COST ACTION CA17107

WG5
SMART TEXTILES FOR SPORTSWEAR AND WEARABLES

THEMATIC WORKSHOP

3rd April 2019, Porto

CONTENT

1. AGENDA AND PRESENTATIONS

9:15 – 9.30 h	**Registration**
9.30 – 9.45 h	**Welcome and short presentation of all the participants** Lúcia Rodrigues (CITEVE) WG5 coleader
9.45 – 10.00 h	**CONTEXT network presentation** Ariadna Detrell (AEI TÈXTILS), CONTEXT Chair
10.00 – 10.15 h	**WG5: Textiles in sports and wearables** *Scientific and technological bottlenecks* Savvas Vassiliadis (University of West Attica), WG5 member
10.15 – 10.30 h	**Presentation of Portuguese Textile Cluster** *Objectives, thematic groups, trends and challenges - SIG. V Sports* Ana Ribeiro (Executive Director of Portuguese Textile Cluster)
10.30 – 11.00 h	**Coffee - break**
11.00 – 11.15 h	**Trends and market needs** Portuguese company in retail business
11.15 – 12.15 h	**Working session**
12.15 – 12.30 h	**Main conclusions**

2. SUMMARY OF THE MEETING

2.1 PRESENTATIONS

The first part of the meeting consisted of several plenary presentations introducing the different aspects involved in the development, industrialization and commercialization of advanced smart textiles in sports and wearables.

These included an introduction of CONTEXT Cost Action by its Action Chair; a presentation of the scientific and technological bottlenecks of smart textiles in sports and wearables as outcomes of the first WG5 meeting, by a WG5 member; a presentation of the objectives, thematic groups, trends and challenges of the Portuguese Textile Cluster' Special Interest Group V by its Executive Director and, finally, a presentation of the trends and market needs by a Portuguese company in the retail business.

All presentations are available in the previous section (agenda) linked to the pdf. file and also through the project website (www.context-cost.eu).

2.2 WORKING SESSION IN GROUPS

The working session was conducted through a participatory dynamic, carrying out four main activities:

- o Brief presentation of the attendees.
- o Discussion on the main bottlenecks for the industrialization and market launch of smart textiles for sports & wearables
- o Thinking-out session of solutions to the needs identified during the presentations in the previous part and the previous discussion.
- o Matrix prioritization of these ideas in order to identify the solutions to promote in the next activities.

The participants were grouped into 4 selected working groups in order to facilitate the contribution of the different points of view among them and to foster an active participation.

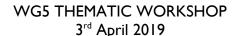# 3. DISCUSSION AND CONCLUSIONS OF THE SESSION

The discussions started with an overview of the presentations and the related comments of the first part. Then the participants presented their ideas and considerations about the bottlenecks occurred and observed during the evolution of the smart textiles technology and especially in the phase of their industrialization.

As known, smart textiles have been in the center of the textile research interest and numerous national and international programs have given impressive results. Smart textiles have also caused a very interesting interaction between various branches of engineering like electrical, electronics, mechanical, chemical, materials etc. However, over the last years, although it was expected that the technology developed in the research level should have passed in the application and industrial level, a delay has been observed. It was expected that we should have in the market products based on smart textiles principles, but only few examples can be found and without a considerable financial success.

The most important outcomes to face the main technological bottlenecks in industrialization and bottlenecks in commercialization are presented below:

1. The research efforts and the industrialization activities must be better focused in limited applications in order to increase power available to expect better results.

2. The multidisciplinary approach must be strengthened so that more solution proposals will be available in certain application problems. Networks between textiles, electronics, end-users, chemists, biologists and physics are required and also more cooperation between R&D centers and the industry.

3. Smart textiles should be understood as a sui generis product and it should be avoided comparing them with traditional textiles concerning their performance, etc.

4. It is important to follow the market trends as they are expressed in specialized exhibitions, special events, etc. and to avoid the design and development of products that are not in the sense of the market trends.

5. Definition of marketing strategies focused to support market uptake is required.

6. Focusing on critical applications like health, sports, defence, where the price is not the most important factor.

7. It is required to assure the reliability of the data generated (data gathering, quality and storage, considering that should have different levels of confidentiality according to the specific application).

8. It is of great importance to connect the smart textile product with the related services like medical supervision in order to increase the added value. To find the niche markets where these services are more valued: handicapped, elderly people, etc.

9. Attention must be paid on the standardization and certification of smart products. Standardization supports the exploitation of the products and it makes the compatibility an important tool for synergies. Scientific certification for wearables is needed (doctors, authorities).

10. A better use of the product development mechanisms is suggested in order to gain the existing experience from the other sectors and similar product categories.

11. It is necessary to provide a global offer: integrated solutions concerning to the solution features and maintenance needs.

12. It is required to get better textile-electronic interconnections and energy supply technology in order to resist to several washing cycles (develop simple tools which can guarantee good connections, deposition techniques that resist to washings, low energy consumption, charging batteries wireless (induction technology is a very promising technology) and self-powered systems).

13. The smart textile area has been strongly interconnected with the use of the electronic components, systems and devices in and on the textile products. However, this is not a one-way path. It is possible to develop smart textile products without electronic components mainly using other physical, mechanical and chemical principles. It seems the use of the classical electronic components and devices introduces many problems and mainly instability and low reliability issues. The change of the character from electronics to other principles could lead to a more reliable category of products.

After the discussion and the contribution of the members in the creation of the previous list, a priorization of possible activities was done concerning their importance and their urgent character.

CONCLUSIONS

Many ideas focused on communication and how to show the added value to potential consumers (how to get them to pay for the costs). For that, several ideas were around cross-sectoral collaboration, the need for user driven approach in designing the smart textiles, the generation of new business models to drive competitive prices. All those points were the highest in prioritization as well both in importance and urgency.

It is also considered as urgent the research activity to solve the washing and the textile-electronics' interconnections problems: to search for different washing chemicals, self-cleaning textiles, use of conductive sewing threads, etc.

Another short-term strategy is the use of "Apple"-like service for niche applications, all the members agreed that the smart textile needs to start with B2B approach prior to deployment to the public as B2C. For both cases, one opportunity is to look at higher end segments and providing a hassle free approach for users with strong customer support.

Other midterm strategies and opportunities identified were the aspects of flexible functionality, smartness modularity in order to create a sort of "modules" for production purposes and for repair/maintenance.

Other midterm strategies prioritized as important is the uptake of 3D printing for flexible structures like new filaments and the application of smart textiles in non-invasive personalized measurements. On the longer term, an aspect identified is the material response based on the user emotions.

Lastly, some other ideas not prioritized with urgency for the short term are the development of new materials such as foams, smart tattoos, bandages or smart biotextiles. One crucial idea is the smartness not created by electronics but with other medium like biochemistry and bio-organisms such as bacteria. Some untapped opportunities could also be the functionality regeneration during the washing step with specific additive using key-lock scheme for specificity.