European Commission

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 Health and Healthcare 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.

H.2.1: Implantable devices for medicine

Scope:

To develop new and improved devices for assisting vital functions or controlled drug delivery (e.g. heart assisting devices, devices for drugs on demand delivery, pain therapy and management).

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

- Tackle the "health, demographic change and wellbeing" societal challenge

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

- Targeted treatment of diseases
- Assistance to living functions
- Individualised / personalized health care

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

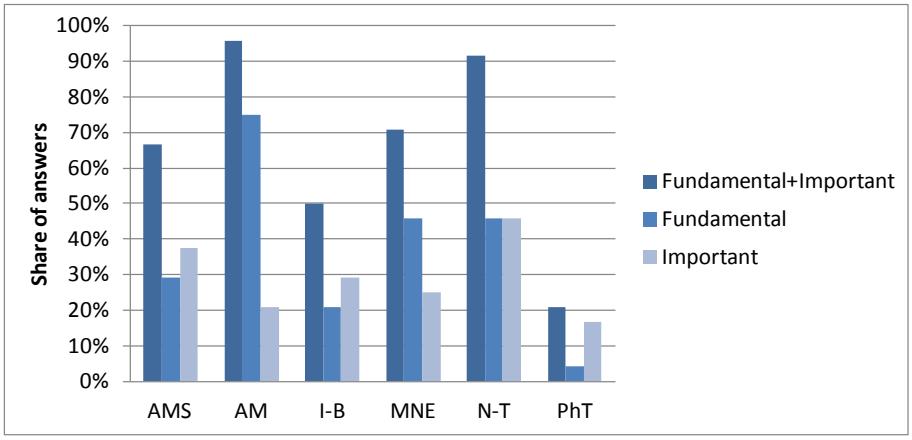
- Miniaturisation for lower invasiveness
- Surface functionalisation and 'biologicalisation' of instruments to increase biocompatibility
- Delivery of macro (bio) molecules
- Development of nano- or micro-scale devices for drug delivery (e.g. micropumps)

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of new and improved devices for assisting vital functions or controlled drug delivery, thanks to further miniaturization to achieve lower invasiveness, surface functionalization and "biologicalization" to increase biocompatibility, or the development of nano- or micro-scale devices for drug delivery.

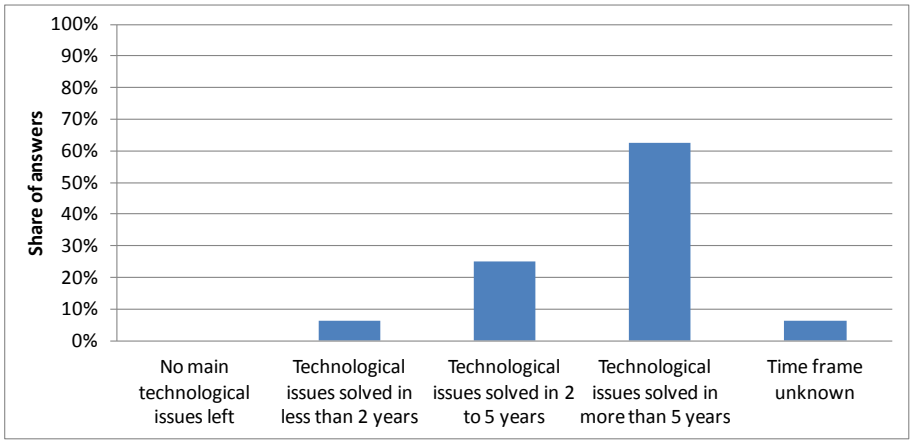
To this aim, the combination of KETs experts' opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong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



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 more than 5 years:

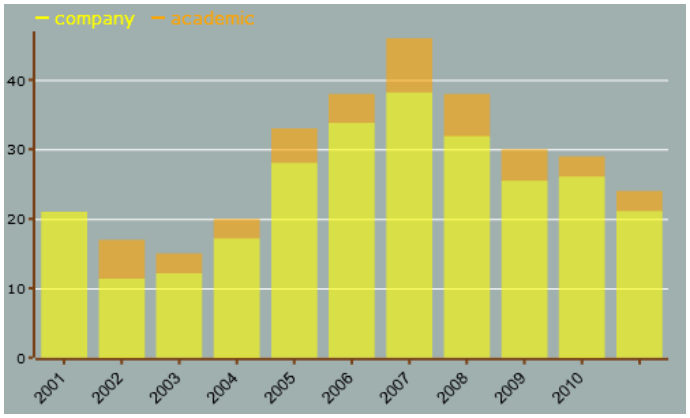


Hence, depending on the specific technical and/or industrial challenges holding back the achievement of cross-cutting KETs based products related to this Innovation Field, the provision of support in the medium term should be taken into consideration within this framework.

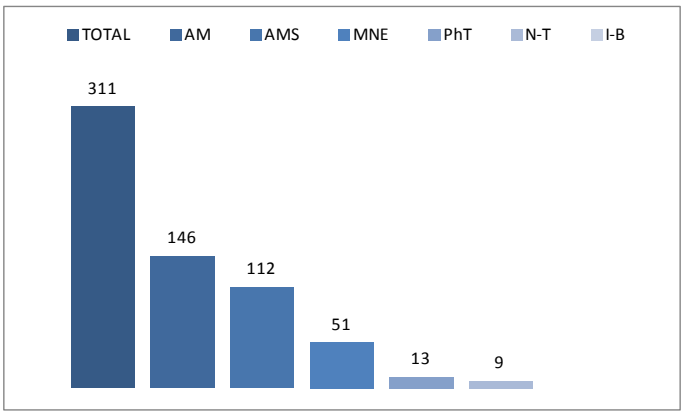
Additional information according to results of assessment:

- ***Impact assessment:***
  - Demand for implantable medical devices is expected to increase significantly. These products have benefited from technological advances, and growth is expected to be strong over the next years. Next generation devices have increased confidence in orthopaedic, cardiovascular and other implants. Demand will also benefit from the lack of alternative treatments for many chronic disorders and injuries. The ability of medical implants to reduce overall treatment cost for many conditions, including osteoarthritis and chronic heart failure, will work in favour of growth for these products. (Source: Implantable Medical Devices Market, March 2012).
  - Implantable medical devices can be classified into active and non-active. Both classes, but especially the Active Implantable Medical Devices (AIMDs) are subject to strict standards and definitions before they can reach the market. Directive 90/385/EEC of the European Union (EU) specifies the Essential Requirements manufacturers and importers must meet to apply the CE Mark and legally market or sell AIMDs in the EU.

- ***Results of patents scenario analysis:***
  - 311 exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
  - Stable trend curve (number of patents per year)
  - Highest share of industrial applicants:



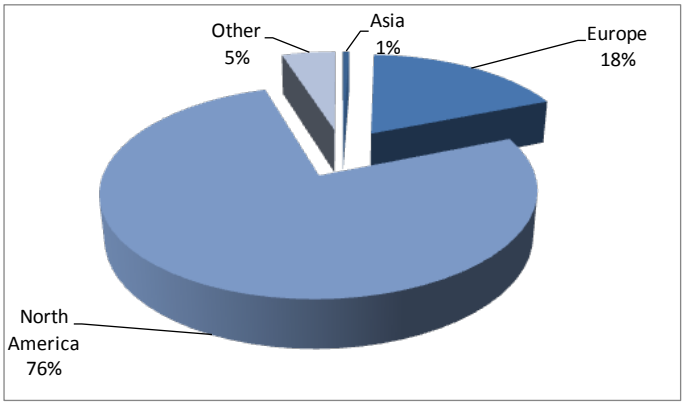
- Patents by KET(s):



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

KET(s)	*Number of patents*
AM	146
AM / MNE	1
AM / N-T	5
AM / PhT	2
AMS	112
AMS / AM	2
AMS / AM / N-T	1
AMS / MNE	3
AMS / N-T	1
AMS / PhT	1
MNE	51
MNE / PhT	6
N-T	9
PhT	13

- Patent distribution by (Applicant) organization geographical zone:



- Patent distribution by geographical zone of priority protection: