

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.1.5: Multiplexing devices for in vitro diagnostics

### Scope:

To develop multi-parameter measuring devices for fast, accurate, easy medical laboratories analyses.

### 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:

- Secure, fast and user friendly sample preparation by laboratory personnel
- Reduced discomfort to patients associated with sampling aimed at in vitro diagnostics
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### Specific technical/industrial challenges (mainly resulting from gaps in technological capacities):

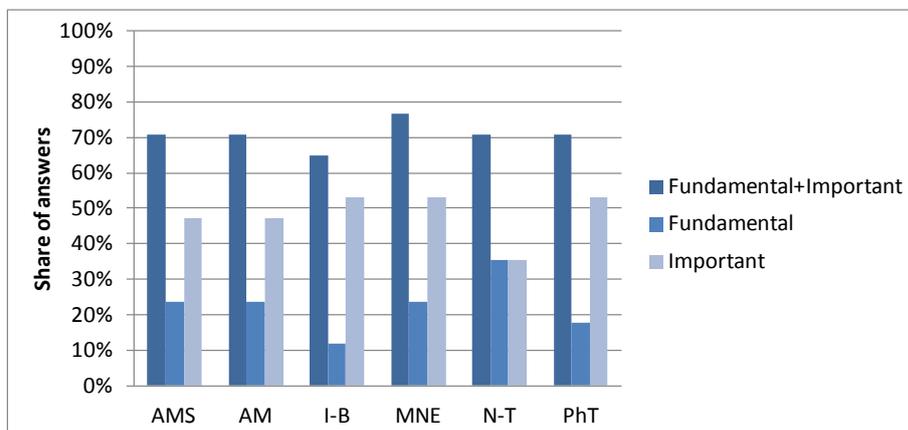
- Design and development of integrated multifunctional devices with a broad range of applications for improving in vitro diagnostics
- Development of reliable, cheap, fast and multiplexed highly sensitive detectors providing high content results from a single sample
- Identification of new diagnostic 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 integrated multi-functional multi-parameter devices, building on reliable, cheap, fast and multiplexed highly sensitive detectors providing high content results from a single sample and the identification and validation of new disease-specific diagnostic markers.

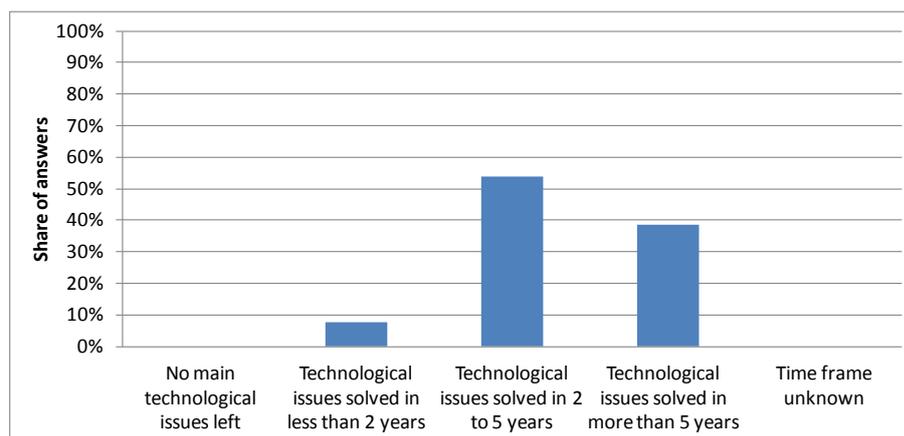
To this aim, the combination of KETs experts’ opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong 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, yet significant consensus by experts indicates also longer 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:**

- On the whole, the multiplexed diagnostics market is expected to tip in favour of continued rapid growth, reaching almost 4.2 billion Euro in 2015, according to a report, Multiplexed Diagnostics 2010, published by Select Biosciences and written by BioPerspectives and Bachmann Consulting (Source: BioPerspectives and Bachmann Consulting, Multiplexed Diagnostics 2010 Market Report, 2011).
- Oligonucleotide arrays, phage display, bacterial artificial chromosome arrays, protein arrays, bead-based arrays, antibody arrays, reverse arrays, mass spectrometry, quantitative PCR bead-based and microplate assays and next-generation sequencing are included in this market. Further, this market is also segmented on the basis of several application areas of multiplexed diagnostics, namely, infectious disease diagnosis, oncology, autoimmune diseases, cardiac conditions, allergies and others (Alzheimer's disease, diabetes, kidney toxicity and HIV).
- The global multiplexed diagnostics market has phenomenally increased the volume and quality of diagnostic procedures by reducing the turnaround time and analyzing multiple analytes in a single cycle and thereby resulting in rapid adoption of such techniques. The stakeholders in this market include market players who provide multiplexed diagnostic assay kits, reagents, solutions and systems (Source: Multiplexed Diagnostics Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2013-2019).

#### ➤ **Results of patents scenario analysis:**

- No exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
- No significant patent-related indicators can be reported in this field