

The Rise of the Robots: The European Robotics Flagship

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The age of robots is dawning. If you think you have heard this before, you are right. In 2007, Bill Gates suggested that robots were about to enter every home, just as personal computers had done a few years earlier. Since then, we have heard repeatedly that robots are about to revolutionize everything: our workplaces and homes, hospitals and farms—even the way we respond to disasters. The promised impact on society and the economy is enormous. But where are the robots?

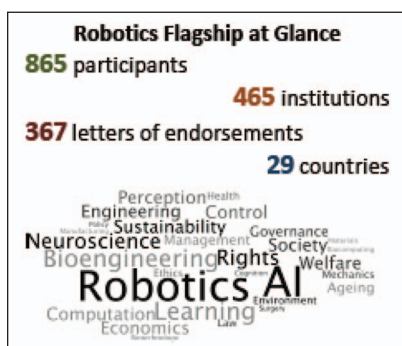


Figure 1. The Robotics Flagship at a glance.

After 60 years of investigation and development, researchers with a vast wealth of knowledge and new technologies are providing robots with the ability

to perform increasingly complex tasks in limited application scenarios. A paradigm shift is needed to achieve the final breakthrough toward robots and artificial intelligence (AI) that are ethically, socially, economically, energetically, and environmentally responsible and sustainable. This means rethinking how robots look and feel and determining what new abilities they need, how they impact the ecosystem and society, and how they should be regulated.

To answer these questions, we are proposing a new large-scale, long-term European initiative, code-named *Robotics Flagship*, to mobilize academia, industry, and society (Figure 1). The flagship will leverage European core

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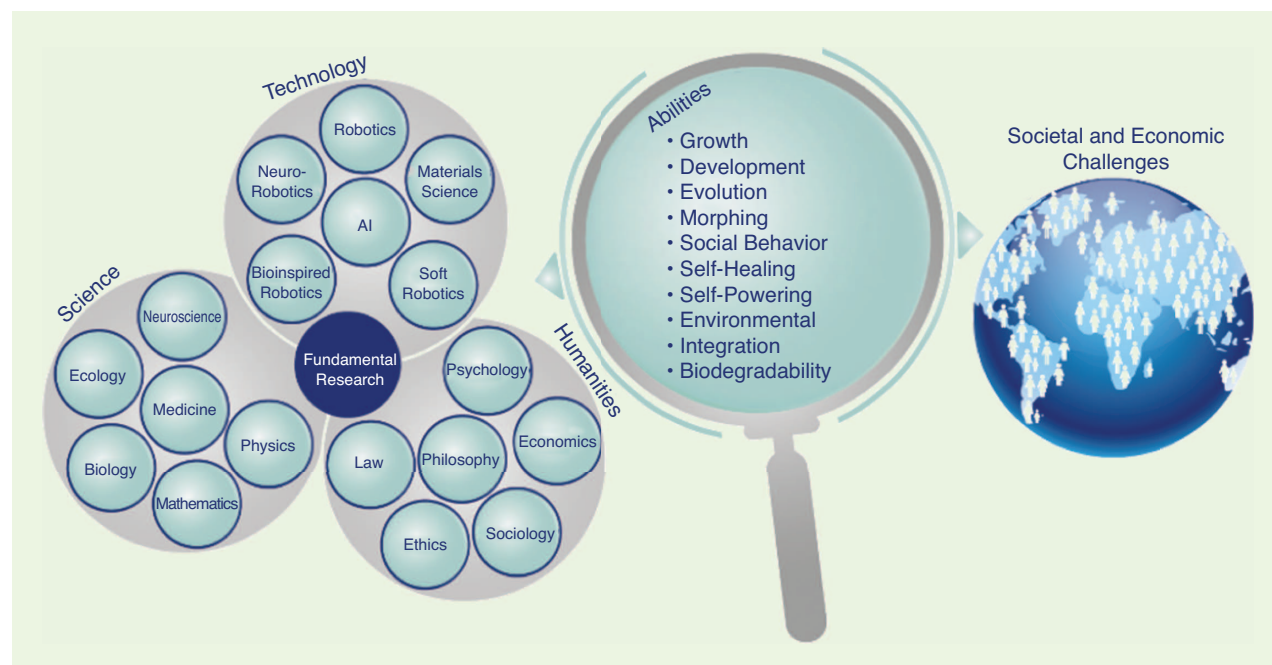


Figure 2. The core values of the Robotics Flagship.

values of sustainable development, citizen well-being, equal opportunities, and respect for the ecosystem and the planet.

Central to the flagship is the need for new technological abilities that enable robots to thrive in our environments, by humans' side, to address societal and economical challenges and promote industry growth. Developing these abilities presents new scientific and technological challenges, which require fundamental interdisciplinary research, ultimately resulting in new technologies.

The Robotics Flagship aims to


- establish a new paradigm that merges biology, materials science, and AI to build learning and collaborative robots that are adaptable and can coexist with humans
- design those robots so that they seamlessly integrate into the planet's life cycle and preserve its resources, rather than consume them
- develop and propose new economic and social models for a world of intelligent robots, where social innovation complements and guides technological innovation.



Figure 3. The logo of the Robotics Flagship (www.roboticsflagship.eu). FET: future and emerging technologies.

In the European Robotics Flagship, 1) biology is the inspiration for simplifying principles to deal with a complex world, 2) materials science is the foundation for giving the body its proper role in shaping behavior, 3) AI powers new forms of cognitive functions, 4) information and communication technologies keep all this connected, and 5) the humanities steer the impact of new machines on society in a positive way (Figure 2).

The robots we envision will not be “just another technology.” They have the potential to create a radical transformation in current economic structure. This is why robots inspire concerns, ranging from their impact on jobs to geopolitical effects. Instead of fearing them, we should take this unprecedented opportunity to advance robotics and AI along with public policies and social innovations to ensure positive effects on citizens, the environment, and the economy. Therefore, in addition to scientific and technological research, the Robotics Flagship (Figure 3) aims to investigate new economic models and public policies for wealth production and distribution with robots at work.

Developing additional technological abilities would enable robotic applications in numerous environments, by humans' side, to address societal and economic challenges and promote industry growth. However, reaching this goal presents new scientific and technological challenges for fundamental research, requiring interdisciplinary knowledge and investigations to prove new principles, develop new solutions, and transform new science into new technology. 

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