

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 Manufacturing and Automation 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.

MA.3.3: Flexible design and manufacturing processes for implementing more creativity and user-driven innovation

Scope:

Flexibility to continuously modify products without drastic re-design of core-product base and operations, e.g. through integration of ICT design technologies and flexible production technologies (additive/subtractive technologies, multifunctional machines, flexible joining technologies).

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

- Tackle the “secure, clean and efficient energy” as well as the “climate action, resource efficiency and raw materials” societal challenge

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

- Provide for cost optimization including through predictive maintenance
- Provide for rapid and flexible production capabilities to match supply with volatile demand of today's rapidly changing markets

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

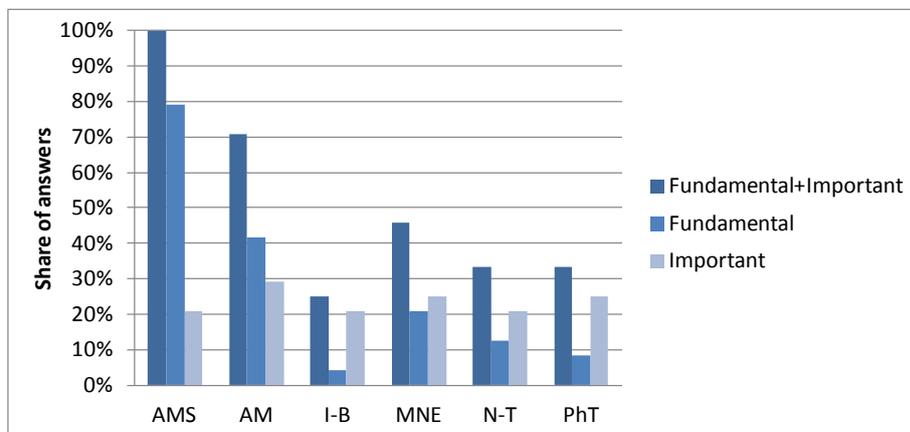
- Exploitation of the creativity potential through the improvement of mediated communication (e.g. via websites or via social media) with end users and their role in the creation/production or selling processes (via digital means)
- Integration of new data management systems and traditional CAD tools to get a design perspective in new disciplinary areas, like emotional engineering or co-design tools
- Use additive/subtractive technologies, multifunctional machines, flexible joining technologies to provide the basis for the new required variability
- Development of novel simulation and fast testing methodologies to assure that properties of such innovative products are compliant with common product quality requirements (i.e. reliability, safety, environmental-friendliness, etc.)

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of flexible design and manufacturing processes for implementing more creativity and user-driven innovation in products, through integration of flexible production technologies (additive/subtractive technologies, multifunctional machines, flexible joining technologies) and advanced ICT design technologies, including collaborative and social ones exploiting the creativity potential of large pools of designers and customers.

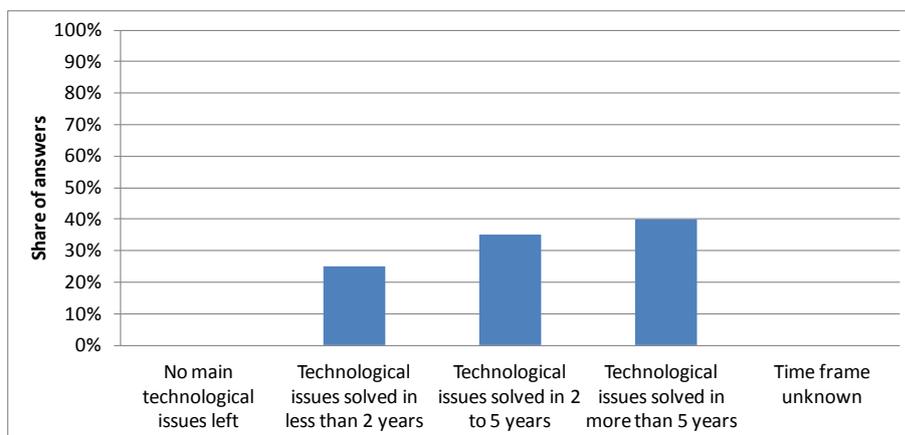
To this aim, the combination of KETs experts' opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong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



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, yet significant consensus by experts indicates also much shorter periods being necessary, as actually some pilot experiences in this sense exist, which can however be significantly improved:



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:

- Today's consumers' generation increasingly demands for individualized performance of products, which can only result from a deep awareness on consumers' needs. Moreover, today's purchasing mechanisms rely on a close selection of products on the global product market. Pervasive use of Information Technology as associated to various hardware than can enable exchange of data, images, and product features in general terms, as well as of money, appears as a stable asset in the recent product proposition, as well as the virtual value of products and their quantitative performance assessment.
- This new consumption pattern requires intelligent design of new products fitting with specific needs of highly sophisticated consumers. Particularly ICT technologies seems to condition the future key features of consumerism trend by enforcing the interaction between company and final users as well as the user-lead innovation and the information exchange in consumers communities.
- Such ICT wave has been shift from the electronic market to the design based consumer goods by producing new quality area for the traditional products and more generally new service platform developments as a stable element of market proposition

- Source: The Joint Research Roadmap - Final outcome of the PROsumer.NET Market/Innovation Trends and Technology Foresight activities serving as outlook on research and technology development priorities in the design-based consumer goods sector up to 2020

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

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