

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.3.3: Connected systems for ambient assisted living

Scope:

To develop improved connected systems for ambient assisted living, i.e. integrated solutions for various (home) care support applications enabling health and disease monitoring as well as assisted living (e.g. assistance to disabilities and/or chronic diseases, rehabilitation monitoring, personalized fitness or nutrition assistance, etc.).

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 of life
- Prompt medical or paramedical response and assistance

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

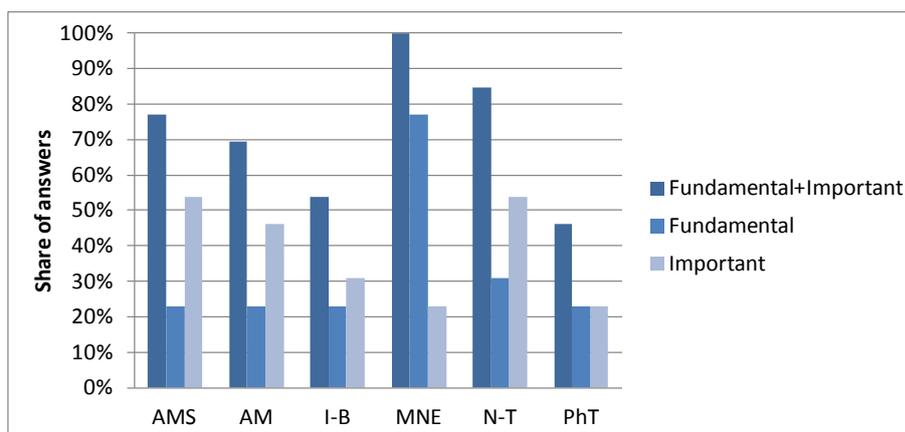
- Decrease of energy consumption of mobile electronics devices
- Development of novel materials for better design (“look&feel”) with better properties (e.g. more wear resistant, lightweight)
- Development of wearable electronics
- Establishment of an independent Machine-2-Machine network (e.g. measuring biological parameters and transfer to healthcare monitoring system)
- Automation of decision making based on collected data
- Adaptation of remote power supply/storage to specific requirements of application (e.g. very long lifetime without recharging)
- Specialization of networks according to specific needs (e.g. low data transfer but precise timing)
- Improvement of self-organization and collective intelligence (cognition, cooperation, coordination)
- Further miniaturization of electronics
- Development of large area sensors/actuators
- Improvement of printed electronics for ubiquitous and flexible electronics (packaging, disposable electronics, textile)
- Design of integrated solutions for various home care support applications (non-invasive health monitoring, assistance to disabilities and/or chronic diseases, rehabilitation monitoring, personalized fitness or nutrition assistance, etc.)
- Development of wearable smart wireless communicating devices with low weight, ergonomic and high autonomy sensing and monitoring capabilities (own ultrasonic imaging, breath analysis, cerebral diagnosis, cardiac risk assessment, integrated sample preparation and sensing, etc.)
- Use trends from robotics and artificial intelligence on automated analytics on environment information/measurement to develop information-based interactive assistance platforms, in particular for supporting independent living of ageing or disabled persons
- Build on specific patient capabilities to setup user-friendly platform human machine interface, adapted to be used by non-computer-literate users
- Achievement of broadband data transmission with high standards of reliability, scalability, interoperability and configurability, as well as controlled levels of electro-magnetic radiation in confined environment
- Development of device low power indoor localization capability based on communication networks
- Ensure trustworthy record, storage, transfer and usage of personal and medical data, so as to prevent new types of attacks or privacy breaching

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of advanced connected e-health home systems, enabling home care support, health monitoring as well as assisted living, building on improved mobile systems or wearable devices.

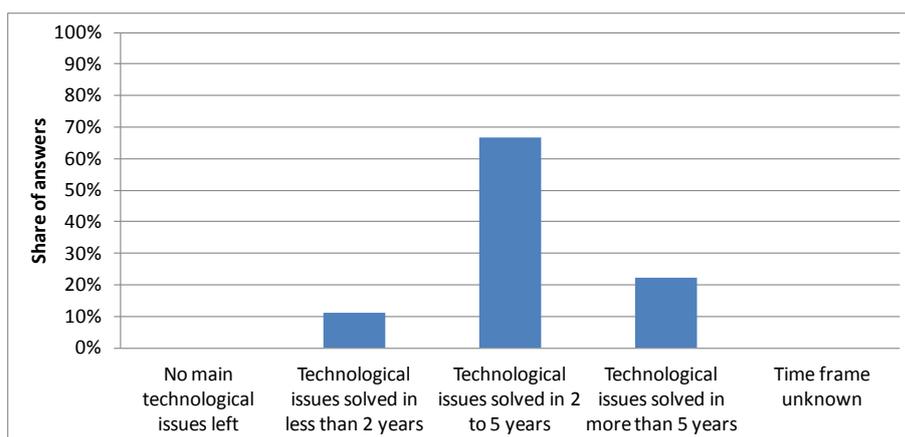
To this aim, the combination of KETs experts' opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong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



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:

- While society ages, connected systems for ambient assisted living are gaining much attraction. Being strictly related to domotic systems but offering in addition advanced functionalities and connectivity, these systems offer the opportunity especially to elderly people to remain autonomous for longer, while being assisted from remotely from their relatives (with solutions expected to gain attraction in the shorter term), or from their medical doctor (in the longer run).

- This trend is benefitting much from new technologies in mobile electronics devices as well as the smartification of the environment where we live.
- Wearable textiles are also expected to gain attraction in this field for monitoring vital functions, with prototypes having been already developed and validated in reduced complexity environments.
- Many of the latest solutions being devised in this field are increasingly sophisticated, with some deployed in assisted living environments, such as nursing homes. In industrialized countries, work focuses as well on the use of intelligent and highly interactive systems (including appliances, as evidenced during interviews conducted throughout the study) for improving quality of life (Source: Special Issue on Ambient Assisted Living and Robotics, www.computer.org).

➤ **Results of patents scenario analysis:**

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