III are the following:

What are the expectations of smart textiles / wearables?

SMEs: SMEs will realise the market expectations

Market: The market needs products that are reliable and cost-efficient. Integration of services to the original product makes smart textiles/smart wearables interesting for industry and costumers. This trend will intensify and requires extended/new business models. The development issues must be industry-driven.

R&D / SMEs: Policies (regulation and standardisation) are needed.

What are the obstacles of smart textiles / wearables?

R&D: R&D needs access to international knowledge

SMEs: need access to knowledge about the sales process, warranty issues and the service in the after-sales market of smart textiles/smart wearables products and services.

Production costs are still high, due to the lack of machines with a high level of automatisisation (digitalised production). In addition, SMEs need better access to financial support (to handle the digital change in production and to realise demo-projects).

What do we need at first?

Important is the product idea. On the one hand, the underlying technology exists already and runs at a sufficient level (basic development) to serve as a basis. Then prototypes and mock-ups are necessary and help initiate the industrial process. They are usually a result of research and innovation activities.

On the other hand, a disruptive technology can produce entirely new products or completely change the classic manufacturing technology of a product (see 3D printing).

Results survey about competencies

Ahead of the conference, a survey was shared amongst ERRIN members and potential participants to the workshop to meet their interests when organising the breakout sessions.

Name	Type of organisation	Fields of work	Regional skills	Challenges	Needs
Nicola Dorigo Salamon	Research Institution	Fashion; Interior design; professional applications	Design; Arts; Fashion; Architecture; Communication and media	consumer acceptance; aesthetics; standardisation; integration; training; curricula development modernisation	partnerships with technology providers and manufacturer; user trials
Thomas Gnahm	Company	Design; science and manufacturing of wearables smart lifestyle product	professional networking; product development; prototypes and consultancy for brands and industries	the value chain of smart wearables; not enough transparent potential of new products for big companies	best practice examples of products in the market; more connections between industries
Berit Greinke	Research Institution	electronic textiles; textile production techniques; practice-led research approaches; fashion; sports; health and wellbeing; Industry 4.0; smart homes; project WEAR	textile interactions; textile production	interdisciplinary collaboration between creative and technology industries; sustainable production and use of personal data; bridging research and product development	sustainable production; cross-sector collaboration (artists and technologists)
Thomas Heinick	Cluster	network coordination; organize workshops and events; public relations, marketing	2 textile research institutes (TITV and TITK) are located in the region; well-developed network and cluster landscape	little personal and financial potential for research and development; transnational co-operation of qualified partners	further internationalization of the SmartTex network; involvement of co-operation with European companies and research facilities

Poul-Erik Jørgensen	Research Institution	coordination of research network dealing with project concerning to smart textiles; integration of function in textile structures; 3D printing	3D Printing; integration of special functions in textile substrates; technical textiles	time to market	network partner; other competences
Uwe Moehring	Research Institution	sensors/actuators; heating; lighting	R&D	consumer acceptance; aesthetics; standardisation; integration; training and curricula development modernisation	
Aase Nielsen	Regional Authority	Design; creative industries	VIA University College has research competences in Smart Textiles		
Moritz Ortelbach	Regional Authority	Thuringian Clustermanagement (ThCM)	Sensors and actors; Coatings; surface modification; functional fibres	structural challenges (SME's etc.)	
Klaus Richter	Cluster	development of Smart Textiles; specializes in the production of small batches			
Elke Römhild	Other	providing advisory services and support for local companies via EEN Services for all technology and innovation fields; transnational co-operations dealing with micro/nano, textiles and wearables	initiation of transnational Business cooperation and EU projects focused on smart textiles like H2020; organizing brokerage events and company missions focused on smart textiles		
Federico Rovea	Other	innovation and smart textile issues; Torino Fashion Week	long established tradition in smart textiles research; smart clothing, recycled clothing and bio-fibres; financing and sustaining SMEs		

Andrew Spink	Company	software for data acquisition; analysis of physiological and other sensors in smart textiles and wearables for researchers	software development; data analysis; behavioural sciences	suitable hardware for our customers (price, functionality)	subsidy projects (consortia, partners, etc)
Weronika Urbanska	Research Institution	researchers from Welsh Universities are working on different fields concerning smart textiles			
Inma Valencia	Regional Authority	innovation projects (FIELD; NANOTEX II; GENTEX I)	Textil Santanderina; Deep-rooted commitment to research and design; established in the international market; Strong R&D Unit	invest in R&D; smart fabrics; new finishing processes; conductive materials	share good practices; set up valuable partnerships to present EU proposals under H2020
Daniela Zavec Pavlinic		smart personal protective equipment; smart textiles for sport	functional design; human comfort towards integration of wearable electronics	how to overcome from prototype level to serial production; relation between prototyping and standardization; overcome the barrier towards to end users	
Xianyi Zeng	Research Institution	integration of sensors into textiles; design of wearable systems; signal processing; big data	health centres are interested in developing smart textiles for medical applications; fashion brand companies working for developing connected and smart textiles for special populations	development of systematic methods for designing intelligent garments and wearable systems; finding a suitable method for reducing noises and extracting "true" signal features	developing new wearable systems for special populations; connection to cloud computing Platform; combination of textile sensors and electronic devices
Dirk Zschenderlein	Research Institution		Printing; integration of special functions in textile substrates; technical textiles	time to market	network partner; other competences

Participants List (by alphabetical order)

First Name	Last Name	Region	Organisation
Adrien	Alberni	Auvergne Rhone Alpes	Region Auvergne Rhone Alpes
Veronica	Cornacchione		ERRIN
Nicola	Dorigo Salamon	London	University of the Arts London
Matthew	Drinkwater		London College of Fashion
Karin	Eufinger		CENTEXBEL
Andrea	Futterer	Stuttgart Region	Stuttgart Region
Jens	Geelhaar	Thuringia / Germany	Bauhaus-University
Thomas	Gnahm	Berlin	Wear It Berlin
Berit	Greinke	Berlin	Berlin University of the Arts
Thomas	Heinick	Thuringia	SmartTex-Netzwerk
Markus	Hell	Berlin	Berlin Partner
Mona	Herter	Germany	EiIL
Poul-Erik	Jørgensen	Denmark	VIA University College / VIA Design
Wolfgang	Kill	Saxony	Saxony Liaison Office
Andreas	Lymberis		European Commission
Michele	Malvestiti		Clap, Delegation of Confindustria to the European Union
Uwe	Moehring	Thuringia	TITV e. V.
Ludovico	Monforte	Lombardia	Union Chamber of Commerce of Lombardy
Aase	Nielsen	Central Denmark	Central Denmark EU Office
Marcos António	Nogueira		IrRADIARE for the City of Guimarães
Moritz	Ortelbach	Thuringia	State Development Corporation of Thuringia
Klaus	Richter	Thuringia	SmartTex-Netzwerk

Elke	Römhild	Thuringen	Foundation for technology, research and innovation Thuringen (STIFT/EEN)
Federico	Rovea	Piedmont	Unioncamere Piemonte
Anna	Spechtenhauser	Stuttgart Region	Stuttgart Region
Andrew	Spink	East Netherlands	Noldus Information Technology BV
Ryan	Titley		ERRIN
Richard	Tuffs		ERRIN
Weronika	Urbanska	Wales	Welsh Higher Education
Inma	Valencia	Catabria	Government of Cantabria
Lutz	Walter		EURATEX
Annelie	Zapfe	Thuringia	Representation of the Free State of Thuringia to the EU
Daniela	Zavec Pavlinic	Thüringen	SmartProducts
Xianyi	Zeng	France	The ENSAIT Textile Institute
Dirk	Zschenderlein	Saxony	Saxon Textile Research Institut

Background Information and suggested readings

Reflection Paper

DG CONNECT issued a reflection paper which:

- takes stock of the latest techno-market and policy developments,
- documents the research and development activities supported by the EU,
- integrates the positions of stakeholders with a focus on barriers that prevent the transition of wearables from lab to the market

[Information and Stakeholders' Day on Wearables](#) organized by DG CONNECT on 11th December 2015

Smart Regional Investments in Textile Innovation

<http://s3platform.jrc.ec.europa.eu/textile-innovation>

Lead regions: Valencia and North-East Romania

Participating regions: Campania, Lombardy, Piedmont, Catalonia, Norte, Hradec Kralove Region, Emilia Romagna, West Flanders

Other interested regions: Puglia, Västra Götaland”

RegioTex

<http://www.textile-platform.eu/regiotex-regional-investment/>

The mission of the RegioTex initiative is to bring together stakeholders from the textile, clothing and related industries, their research, technology and education providers as well as public authorities and agencies in a joint effort to develop and implement strategies that will facilitate and accelerate the emerging industrial renewal in traditional manufacturing regions across Europe. The goal is to strengthen the regional innovation capacities, to facilitate investment in open innovation infrastructures or new technologies by SMEs and to establish effective European collaboration between regional actors.

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