

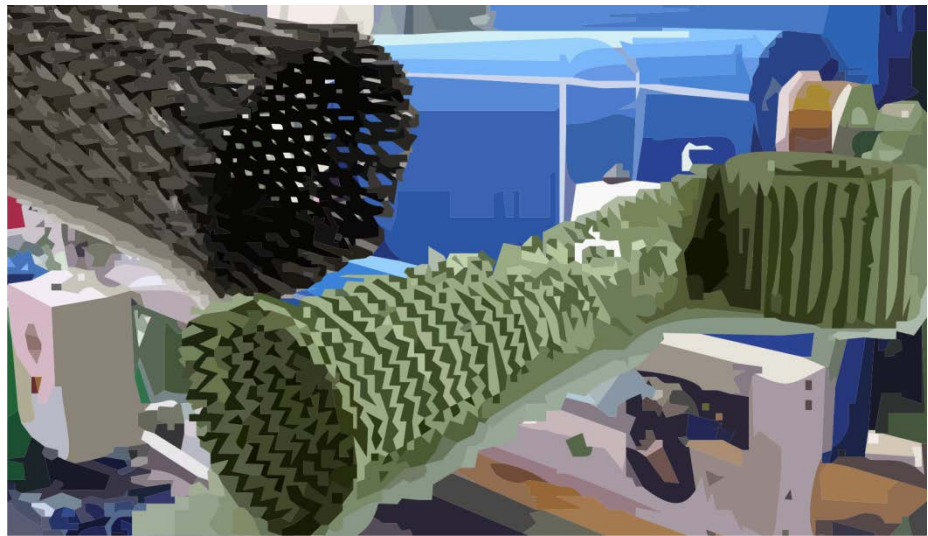
This fiche is part of the wider roadmap for cross-cutting KETs activities

'Cross-cutting KETs' activities bring together and integrate different KETs and reflect the interdisciplinary nature of technological development. They have the potential to lead to unforeseen advances and new markets, and are important contributors to new technological components or products.

The complete roadmap for cross-cutting KETs activities can be downloaded from:

<http://ec.europa.eu/growth/industry/key-enabling-technologies/eu-actions/ro-ckets>

Potential areas of industrial interest relevant for cross-cutting KETs in the Textiles domain



This innovation field is part of the wider roadmap for cross-cutting KETs activities developed within the framework of the RO-ckETS study. The roadmap for cross-cutting KETs activities identifies the potential innovation fields of industrial interest relevant for cross-cutting KETs in a broad range of industrial sectors relevant for the European economy.

The roadmap has been developed starting from actual market needs and industrial challenges in a broad range of industrial sectors relevant for the European economy. The roadmapping activity has focused on exploring potential innovation areas in terms of products, processes or services with respect to which the cross-fertilization between KETs can provide an added value, taking into account the main market drivers for each of those innovation areas as well as the societal and economic context in which they locate.

Taking the demand side as a starting point, cross-cutting KETs activities will in general include activities closer to market and applications. The study focused on identifying potential innovation areas of industrial interest implying Technology Readiness Levels of between 4 and 8.

TX.2.3: Functionalized textile products for better health, wellbeing, comfort and aesthetics

Scope:

To develop functionalized textile products with enhanced functionalities and performance for better health, wellbeing, comfort characteristics and aesthetics.

Demand-side requirements (stemming from Societal Challenges) addressed:

Depending on the application, textiles can contribute to tackle the following societal challenges:

- Health, demographic change and wellbeing
- Inclusive, innovative and secure societies
- Climate action, resource efficiency and raw materials
- Secure, clean and efficient energy

Demand-side requirements (stemming from market needs) addressed:

- Optimize the wearer's comfort and safety at every moment

Specific technical/industrial challenges (mainly resulting from gaps in technological capacities):

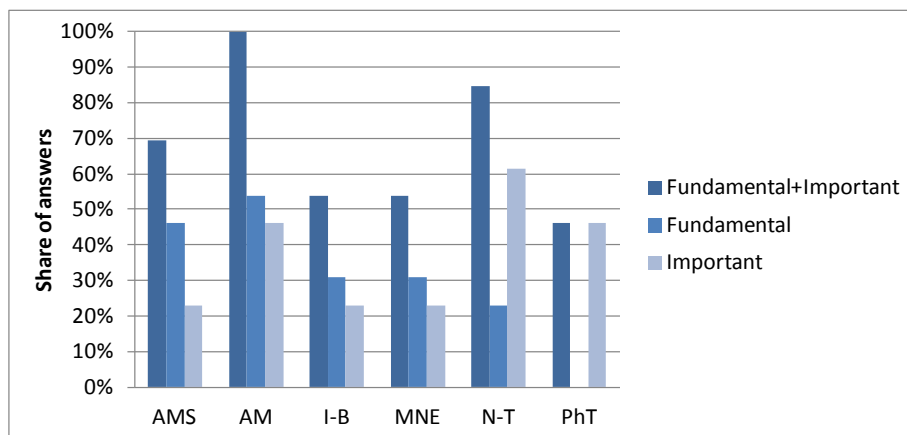
- Development of fibres and textiles with enhanced functionalities and performances for better health, wellbeing and comfort characteristics
- Development of active textiles, which react autonomously or actively to the changing activities or conditions of the wearer in order to optimize comfort and safety at every moment
- Development of surface functionalization methods and processes for the production of fibres and textiles with enhanced performance

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of more advanced functionalized textile products with enhanced functionalities and performance for better health, wellbeing, comfort and aesthetics, building on solutions such as innovative material formulations or the modification of the starting material, surface functionalization, and integration of smart textile materials and/or built in electronics.

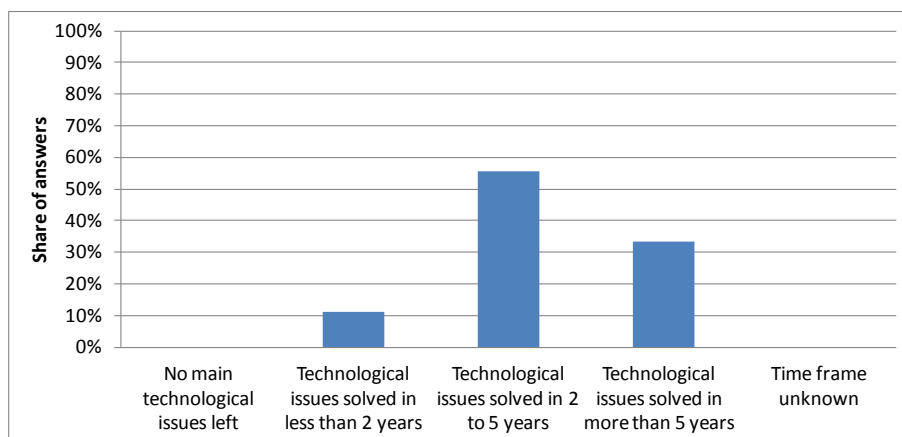
To this aim, the combination of KETs experts' opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong interaction of KETs with respect to this Innovation Field, with either fundamental or important contribution mainly by the following KETs:

- Advanced Manufacturing Systems (AMS)
- Advanced Materials (AM)
- Nanotechnologies (N-T)
- Industrial Biotechnology (I-B)
- Micro- and Nano-Electronics (MNE), eventually, if embedded electronics would be involved



Timing for implementation:

According to the majority of KETs experts' opinions (whose result is depicted in the below bar chart), desk research, and in line with the KETs-related patenting activity in this field, it is considered that the main technological issues holding back the achievement of cross-cutting KETs based products related to this Innovation Field could be solved in a time frame of 2 to 5 years, yet significant consensus by experts indicates also greater periods being necessary:



Hence, depending on the specific technical and/or industrial challenges holding back the achievement of cross-cutting KETs based products related to this Innovation Field, the provision of support in the short to medium term should be taken into consideration within this framework.

Additional information according to results of assessment:

➤ **Impact assessment:**

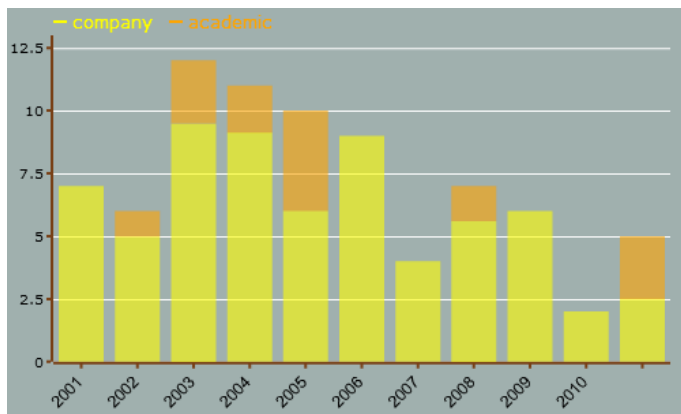
- As introduced in relation to other Innovation Fields, the textile industry is experiencing a period of change in the supply chain, in the end markets and business models. The major long-term industry trends for the textile and clothing sector are well identified by the European Technology Platform for Textiles and Clothing. Among others, the textile industry is experiencing a change from providing commodities to providing specialty products by applying high-tech processes, fibres, filaments, fabrics and final products with highly functional, purpose-targeted properties.
- Especially in sport and workwear, end-users demand materials with a broad range of functionalities. Within this framework, the application of technical finishes, as well as multilayer coating and lamination, is an area of substantial innovation. Textiles with antimicrobial properties have been one of the earliest functional products introduced in the market segment of sport and workwear by the textile industry. Yet to date only a few possibilities have been explored and commercialized. A new generation of finishes based on nanotechnology (e.g. the lotus effect) is also at a level of market introduction. Biotechnology-based functionalities such as enzymes, plant extracts are being researched and developed. Alternative, more sustainable finishing processes based on digital technology, plasma or supercritical CO₂ are being explored and tested. Several of these methods are essentially oriented to functional properties, but

especially Italian finishers are also exploring the aesthetic potential of new finishes and finishing technologies.

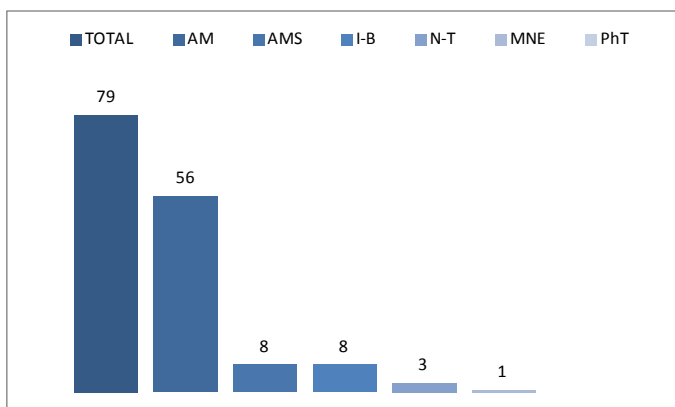
- Europe still has a commanding position in textile finishing worldwide. Finishing is where most of the functionalization towards special properties can be applied, and therefore plays a key role when it comes to incorporate innovative properties to a textile product. It is also the first mover in new technologies such as digital printing.
- Source: In-depth assessment of the situation of the T&C sector in the EU and prospects, Task 7: Synthesis report for the European textile and clothing sector, December 2012

➤ **Results of patents scenario analysis:**

- 79 exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
- Stable-decreasing trend curve (number of patents per year)
- Highest share of industrial applicants with intermittent relevant patenting activity by academic applicants, most probably standing for new technologies having been patented in the corresponding periods:



- Patents by KET:

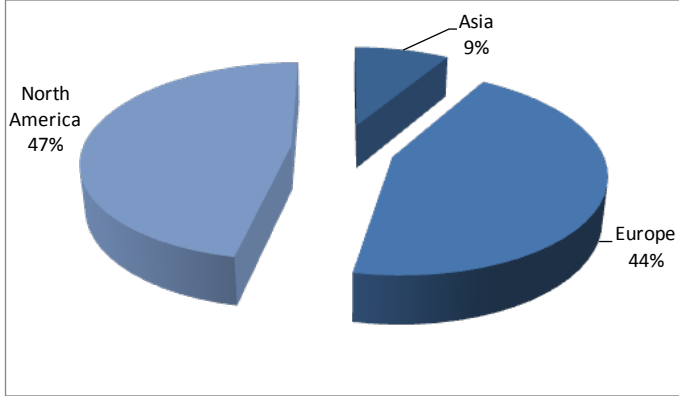


- Patents by KET(s) and relevant combinations of KETs:

KET(s)	Number of patents
AM	56
AM / MNE	1
AMS	8
AMS / MNE	1
IBT	1
MNE	10
MNE / PhT	5
N-T	3

<i>KET(s)</i>	<i>Number of patents</i>
PhT	8

- Patent distribution by (Applicant) organization geographical zone:



- Patent distribution by geographical zone of priority protection:

