

Promoting Responsible Robotics - Recommendations for Policy Makers



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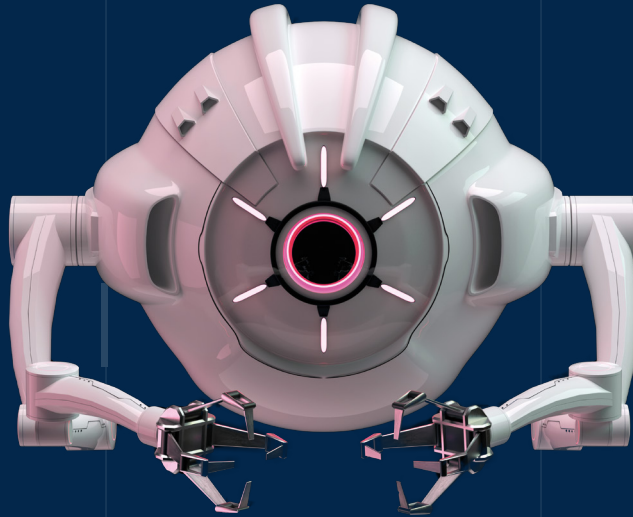


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Work in progress



Foreword

The **Robotics4EU** project focuses on addressing non-technological robotics-related challenges with a specific focus on the legal, ethical, and societal implications. Through the Robotics4EU project activities, we strive to help bring robotics closer to societal needs and expectations and, thus, support robotics societal acceptance.

One of the project's objectives is to deliver a responsible robotics advocacy report. The report aims to translate the citizens' expectations, experts' insights and industry's needs into actionable steps for EU-level and national policymakers to steer the development of the robotics field in a responsible direction. The main recommendations could be summarised into the main four "calls":



01.

Engage a wide array of actors in the formulation of robotics policies and the development of products.

02.

Support the industry in steering the development of responsible robotics.

03.

Ensure adherence to the responsible robotics principles in safety, data, ethics and sustainability.

04.

Advance solutions to socio-economic challenges.

This document summarises the draft recommendations. Each section begins by describing a non-technological problem of the robotics field and is followed by a set of recommendations alongside initial measures tailored explicitly for policymakers to advance the respective recommendation.

We invite you to partake in the iterative process of recommendations refinement and share your thoughts and proposals, providing feedback on the relevance of the problem statement, the correctness of the direction of recommendation and the feasibility of the suggested measures.

We invite you to fill in the feedback form [see QR code on the last page] or share your feedback directly by emailing us at info@robotics4eu.eu.

01.

ENGAGE A WIDE ARRAY OF ACTORS IN THE FORMULATION OF ROBOTICS POLICIES AND THE DEVELOPMENT OF PRODUCTS

The expanding impact of robotics on personal life, health and social services, work environments, and public spaces raises various ethical issues (biases; potential marginalisation of certain affected groups; privacy and data management issues, etc.), socio-economic implications (employment shifts, risk of inequality, etc.). The deliberation of these issues, affecting a wide range of actors and robotics development directions, cannot solely rely on industry-policy discussions. Based on findings from Robotics4EU engagement activities with the citizens, end-users, SSH and robotics community, it is seen that currently, a broad stakeholder engagement in the robotics development, including policy levels, is lacking. The gap between society and industry breeds misconceptions and reduces trust.

To ensure the societal acceptance of robotics, multi-stakeholder engagement should be promoted in the public discourse, policy discussions, product development, deployment and evaluation.

1. Engage a wide array of actors in the formulation of robotics policies and the development of products

Involving society in robotics policy development is the first step to ensure its acceptance. To align the EU's robotics mission with societal expectations, stimulating discussions, including citizens, stakeholders and social sciences and humanities (SSH) experts, is vital. They should address crucial questions about development priorities, acceptable sectors and application cases for robotics, and deliberate societal impacts from robotics uptake.

Citizens and stakeholders

1.1 Promote public discourse and awareness about robotics and establish regular citizen consultations and stakeholder engagement for policy inputs.

SSH Experts

1.2 Establish a role for SSH experts in shaping Horizon Europe and other research and innovation programmes and strategic documents.

2. Ensure representation of citizens, experts, stakeholders and end-users in the robotics research, development and deployment

Involving end-users and stakeholders, including trade and labour unions, social partners, and NGOs, representing affected workers and vulnerable groups in early-stage robot design would enhance the alignment with users' needs, fostering fair representation and potentially increasing societal trust and acceptance of robots by considering their inputs and concerns.

Citizens

2.1 Fund Horizon Europe projects focusing on citizen engagement in the field of robotics.

SSH Experts

2.2 Strengthen the interdisciplinarity (role of stakeholders and SSH experts) in the EU-funded robotics projects and expand participation eligibility to encompass ethical/social/humanitarian experts, including non-profit organisations.

Stakeholders and representative groups

End-users

2.3 Define the requirements of involving end-users and stakeholders in EU-funded robotics projects and broaden their role in robotics testing facilities.

3. Focus on researching and redefining the shifting landscape of employment

Recognising the fundamental transformation caused by automation in the labour market, particularly of altering job roles, workers' autonomy levels, and skills demand, highlights the importance of understanding its short and long-term consequences. Furthermore, the need to strengthen the advocacy for employees' rights is a critical issue.

End-users

Stakeholders and representative groups

3.1 Facilitate regular consultations between employers, employees, unions, and policymakers.

3.2 Establish mechanisms for effective dispute resolution and to address conflicts or issues between employers and employees.

SSH Experts

3.3 Allocate funds for researching job displacement within specific application domains.

3.4 Fund research on the effects on workers and stakeholder groups of human-robot interaction, changes in work roles and autonomy, and co-existing and co-working with robots.

3.5 Funding research investigating the changes in the cycle of obtaining the skills and long-term skill demand.

02. SUPPORT INDUSTRY IN STEERING THE DEVELOPMENT OF RESPONSIBLE ROBOTICS

The evolving regulatory framework in the EU poses challenges for the industry, especially small and medium-sized enterprises, in navigating compliance. Further, integrating ethical, legal and social (ELS) aspects from the design stage demands commitment, resources and competencies from robotics developers. The findings of Robotics4EU show that the industry needs more awareness, resources, and capacity to comply with complex regulations and consider emerging ethical and societal concerns. Therefore, there is a need to ensure that the regulatory developments and policies do not impede innovation, as well as create incentives and provide accessible, sector-specific tools to address ELS aspects in a meaningful and reiterative way, adhering to the principles of responsible robotics.



4. Steer the regulatory and policy developments to foster innovation while ensuring adherence to necessary safety and ethical requirements

5. Support the industry in integrating ethical, legal and societal aspects from the outset of product development

Even though the EU is advancing greatly towards establishing a harmonised legal framework, supporting legal sandboxes and testing facilities, there are still gaps in harmonisation, related to the different requirements across borders in application domains, the accessibility of the testing facilities and legal frameworks.

- 4.1** Advance harmonisation of regulations and standards for robotics across borders in application domains, including ethical requirements.
- 4.2** Advance frameworks for regulatory sandboxes.
- 4.3** Develop testing facilities and fund experiments to advance standardisation.

To ensure that robotics industry actors (technology and software developers, robotic application developers) are well-positioned to address ethical, societal and legal aspects from the initial stage of robot development, they must be equipped to identify risks, engage stakeholders, and formulate solutions. There is a need to support the industry in capacity-building and providing accessible, sector-specific tools for meaningful integration of ELS aspects.

- 5.1** Strengthen the capacity building and consulting on legal frameworks through the DIHs, IP help desk, and other robotics-industry targeted EU initiatives.
- 5.2** Support the further development of ELS standards and guidelines for robotics.
- 5.3** Develop application domain-specific practical tools for responsible robotics development and integration.
- 5.4** Support the interdisciplinary collaboration between technical and social science and humanitarian representatives by establishing methodologies, providing training and best-practice examples of collaboration.
- 5.5** Establish the requirements of adherence to the established ELS guidelines for responsible robotics in EU-funded projects.
- 5.6** Create and maintain self-assessment tools for the industry to navigate the ELS aspects and legal framework.
- 5.7** Include (or strengthen) the ethical and societal dimensions of robotics in the curricula of robotics/engineering education.

03.

ENSURE ADHERENCE TO THE RESPONSIBLE ROBOTICS PRINCIPLES IN SAFETY, DATA, ETHICS AND SUSTAINABILITY

The Robotics4EU project, centring its efforts on exploring the perspectives of citizens, end-users, and the robotics industry, aims to identify risks related to non-technical aspects of robotics, which need to be tackled to strengthen the trust of society and end-users in robotics. The risks of the development and uptake of robotics stem from the complexities of safety, privacy, representation, liability and sustainability issues. Each category presents a range of risks, spanning from physical and psychological safety concerns to issues surrounding data access and management, biases, and the representation of marginalised groups, and sustainable governance of robotics. Based on insights gleaned from engagements with citizens and robotics communities, a non-exhaustive list of recommendations is proposed for policymakers, targeting some of the most pressing challenges within these domains.



6. Ensure the relevance of safety standards in robotics advancements

6.1 Review risk guidelines considering new developments in robotics (smarter, smaller, collaborative, softer).

6.2 Enhance workers' training on current real-life safety risks involved in integrating collaborative robots in the workplace.

7. Demand to follow the privacy-by-design principles

7.1 Develop standards and guidelines, as well as enforcement mechanisms ensuring data containment in the robots operating in private and public environments.

7.2 Define clearly the frameworks governing data ownership and access rights.

8. Establish protocols for testing, liability, and legal classification of autonomous systems

8.1 Establish mandatory evaluation and testing procedures to detect biases.

8.2 Develop liability frameworks for autonomous systems.

8.3 Initiate deliberation on the new legal categories for autonomous robots.

9. Advocate for reusability and repairability in robotics manufacturing, alongside assessment of environmental impacts

9.1 Demand re-use and repairability principles from robot manufacturers.

9.2 Encourage the robotics industry to evaluate the environmental impact of their business.

04.

ADVANCE SOLUTIONS TO SOCIO-ECONOMIC CHALLENGES

The more widespread integration of robotics creates shifts in the employment landscape, including the changing demand for the skills and impacts on the welfare systems. Also, it is essential to pay attention to the prevailing fear of technological unemployment, enhanced by the concerns for the skills mismatch and the risk of deepened inequality, as these aspects remain significant constraints to the societal acceptance of robotics.

To tackle these questions, a reassessment of education, training and welfare systems is required in close collaboration with the robotics industry and stakeholders. First, due attention must be paid to the education systems, aligning the programmes with long-term skills demand. Further, as workplaces transition towards automated solutions, it is crucial to implement robust strategies for training, incentivization, and the establishment of safety nets to protect workers' rights and well-being. Nevertheless, these questions transcend the scope of robotics policies and are intertwined with the ownership at the national and EU levels of socio-economic spheres.

10. Enhance technology and engineering education alongside industry-focused training programmes

10.1 Sponsor and encourage the creation of robotics clubs in schools and pre-schools in local municipalities.

10.2 Including robotics in general education topics as a part of ICT and digital methods integration in curricula.

10.3 Promote TVET technology and engineering education.

10.4 Develop training programmes that support industry transition.

11. Research automation's impact on the labour market and welfare system

11.1 Facilitate the research on the impact of automation on employment in specific application sectors.

11.2 Ensure that the welfare system's "safety nets" are answering the needs of the transition.

12. Evaluate and mitigate the risks of structural changes and inequality

12.1 Drive evaluation and research on automation's impact on equality (income equality, affordability of automation and digital divide).

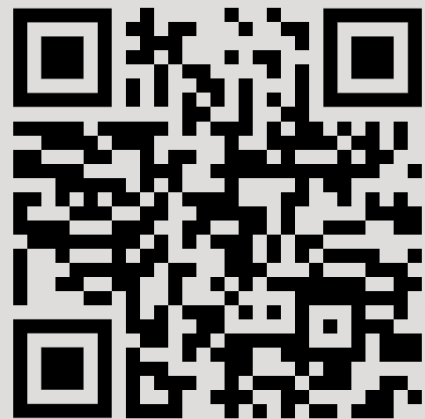
12.2 Consider the changes in fiscal policy towards favouring automation for repetitive and demanding tasks in low-paid positions.

See more information on responsible
robotics and Robotics4EU at
www.robotics4eu.eu

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