

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/rockets>

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.1.3: Technologies to identify and validate biomarkers for diagnostics and predictive personalized medicine

Scope:

To develop technologies able to identify and validate more accurate and informative biomarkers for diagnostics e.g. better than PSA in prostate cancer, including epigenetic methylation profiles; including predictive biomarkers as short DNA repeats for preventing/anticipating disease susceptibility.

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:

- Improved quality (increased sensitivity and speed) of diagnostics approaches
- Early detection of diseases
- Increased safety for patients
- Individualised / personalized health care

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

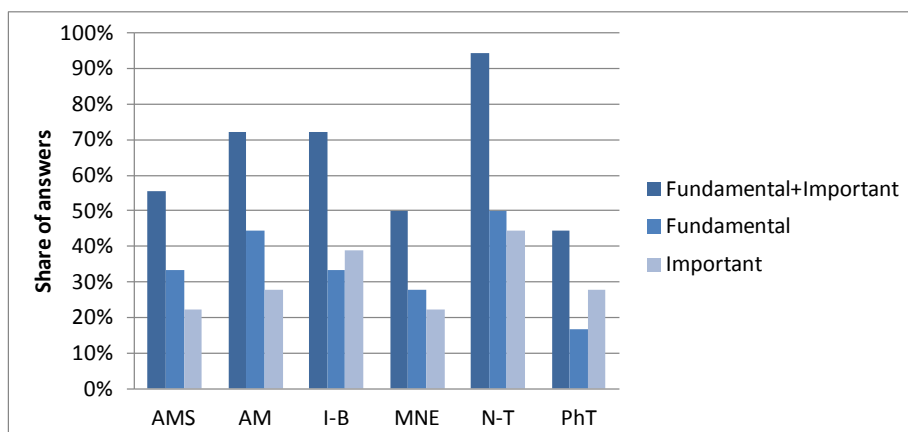
- Identification of new diagnostic markers specific to diseases

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 technologies able to identify and validate biomarkers for diagnostics, e.g. better than PSA in prostate cancer, including epigenetic methylation profiles, or including predictive biomarkers as short DNA repeats for preventing/anticipating disease susceptibility.

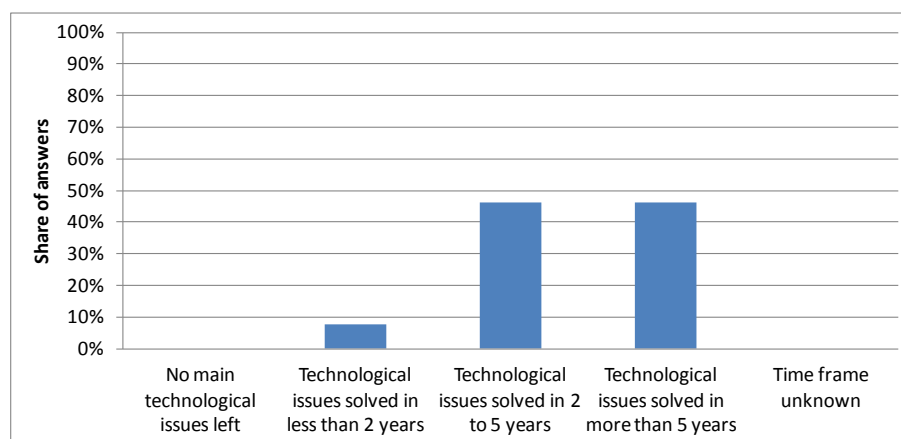
To this aim, the combination of KETs experts’ opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong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

- Advanced Materials (AM)
- Nanotechnologies (N-T)
- Industrial Biotechnology (I-B)
- Advanced Manufacturing Systems (AMS)
- Micro- and Nano-Electronics (MNE)
- Photonics (PhT)



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 either 2 to 5 years or 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 short to medium term should be taken into consideration within this framework. Particularly, while short term support could be useful to further R&D development in this field, longer term support will be needed in order to enable validation in more complex environments including, ultimately, through clinical trials.

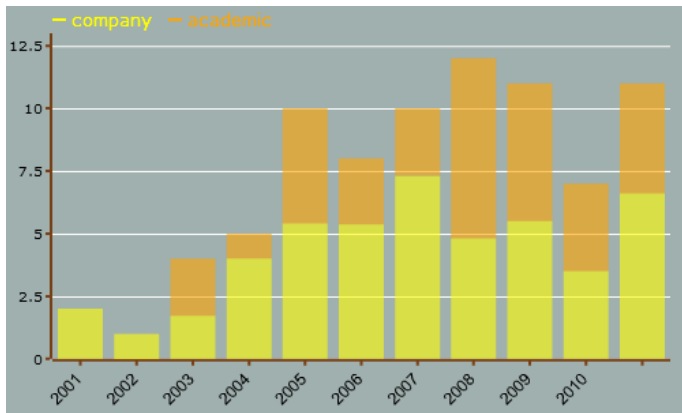
Additional information according to results of assessment:

➤ **Impact assessment:**

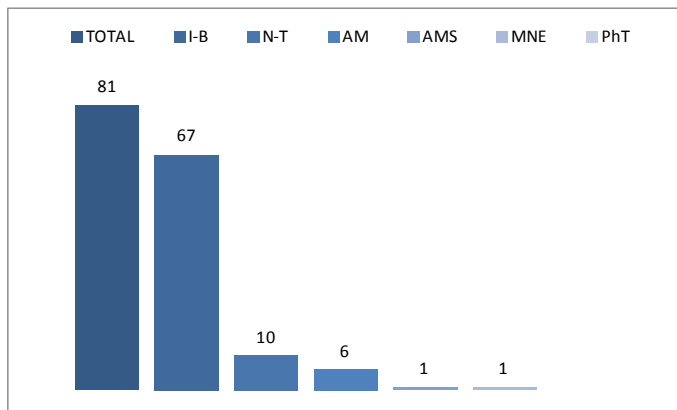
- The global biomarkers market showcases high growth potential in the near future with an estimated compound annual growth rate (CAGR) of 18.5% from 2013 to 2018, to reach 30 billion Euro by 2018. Current industry trends such as advancements in discovery technologies, government initiatives, and grants for biomarker research activities, and the rising demand for personalized medicine are the key factors that contribute to the growth of this market. However, the need for high capital investment for biomarker discovery, low benefit-cost ratio, a cumbersome biomarker validation, and testing process are a few of the critical factors that restrain the growth of the market.
- The omics technology segment holds the largest share of ~75% of the biomarker discovery market, primarily due to the increase in adoption of proteomics and genomics technologies, globally. The emerging Asia-Pacific region exhibits high growth opportunities for industry participants. Growing economies such as China and India are experiencing an increasing rate of biomarkers research activities. This is attributed to the rising number of contract research organizations and the low cost of conducting clinical trials in Asia-Pacific nations when compared to developed countries.
- Increasing popularity of personalized medicine and the growing importance of companion diagnostics are further opening new growth opportunities for the development of novel biomarkers.
- Source: Market and Markets, Biomarkers Market, ([Discovery Technologies - Proteomics, Genomics, Imaging, Bioinformatics], Validation Services, Applications [drug development, personalized medicine], Diseases [Oncology, Cardiology, Neurology]) - Global Trends & Forecasts (2013 – 2018), 2012)

➤ **Results of patents scenario analysis:**

- 81 exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
- Growing trend curve (number of patents per year)
- Significant participation of academic applicants in the patenting activity:



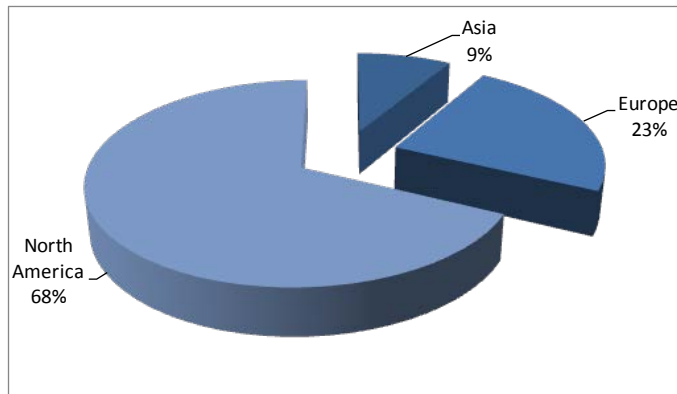
- Patents by KET(s):



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

KET(s)	Number of patents
AM	6
AM / N-T	4
AMS	1
IBT	67
MNE	1
N-T	10

- Patent distribution by (Applicant) organization geographical zone:



- Patent distribution by geographical zone of priority protection:

