

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 Electronics and Communication Systems 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.

E&C.3.1: Convergence and smartification of consumer electronics

Scope:

To develop high usability and multi-functional consumer lifestyle products (e.g. washing machine, television), supported by high degrees of connectivity and convergence of all home/consumer equipment and devices, so as to support advanced consumer services as more automation of house-keeping, assisted-living, etc.

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

- “Inclusive, innovative and reflective societies” and a competitive European economy need breakthrough innovations, smart capabilities, personalized services and high performance systems to be made available to consumers and citizens
- Twentieth century consumer society produces huge wastes of energy and resources. Waste Electrical and Electronic Equipment Directive (WEEE), the European Community directive 2002/96/EC, highlights the specific role to be played by the consumer electronics industry in building up a sustainable model
- Individual behaviour changes can have a dramatic impact on environment and climate impact; they have to be supported with life-easing technological solutions. Smartification and convergence of consumer electronics have a role to play in a better organization of society consumptions
- Protecting citizens security and freedom requires personal data and personal equipment and systems to be protected against misuses and malevolent actions

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

- Consumer electronics markets deliver a wide variety of services to European customers, including for entertainment, education, sports, well-being, lifestyle, communication, home services, connected mobility, etc. These markets experience rapid shifts based on evolution of the needs or on product-based new opportunities that create their own markets. Open innovation driven by the use is requested to quickly identify and support fast-adoption technologies
- Context-aware, personalized and convergent capabilities embedded into seamless experiences and serving smart services are necessary for citizens to go on with buying new products and services without being stuck in a growing complexity
- Guaranteeing a sufficient level of trust, privacy and security is mandatory for supporting a sustainable acceptance of Information-based services

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

- “Smartification” (novel information-based functions) of classic devices through connectivity and automation
- Development of multi-function devices, converge devices by means of functionality (e.g. MP3 players become more and more obsolete due to the emergence of smart-phones that allow for extensive music consumption, include smart phone functionality in TVs, etc.)
- Increase of connectivity of multi-media devices
- Development of robots as smart household helpers
- Development of services taking advantage of the novel smart functions

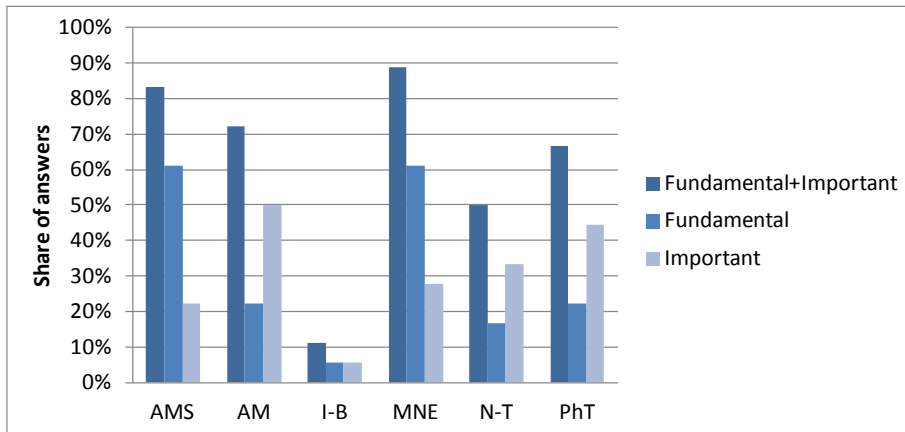
Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to achieving higher levels of “smartification” of classic devices and systems through increased connectivity and automation, thanks to the integration of novel functions supported by appropriate miniaturized and embedded hardware components.

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:

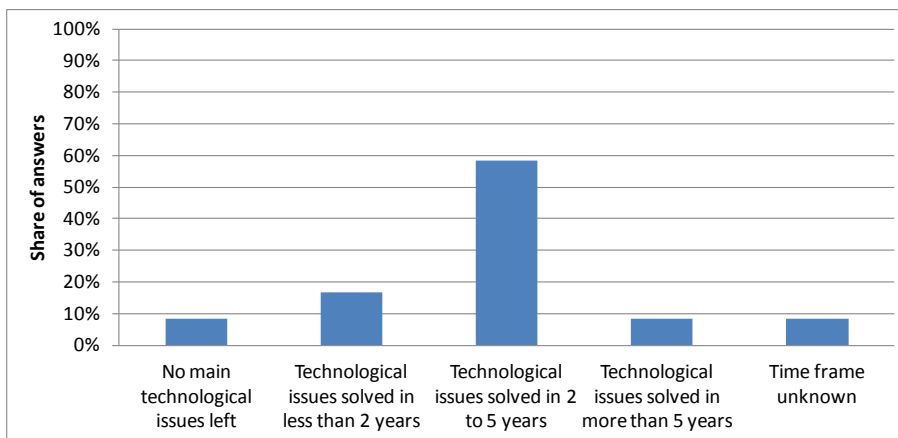
- Micro- and Nano-Electronics (MNE)
- Advanced Manufacturing Systems (AMS)

- Advanced Materials (AM), Nanotechnologies (N-T) and Photonics (PhT), with an important but less fundamental contribution



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:

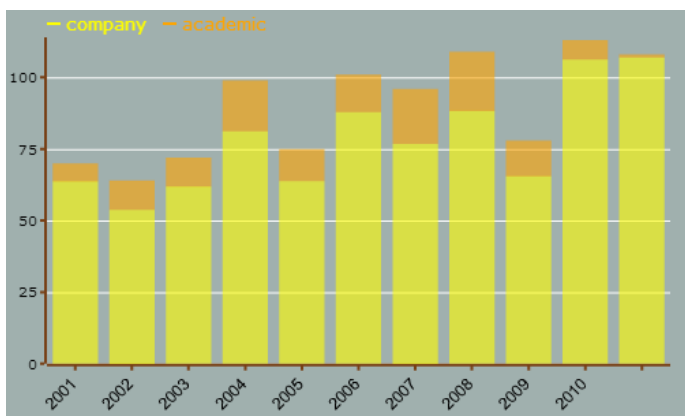
➤ **Impact assessment:**

- Consumer electronics gather consumer devices and home equipment used for entertainment, home care, communication, office works, education, personal care and wellbeing. Organizing their convergence and smartification will improve delivered services whilst delivering social, environmental and economic benefits.
- New services will support more creative and innovative usage of electronic devices and provide better services with the help of more personalization, planning and decision-making assistance, remote controls and nomadic usage capability, more user-friendly interfaces and attractive designs. Massive market growth can be supported by such new functionalities, if security and privacy is ensured so that trust between citizens and industry is maintained.
- Western Europe has lost a large part of its industrial capabilities in such innovation field, but in some cases to the advantage of Eastern and Central Europe and with relevant players remaining in Europe with know-how in designing high added-value consumer electronics.

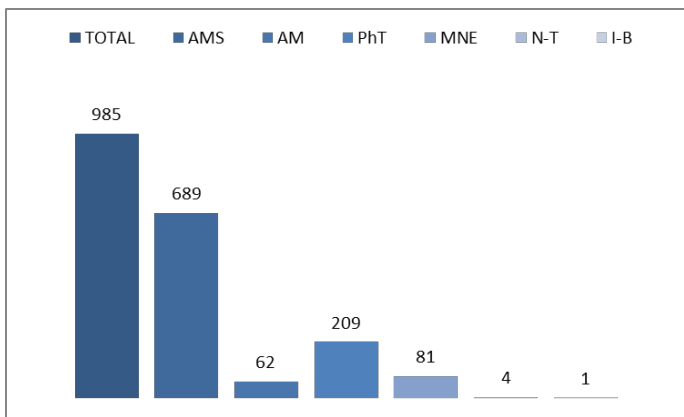
- Social, environmental and economic benefits are expected from KET-based convergence and smartification, through better context-aware energy usage and management (e.g. home equipment able to start when energy is abundant and cheap and stop when it is not, easier interfaces enabling better inclusion of elderly or disabled persons, personalized healthcare support, waste reduction assistance (e.g. with the smart fridge), etc.

➤ **Results of patents scenario analysis:**

- 985 exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
- Increasing trend curve (number of patents per year), with a decreasing share of academics (sign of technology reaching industrial maturity)



- Little concentration of patent applications (top 10 applicants represent only 7 to 22% of annual applications, depending of the years). Except Sharp and Sanyo (Japan), top applicants are either US or European, balanced between the two regions.
- Patents by KET(s):

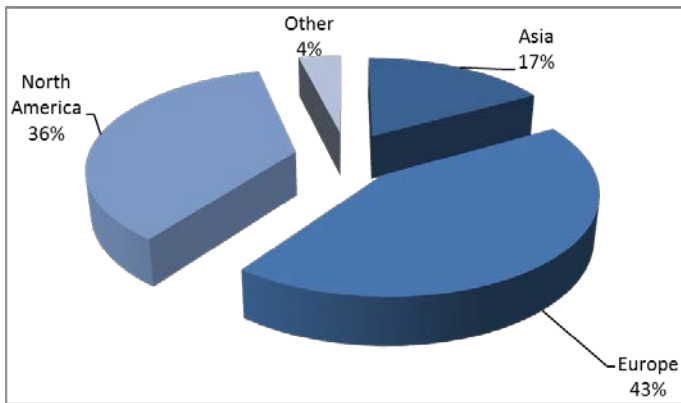


- Patents by KET(s) and relevant combinations of KETs:

KET(s)	Number of patents
AM	62
AM / MNE	1
AM / MNE / PhT	1
AM / N-T	2
AM / PhT	5
AMS	689
AMS / AM	6
AMS / MNE	16
AMS / MNE / PhT	2
AMS / PhT	10

<i>KET(s)</i>	<i>Number of patents</i>
IBT	1
MNE	81
MNE / N-T	1
MNE / PhT	22
N-T	4
N-T / PhT	1
PhT	209

- Patent distribution by (Applicant) organization geographical zone:



- Patent distribution by geographical zone of priority protection:

