

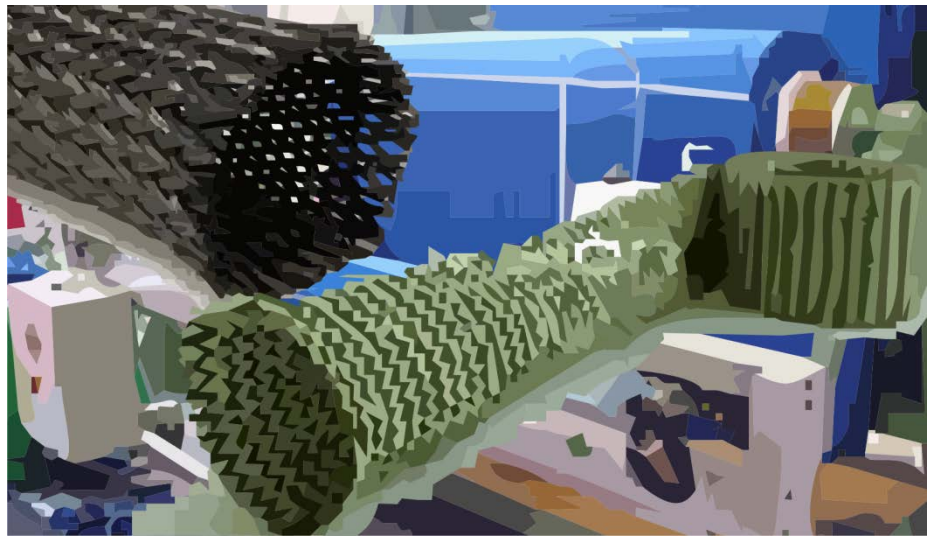
This fiche is part of the wider roadmap for cross-cutting KETs activities

'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.2.2: Active textiles with embedded sensing capabilities for “large area” applications

Scope:

To develop textile products reacting autonomously or actively to the changing conditions of the environment (e.g. geotextiles with built in sensing functionalities capable of monitoring slopes) for environmental protection and climate-related environmental risks mitigation.

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:

- Provide for environmental protection and environmental risks mitigation

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

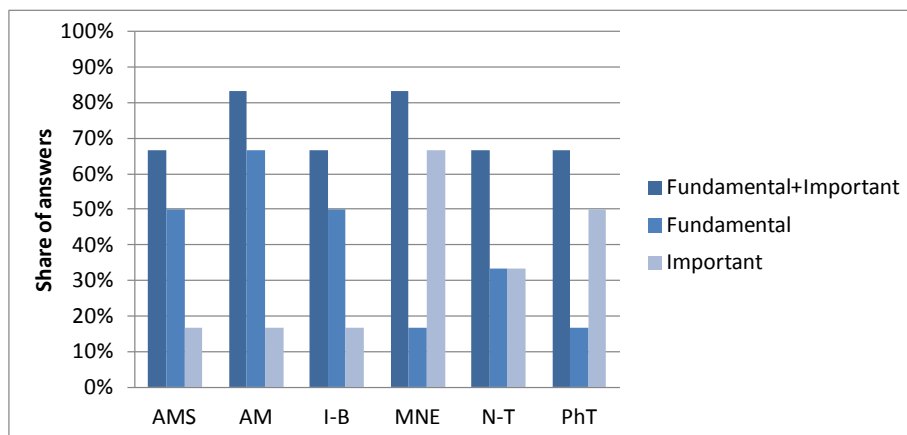
- Development of active textiles, which react autonomously or actively to the changing activities or conditions of the environment
- Development of enhanced manufacturing methods that can effectively build sensors into the textile structure

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of active textiles with embedded “large area” sensing capabilities for environmental protection and risks mitigation, thanks to incorporating smart textile materials and/or built in electronics, optical fibres, or any other sensing element.

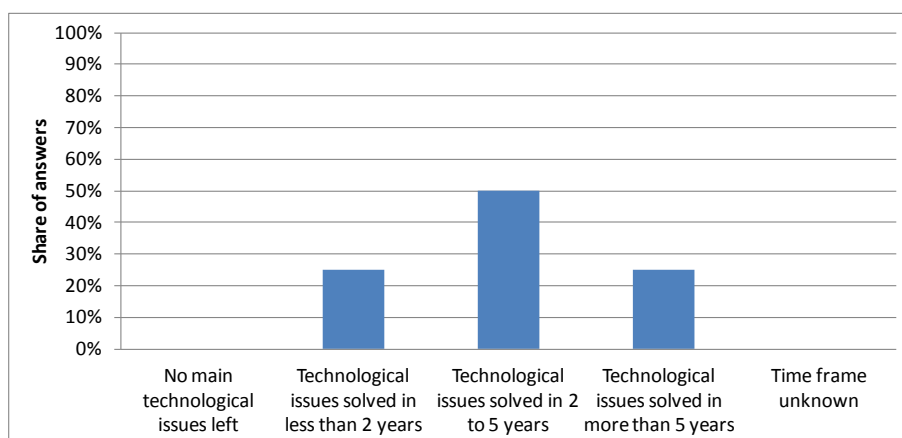
To this aim, the combination of KETs experts’ opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong 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)
- Photonics (PhT)
- Micro- and Nano-Electronics (MNE)
- Nanotechnologies (N-T)
- Industrial Biotechnology (I-B)



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:



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 term should be taken into consideration within this framework.

Additional information according to results of assessment:

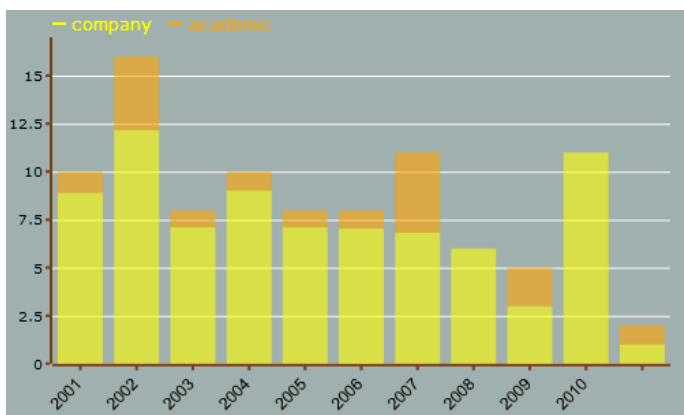
➤ **Impact assessment:**

- Geotextiles are gaining importance due to large scale infrastructural development at a global level. The geotextiles performs several functions which include separation, filtration, reinforcement, protection, and draining. The major applications for geotextiles are road industry, erosion control, waste management and pavement repair. The emerging economies have large number of projects which are currently being developed. Countries such as China, India, and other Asian economies are growing markets for the geotextiles industry. As a result, the global geotextiles market is forecast to reach a value of 4.6 billion Euro by 2017.
- Major players in the field of geotextiles in Europe include TenCate, NAUE, and Huesker Synthetic. Within Europe, most of the major market players are situated in countries such as UK, Germany, Denmark, The Netherlands, and Italy.
- Considering regional markets, Asia dominates the global geotextiles industry. It is estimated to reach 1.8 billion Euro by 2017. The growth of Asian market is expected to be highest among all regions. North American region is the second largest market of geotextiles and is estimated to reach a value of 1.2 billion Euro by 2017.

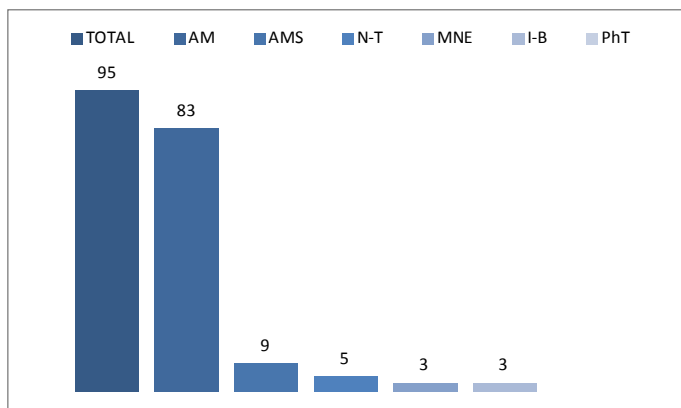
- Source: Markets and Markets, Geotextiles Market by Types (Woven, Nonwoven, Knitted), Materials (Polypropylene, Polyester, Polyethylene) and Applications (Road Industry, Pavement Repair, Erosion Control, Waste Containment, Railroad Stabilization) - Global Trends and Forecasts to 2017, 2013
- This Innovation Field is highly interesting also for dual use applications. The defence sector already uses this kind of advanced geotextiles and active textiles for specific applications, such as in the marine domain. This wide background of knowledge can be transferred into the civil domain, thus strengthening the potential of duality.

➤ **Results of patents scenario analysis:**

- 95 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:



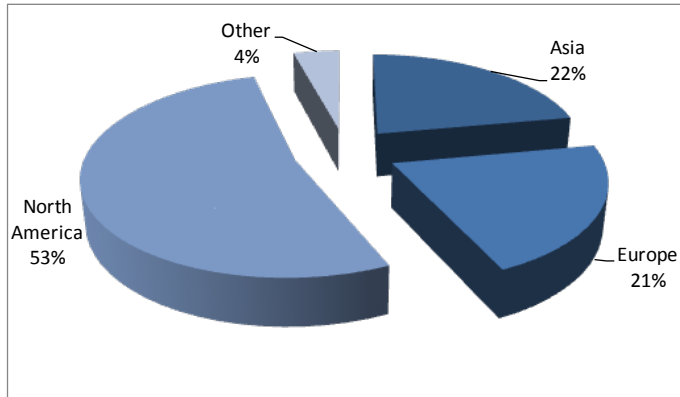
- Patents by KET:



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

KET(s)	Number of patents
AM	83
AM / MNE	1
AM / N-T	4
AMS	9
AMS / AM	2
AMS / MNE	1
IBT	3
MNE	3
N-T	5

- Patent distribution by (Applicant) organization geographical zone:



- Patent distribution by geographical zone of priority protection:

