

# Robotics in Medicine and Healthcare



## Investigating the potential of Robotics in healthcare

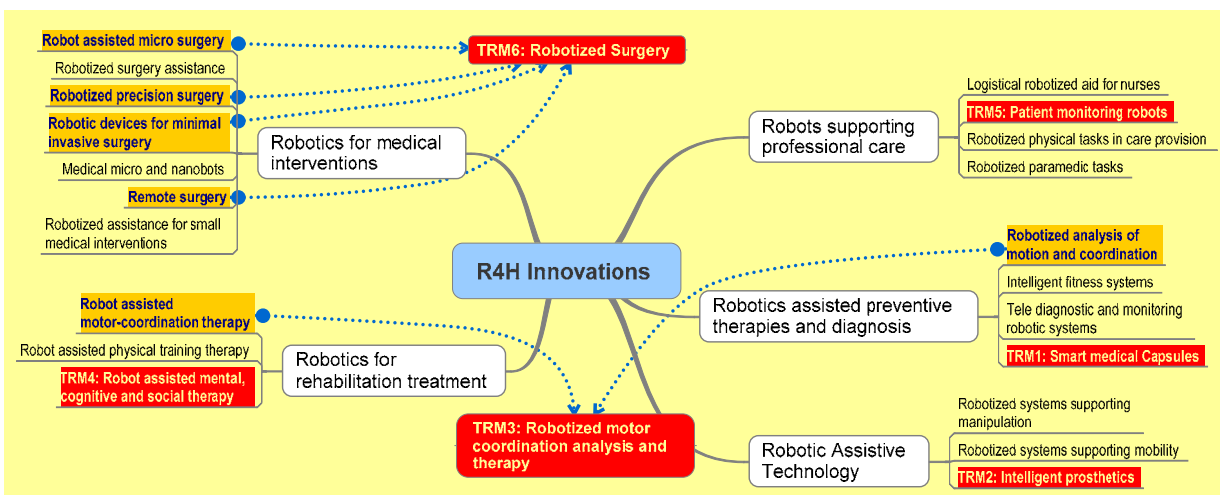
**ICT is an enabling technology which can provide various solutions in the healthcare sector, ranging from electronic patient records and health information networks to intelligent prosthetics and robotised surgery.**

The EC funded the "Roadmap for application of robotics in medicine and healthcare" study with the aim to investigate the potential of robotics in healthcare. Robotics for healthcare is an emerging field which is expected to grow in the face of demographic change (ageing), expected shortages of healthcare personnel, calls for improving quality of life for the elderly and disabled, and the need for even higher quality care, for example high precision surgery. All these factors stimulate innovation in the domain of Robotics for Healthcare.

Several programs and networks dedicated to research on robotics are already focusing part of their efforts on applications in healthcare.

The aims of the study are to provide key research policy recommendations for the application of robotics in healthcare and to raise awareness about these important new developments among a wider audience. To this extent, a roadmap of promising applications of robotics in healthcare and associated R&D was developed, taking into account the state of the art as well as short and long-term future possibilities with a time horizon ending in 2025. Special attention was paid to three main aspects:

- Contributing to **quality, safety** and **efficiency of care.**
- Promoting the **shift to preventive and personalized care.**
- Supporting the **availability of long term care for people in need.**



Overview of the innovation areas and relation with the Technology Roadmaps developed.

## Major findings

This study identified the following five innovation themes:

- Robotics for medical interventions
- Robotics supporting professional care
- Robotics assisted preventative therapies and diagnosis
- Robotic assistive technology
- Robotics for rehabilitation treatment

Within these innovation themes, 21 innovation areas were identified. Based on a survey among stakeholders and in close cooperation with the EC, the six most relevant innovation areas were selected and research roadmaps were prepared for them:

- Smart medical capsules (for endoscopy, biopsy and targeted drug delivery)
- Intelligent prosthetics
- Robotised patient monitoring systems
- Robotised surgery (a combination of the areas related to the facilitation of the surgeon in the operating room)
- Robotised motor coordination analysis and therapy
- Robot assisted mental, cognitive and social therapy

Robotic systems are very complex. They depend on many enabling technologies and challenges. The field of Robotics for Healthcare is driven by the expectation that robots will be able to play an important role in helping societies to cope with a number of the big challenges and trends of the next decades. The **application of robotics in healthcare** is in many areas a **young but promising field** with different segments that are progressing at different speeds. Only a few products have reached the stage of large scale market introduction, the real measure for successful innovation. Many **applications are still very expensive**. In many instances, it is quite difficult to identify the reasons for discontinued and unsuccessful projects, since multi-dimensional factors like legal issues, regulations, enabling technologies, social acceptance and unforeseeable disruptive incidents play key roles.

## Important Links:

Report: [http://ec.europa.eu/information\\_society/activities/health/docs/studies/robotics-final-report.pdf](http://ec.europa.eu/information_society/activities/health/docs/studies/robotics-final-report.pdf)  
Flyer: [http://ec.europa.eu/information\\_society/activities/health/docs/studies/robotics-in-healthcare.pdf](http://ec.europa.eu/information_society/activities/health/docs/studies/robotics-in-healthcare.pdf)  
eHealth studies: [http://ec.europa.eu/information\\_society/activities/health/studies](http://ec.europa.eu/information_society/activities/health/studies)

## For further information:

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[http://ec.europa.eu/information\\_society/eHealth](http://ec.europa.eu/information_society/eHealth)

## ... On the market

The first commercial products on the market may serve as a signal for a greater development to follow, as the potential added value of robots in healthcare will be fully recognized. The market is expected to grow, as the following examples indicate. The U.S. market for prosthetics, orthoses and cosmetic enhancement products is expected to increase from \$6.8 billion in 2005 to \$10.8 billion in 2010, at an AAGR (average annual growth rate) of 9.9%. Powered wheelchairs could reach a market volume of a little over \$1 billion by 2013 in the USA and Asia alone. Smart medical capsules may even take over the whole market for classic colonoscopy screenings as prices for smart medical capsules will drop below the current \$450 per unit.

## Interesting developments but slow take-up

Since the overall sector of robotics in healthcare is still an **emerging area with successes and failures**, a final conclusion about the future trajectory cannot be made at present. Nonetheless, the identification of drivers, barriers and challenges will be helpful for guiding the development into a desired direction for achieving higher quality, safety and availability of care and a shift to prevention.

From the side of patients, doctors, hospitals, care institutions, health insurance companies and authorities, it appears that most of them see the developments as very interesting for the future, but very few of them show an urgent drive to switch to these new applications right now.

The full report with the research roadmap as well as a 4-pages descriptive flyer are available on the ICT for Health studies web page: [http://ec.europa.eu/information\\_society/activities/health/studies/published](http://ec.europa.eu/information_society/activities/health/studies/published).

