Robotics4EU

Boosting Wider Adoption of Robotics in Europe

Deliverable 4.1

GlobalSay on Robotics

Citizen Consultations on Wishes and Concerns

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Deliverable 4.1

Citizen Consultations Report

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1. Executive Summary

This document presents the results from a global citizen consultation on robotics, GlobalSay on Robotics, which took place in October and November 2021 across 12 different countries. The consultation focused on getting insights into what citizens think about the non-technological issues regarding robotics, the potential benefits and risks, and which barriers there might be to the wide adoption of robotics in society.

The consultation found that the participating citizens were generally positive towards robotics seeing that this technology can make life easier and more convenient for people overall.

However, there were also widespread concerns, and the largest worries by far are military and defense robotics, robotics in healthcare, and robotics with a high level of artificial intelligence. Another worry throughout the consultation is that the advancement of robotics could increase unemployment and destabilize the job market.

Further, the consultation found that the vast majority of participants believed that robotics should be subject to both limitations and regulation.

A very relevant takeaway from the consultation was that 85% of the participants feel that it is important that citizens' considerations are considered when developing and regulating robotic solutions. This speaks for the importance of citizen engagement though consultations like this one.

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2. Introduction

This report presents the results of a European wide citizen consultation on robotics – with the additional inclusion of the United States and South Korea. The consultation used the GlobalSay methodology, in which small-scale meetings consisting of 4-9 participants are arranged and held by private citizens. The participants are guided through the process by the online platform EngageSuite which is able to provide informative videos, pictures, questions for shared discussion and then collect individual responses from the participants. Thereby, the GlobalSay methodology produces a quantitative output. The meetings were held during October 2021 and into the first two weeks of November 2021 and engaged a total of 742 participants in 12 different countries.

2.1 About Robotics4EU

The citizen consultation presented in this report is a part of the 3-year project Robotics4EU which is funded under the European Union's Horizon 2020 research and innovation program. The project aims to ensure a more widespread adoption of (AI-based) robots in healthcare, inspection and maintenance of infrastructure, agri-food, and agile production. This will be reached through the implementation of the responsible robotics principles among the robotics community that results in societal acceptance of the robotics solutions in application areas.

Robotics4EU will create and empower the EU-wide responsible robotics community representing robotics innovators from companies and academia in the fields of healthcare, inspection and maintenance of infrastructure, agri-food, and agile production as well as citizens/users and policy/decision makers. This will be done by raising awareness about non-technological aspects of robotics (ethics, legal, socioeconomic, data, privacy, gender) by organizing community building and co-creation events bringing together robotics community, citizens and end-users, advocating for responsible robotics among all stakeholder groups, incl. policy makers, developing a responsible robotics maturity assessment model and bringing the project results to the standardization bodies.

Robotics4EU will create and empower the EU-wide responsible robotics community representing robotics innovators from companies and academia in the four application areas, as well as citizens/ users and policy/ decision makers by:

- raising awareness about non-technological aspects of robotics by organizing community building and co-creation events bringing together the robotics community and citizens.
- advocating for the responsible use of robotics among all stakeholders' groups.
- developing a responsible robotics maturity assessment model and bringing the project results to the standardization bodies.

To accomplish the above, Robotics4EU will implement the following set of activities:

1) Assessing the needs and developing a responsible robotics maturity assessment model that is a practical tool for the robotics developers and helps them to

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strategically plan how to address the legal, societal and ethical aspects of robotics;
2) Empowering the robotics community by organizing capacity building events in healthcare, agri-food, agile production and infrastructure;
3) Ensuring citizen acceptance of robotics and assessing robotics ideas and applications provided by the industry with citizens and end-users (via online consultation and co-creation workshops);
4) Reaching out to the policy makers by compiling a responsible robotics advocacy report, organizing a high-level policy debate, and transferring the results to the standardization bodies.

2.2 Creating Societal Acceptance – Engagement is Key

As mentioned above, one of the main purposes of the Robotics4EU project is to create societal acceptance of robotics. As of January 2022, the project has already carried out a comprehensive survey among the robotics community, experts, stakeholders, and policy makers as well as a round of interviews. The results of this work are described in Deliverable 1.2 – Robotics community, citizens and policy makers needs analyses[1]. To create a comprehensive picture, the project also seeks to include the view of the citizens that is also interesting to compare to those of the stakeholders and experts. This comparison will be touched upon in Chapter 4.5.

2.3 The Importance of Engaging Citizens

There are numerous reasons as to why it is important to conduct citizen consultations on topics such as robotics. The current development within the area of robotics is rapidly causing considerable change to our society and evidently, these changes are already impacting much of the world around us. Areas such as production, transportation, agriculture, healthcare, and most everything in between are already deeply intertwined or are increasingly becoming more involved and reliant on robotics and automation technology. Therefore, it is also essential to investigate how these societal changes might be perceived and received by "regular citizens", namely individuals who are not directly involved or consulted for the design of robots, and not considered by robot designers as the target customers and users of these devices.

The case for involving citizens rests on the core democratic notion that technology with the potential to have a significant impact and thereby change the lives of most everyone, should not only be discussed by stakeholders, policy makers, experts, or businesses. On the contrary, it is important that the opinions of those most likely to be directly impacted by these changes are considered and that a broad public debate is engaged.

It is important to consider the barriers that might stand in the way of adopting new technology and involving citizens can help to uncover actual worries and wishes and in

[1] Read the report here: https://www.robotics4eu.eu/publications/deliverable-1-2-robotics-community-citizens-and-policy-makers-needs-analyses/

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turn help to overcome barriers and consequently build trust in new and emerging technologies. Furthermore, it is important to engage in these discussions while the technology is still undergoing developmental changes to steer development away from unwanted paths, thereby seeking to ensure that new and emerging technological development is both ethical and broadly acceptable by society.

One expected concern/critique when conducting a methodology like GlobalSay is that citizens lack knowledge about highly specialized areas such as robotics and that in turn, asking them would not produce useful information. However, it is important to remember that citizens engaging with the consultation come from all walks of life and that the professor of mathematics, doctor, schoolteacher, and mailman are all citizens and thereby should be able to partake in the consultation. All these people have intricate knowledge about many societal aspects from their professional and private lives as well as different views and beliefs that all serve to paint a nuanced picture of society by aggregating the amount of knowledge shared between them. And as citizens they are key in creating more acceptance of robotics in society. Only by engaging them, listening to their concerns, and using this knowledge in our work can we make sure of a more widespread adoption of robotics with societal acceptance.

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3. The GlobalSay Methodology

GlobalSay is a concept for distributed dialogue that is designed to engage citizens in deliberations about selected topics. The citizens are engaged in micro-meetings of 4-9 participants which are organized by regular citizens, who have volunteered to host the meetings. The meetings can take place where and whenever it is convenient for the participants, and instead of having a human facilitator, the event is facilitated by an online platform: EngageSuite.

At the meetings, participants will gather around a computer in the living room of the host, the break room of the office, the local library or where it is convenient. The online platform guides them through a predefined process during which they engage in consecutive rounds of deliberation, alternating between presentation of information in the shape of short texts, video presentations and deliberation on questions addressed by the platform. At the end of each round, they are asked to provide answers to a range of questions with predefined answering options. The video on the following page gives a short introduction to the methodology and consultation.

The methodology enables anyone to invite friends, family, colleagues etc. to join them for a face-to-face deliberation, wherever they like and whenever they like, using a digital platform to facilitate and inform the meetings and collect the results.

Thus, the methodology provides the flexibility of online facilitation while ensuring that participants have had time to reflect over their answers and have had their preconceptions and values challenged in open face-to-face deliberation. Below are some of the photos the citizens took of their meetings. More photos are shared on the front page of the report.

Figure 1: Picture from a citizen consultation in South Korea

Figure 2: Picture from a citizen consultation in Malta

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GlobalSay in short

Self-organized
Anyone can set up a meeting and invite whoever they would like to. No prior knowledge or interest in the topic is necessary to take part.

Distributed
The meetings can be set up where and when it is convenient for the host. The only requirement is a computer with internet connection.

Digitally supported
Meetings are supported by an online engagement platform, EngageSuite, which provides the structure for the meetings and facilitates the deliberation, as well as collecting the participants' assessments and opinions. In addition, it enables everyone to participate in their own language.

https://www.youtube.com/watch?v=s9DKF9WrcsQ&t=1s

For a more detailed description of the process please see the Partner Manual in Appendix 3.

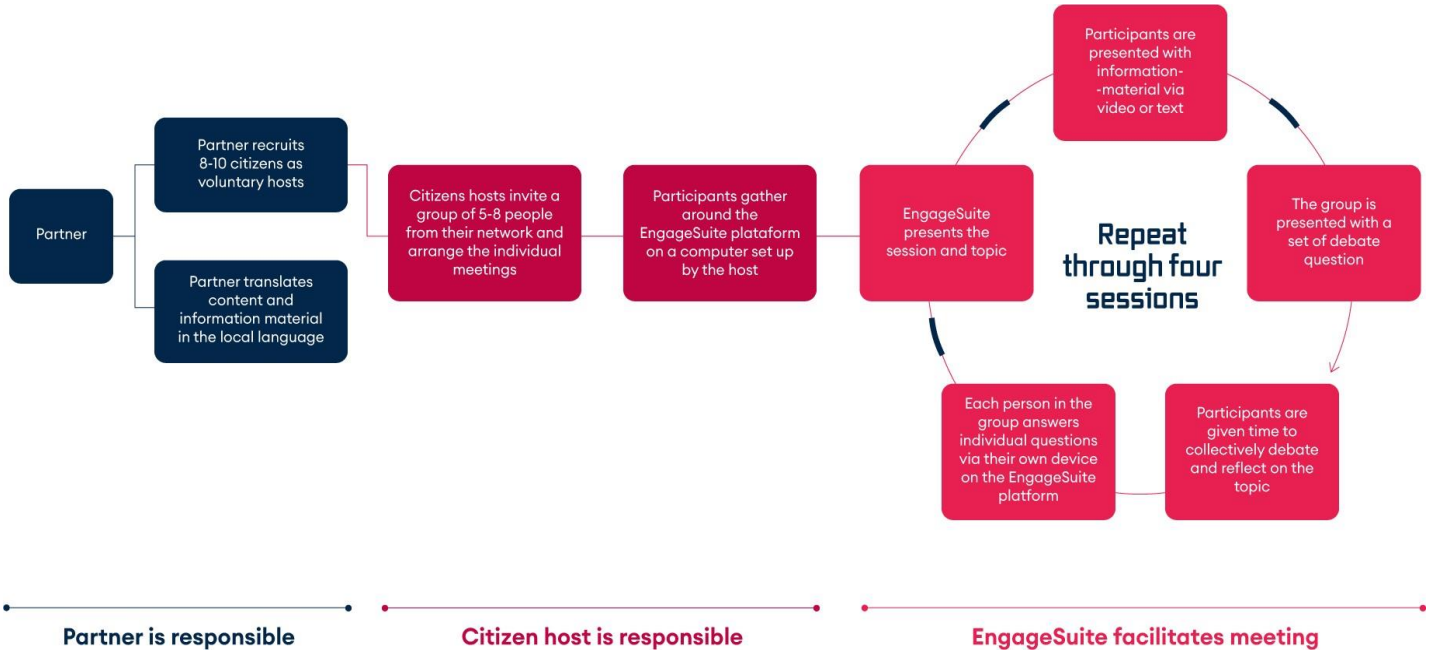

Figure 3: The GlobalSay Methodology in short

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The GlobalSay consultation on robotics was developed and organized by The Danish Board of Technology (DBT), who also coordinated and facilitated the Danish consultations. Partners from 11 countries, including 5 partners from the consortium and 6 external partners collaborated closely with DBT on the consultations in their own countries. The partners were responsible for finding local hosts and ensuring that they were supported in arranging their own meetings. The partners were also responsible for translating all the content to the 9 national languages.

As seen in the table below, 141 consultations took place in 12 different countries, where a total of 742 citizens were engaged. The consultations took place in October 2021 and the first two weeks of November 2021.

Country	Name of partner	Number of consultations	Number of citizens
Denmark	DBT	14	74
Estonia	CIVITTA	11	58
France	LNE	9	52
Italy	Formattiva	12	57
Lithuania	AFL	12	74
Malta	Across Limits	11	63
Norway	NTNU	20	94
Poland	Łukasiewicz - Instytut Technologii Eksploatacji	10	55
Portugal	LOBA	10	52
Slovakia	PhDr. Tomas Michalek	13	59
South Korea	KAIST	11	61
USA	Museum of Science, Boston	8	43
Total		**141**	**742**

Table 1: Consultation Overview

The methodology seeks to achieve a well-grounded picture of the quantitative tendencies in the population, both at the national and transnational level. This picture can be very useful for getting a rough understanding of what the citizens think of robotics and how its development should be steered, and thus lay out an initial guiding line for the maturity assessment model to follow.

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By including USA and South Korea in the GlobalSay consultation, we get the opportunity to compare data from countries in the EU with data from other cultures that might have another view and perspective on robotics.

3.1 Demographic data and considerations

The methodology seeks to achieve a well-grounded picture of the quantitative tendencies among citizens, both at the national and transnational level. This picture can be very useful for getting a rough understanding of what the citizens think of robotics and how its development should be steered, and thus lay out an initial guiding line for the maturity assessment model to follow. One of the specific aims of the consultation was to try and engage a broad and diverse selection of participants from a wide variety of gender, age, educational level, and from different residential areas (large city, suburban, small town or rural). However, while this was what was strived for, it is very important to note that the GlobalSay methodology does not make any claims towards statistical representativeness. Rather it is a method that can be used to get well-grounded insights into an informed public opinion about a given topic. The demographical data collected tells us that it was indeed the case that the consultation engaged a broad and diversified spectrum of people while not making any claims to do so representatively. However, the broad demographic engagement is useful, and will serve to provide interesting answers to the questions of the consultation from people with many different professional and personal backgrounds and perspectives. The idea behind using the GlobalSay methodology was to engage citizens in deliberations on robotics and its societal, legal, and ethical impact and thus, the wider goal of the consultations was to democratically qualify the debate on robotics by including the concerns, wishes and opinions of the wider public. Such inclusion can help supplement the ongoing discussion and viewpoints of those who are already well-represented, such as researchers, policy makers, engineers, businesses and interest organizations and others. The output generated by the GlobalSay activity can be used to broaden the knowledge base for policy making at national levels as well as at EU level.

The fact that the methodology does not make claims to statistical representativeness is also important to keep in mind when looking at the answers. Contrary to examinations and surveys such as Eurobarometer[1] where responses are representative and sample sizes are considerably larger, the GlobalSay methodology aims at enabling a shared forum for face-to-face discussion among small groups of citizens instead of simply collecting answers from individuals. The main goal of these meetings is to facilitate a dialogue between citizens where focus is on generating both qualitative as well as a quantitative outputs for analysis. The methodology differs further in the sense that focus is placed on the consultations being informed, meaning that participants get information about the overarching topic as well as the subsequent topics and themes of the consultation (either via informational videos or text). This means that participants are guided through the consultation and thus spend a previously allocated amount of

[1] Eurobarometer is a polling instrument used by the European Commission, the European Parliament as well as other EU institutions and agencies. Eurobarometer uses CAPI, CATI and CAWI methods to conduct interviews and collect data. For more information, see: https://europa.eu/eurobarometer/about/eurobarometer

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time discussing the topics and the questions asked before answering the questions individually. The setup of the small tabletop meetings combined with the large qualitative output that is generated by the GlobalSay methodology is part of what makes it stand out from other surveys.

By including USA and South Korea in the GlobalSay consultation, we get the opportunity to compare data from countries in the EU with data from other cultures that might have another view and perspective on robotics.

3.2 Considerations Regarding the Data and Methodology

Before presenting an in-depth analysis of the demographics, a summary reveals the following: The average age of participants was 37,02 years. 54% were female while 45% were male and the remaining 1% chose 'Other' or 'Prefer not to answer'. 46% answered that they live in a 'Large city', with the second most picked answer being 'Small town' with 23%. When asked about education 33% answered that they had a 'Masters' degree or equivalent' while 24% answered that they had a 'Bachelor's degree or equivalent', indicating that the consultation noticeably engaged citizens of higher education. However, there was an adequate distribution of participants that opted for the remaining available categories, meaning that for the purpose of the consultation the GlobalSay activity succeeded in engaging a broad segment of participant from different educational backgrounds.

Participants were asked to answer a series of questions before starting the consultation. First, they were presented with the following introductory text:

> *Before we get started, we would like to get to know a bit more about you, to better understand who the people answering this consultation are. Now it is time for you to get out your smartphone, tablet, laptop or other device that can access the internet. We want you to individually answer the following questions.*

Subsequently the following series of questions were asked:

1. What is your year of birth?
2. What is your gender?
    - Female
    - Male
    - Other
    - Would prefer not to answer
3. What is your country of residence?
    - Denmark
    - Estonia
    - France
    - Italy
    - Lithuania
    - Malta
    - Norway

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- Poland
- Portugal
- Slovakia
- South Korea
- United States of America

4. What is your area of residence?

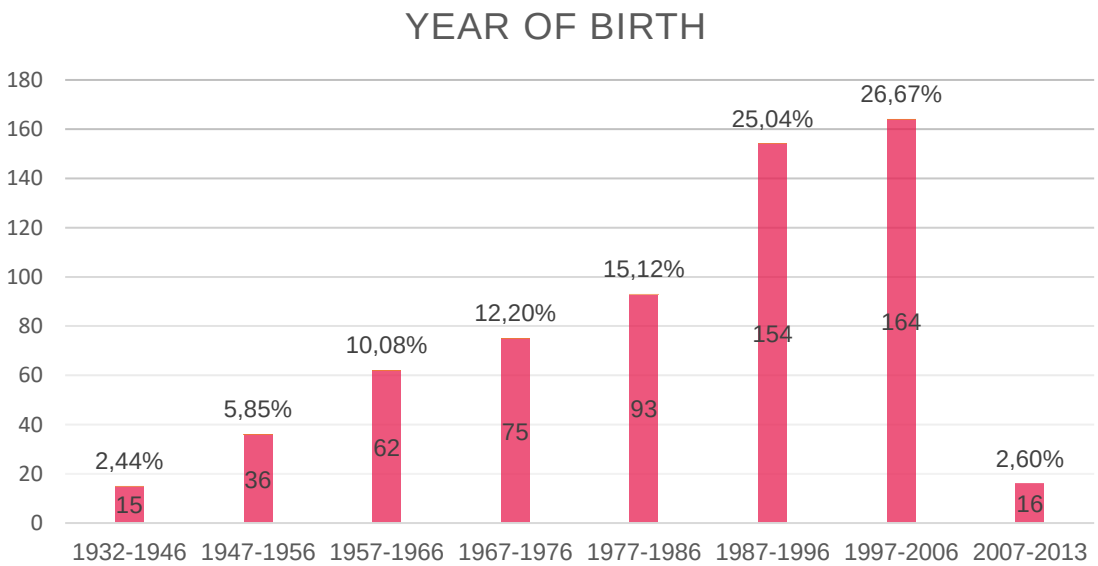
- Large city
- Suburban
- Small town
- Rural

5. What is your highest attained level of education?

- Primary or lower secondary education
- General upper secondary education
- Vocational education or training
- Bachelor's degree or equivalent
- Master's degree or equivalent
- Doctoral degree or higher
- I do not know / wish to answer

A more in-depth analysis of the demographics tells the following.

Looking at the data collected from the European citizens that participated, a total of 615 participants entered their year of birth during the consultation. The category with the highest number of participants was the one concerning the range between 1997-2006, this was chosen by 164 (26,67%) participants. This was closely followed by 1987-1996 with 154 (25,04%) participants. Calculating the average year of birth of those who answered it comes to the average birthyear 1983,97, i.e., an average age of 37,02. For a full overview of the distribution, see the graph below:



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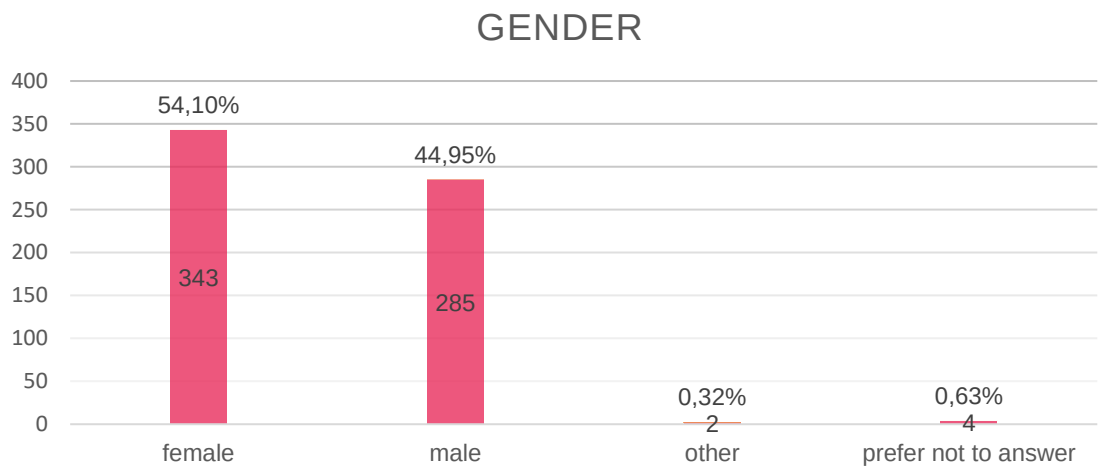
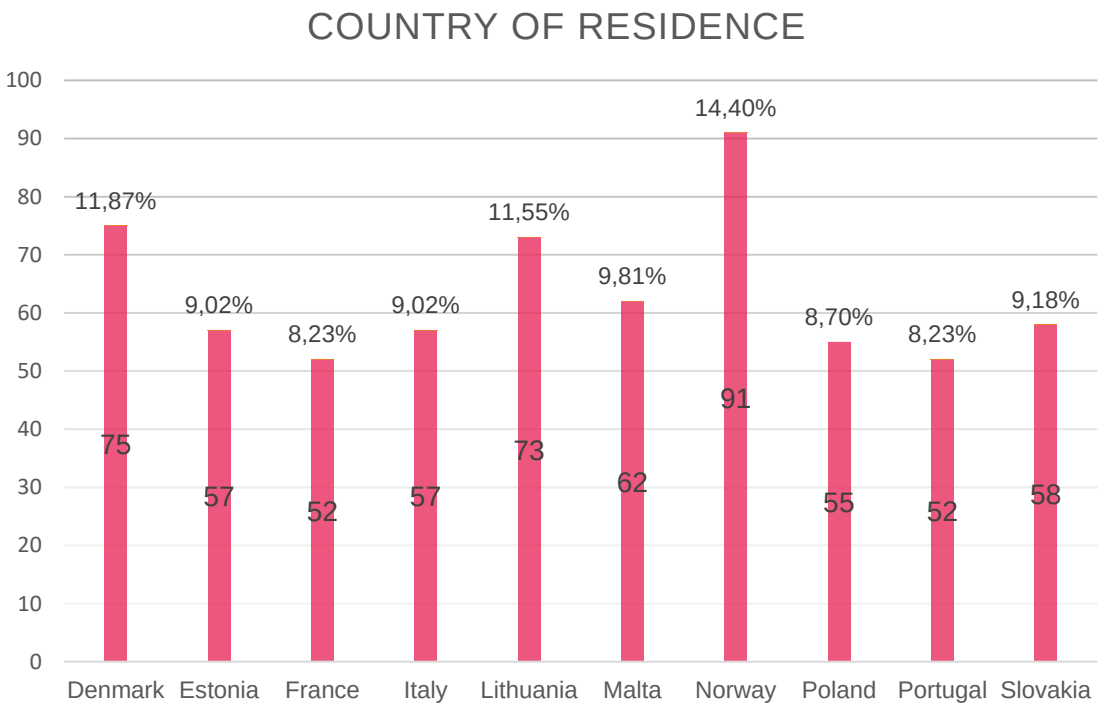
Concerning the gender distribution, a total of 634 participants chose to enter this information. Of those who provided this information the distribution came to 343 (54,10%) female and 285 (45,95%) male. Of the remaining categories 2 (0,32%) participants entered 'Other' and 4 (0,63%) chose the option 'Prefer not to answer'. A comprehensive overview of the distribution can be seen in the graph below:



A lot of effort was put into making sure that there was an equal distribution of gender for the consultations. However, as can be seen in the graph above, there were slightly more female participants than male.

Each consortium partner was tasked with recruiting hosts from their own country for the consultation. All consortium partners put a lot of effort into this task, and all succeeded in reaching the KPIs. Norway succeeded in recruiting the most participants for the consultations with a total of 91, followed by Denmark with 75 and Lithuania with 73. A comprehensive overview of the distribution, can be seen in the graph below:



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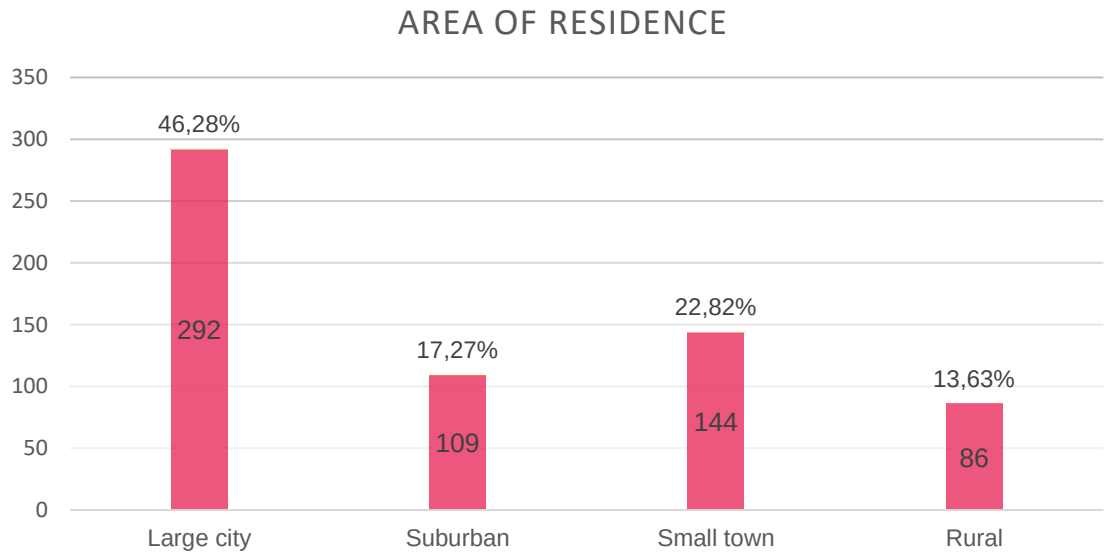
Turning to the distribution of the areas of residence of the participants, there is a substantial overrepresentation of those who chose the option ‘Large city’ as opposed to any of the other categories. Here, 292 (46,28%) of those who answered, selected this option. Secondly, 144 (22,82%) participants opted for ‘Small town’, while the category ‘Suburban’ was selected by 109 (17,27%) of the participants and finally ‘Rural’ which was chosen by 86 (13,63%) participants. See the graph below:



There was a lot of focus on engaging citizens from many different walks of life as well as personal and professional backgrounds and therefore there was also a lot of effort put into recruiting citizens from different areas of residence. However, looking at the distribution of the areas of residence of the participants, there is a substantial overrepresentation of those who chose the option ‘Large city’ as opposed to any of the other categories. However, this is not something that was the cause for too much concern. Since more than half of all European citizens reside in urban areas a distribution such as the one presented in the graph above was to be expected. Furthermore, effort was put into recruiting beyond the larger metropolitan areas, but as expected it was not possible to recruit an equal number of citizens from the different areas of residence.

Looking at the distribution regarding the level of education, it is evident that most of the participants that took part in the consultation held a bachelor or master's degree or equivalent. Out of the 633 total answers, 212 (33,49%) participants picked the option ‘Master's degree or equivalent’, while the second most chosen option was ‘Bachelor's degree or equivalent’ with 150 (23,70%) participants choosing this answer. The full distribution can be seen below:

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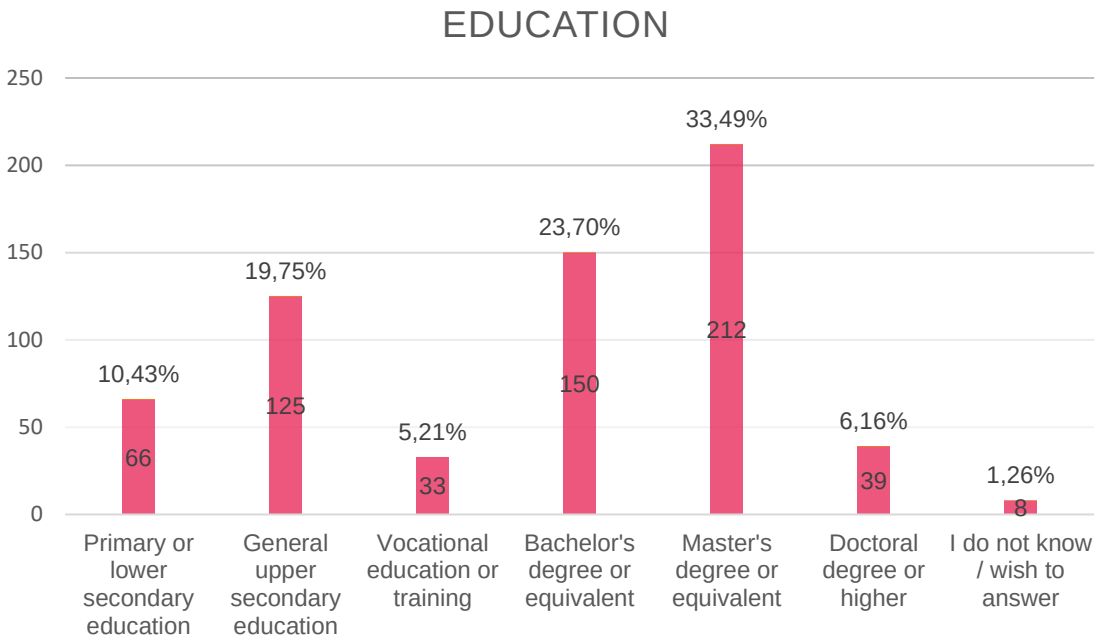

As there is a discrepancy of the answers in this category special attention will be given to the answers of those without higher education to make sure that they are heard and included.

When looking at the data it is relevant to also have in mind the context in which the questions were answered. Before each batch of individual questions, the participants watched an informative video. The information in the video might have influenced the answers as certain issues, sectors, and robots were described in the video and others were not. This risk was taken into consideration during the planning phase, but it was found that examples were very important as the citizens had no prior knowledge about robotics and would have a difficult time understanding the questions if they were not explained through relevant examples.

Therefore, the construction of the questions for the consultations was a difficult task, as they had to be constructed in such a way that they were accessible to everyone participating in the consultation, regardless of previous knowledge about robotics and robot technology. At the same time, it was important to avoid that that the questions became too general. However, as the main purpose of the activity was to uncover the wishes and concerns of citizens with different backgrounds and of different ages via a multi-country citizen engagement activity, it was also very important that the questions were able to accommodate this and therefore, the questions were constructed with these parameters in mind. This also meant that it was not possible to construct questions that were specifically target towards the four individual focus areas of the project (healthcare, agri-food, inspection and maintenance of infrastructure and agile production). However, this was not a concern, as it was not the aim of the consultations to engage citizens in discussions on the four focus areas of the project. Rather, the citizen consultations were designed to engage citizens in deliberations on ethical, legal, and social aspects of the potential take-up of robotics.

Another consideration is whether the formulations of some of the questions were too technical for the citizens to understand. Especially in one of the last sections of the

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consultation some of the questions are taken directly from the expert/stakeholder survey made in the Robotics4EU project during the first quarter of 2021. This survey was directed towards the robotics community including participants from industry, research facilities and policy makers. Needless to say, these stakeholders have a much larger prior knowledge of robotics and so the questions might have been more technical than the citizens could follow. But it was still found relevant to include some of them to make a comparison, and efforts were made to increase the understanding by including examples. (See Appendix 2 for the full overview of sections and questions).

Opinions of Participants Without Higher Education

Even though a lot of focus was placed on getting a diverse and broad selection of citizens, one specific area fell short. Looking at the distribution of levels of education, it is evident that there is an underrepresentation of citizens without higher education. This section looks at the opinions of those that were underrepresented in the consultations and considers their viewpoints to examine whether any differences can be found. Thus, this section will look at those who answered: 'Primary or lower secondary education', 'General upper secondary education' or 'Vocational education or training' when asked about their highest attained level of education.

When going through the survey results with special focus on those without higher education it becomes apparent that those who answered that they had either a 'Primary or lower secondary education', a 'General upper secondary education', or 'Vocational education or training' were mainly younger participants. A total of 44,49% of those who chose one of these answers also answered that they were born between 1997 and 2006. Looking at the distribution of area of residence, the geographical spread of this group of participants was somewhat more evenly divided. Here, 31,17% answered 'Large city' while 25,97% answered 'Small town'. 21,21% and 21,65% answered that they lived in 'Suburban' and 'Rural' areas respectively. There was no noticeable difference in gender distribution as this was similar to the distribution of the complete sample. However, there was a noticeable overrepresentation of participants from Slovakia, accounting for 18,97% of those without higher education. Slovakia was followed by Lithuania (14,22%) and Italy (13,36%). The countries with the least number of participants without higher education was France (2,59%) and Norway (6,90%) followed by Denmark and Portugal both with 6,90%.

Looking at the distribution of answers to the questions asked in the consultation, there are almost no discernible differences between the way people without higher education answered when compared to those with higher education. There was only one area where a noticeable difference could be found. In session 4 of the consultation, when asked about regulation of robots and robotic technology and questions pertaining to legal matters, participants without higher education were less likely to consider international institutions such as the EU as the actors responsible when it comes to ensuring that robots are socially and ethically acceptable. Participants without higher education were also a little less likely to consider public, governmental and EU authorities as being tasked with issuing certifications of good practice that companies can apply for to ensure trust and ethical soundness of robots.

Rather, they were a little more focused on ensuring trust in robots by relying on approval by using a case-by-case basis. However, they were more focused on issues concerning cyber security and cyberwarfare than those with higher educations, rating

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this as one of the issues related to data that would have the most negative impact, placing it above issues related to surveillance.[2]

Evidently, since many of those who answered that they did not have a higher education were younger participants, there might be a significant correlation between their age and their level of education. However, removing the percentage of participants without higher education that also answered that they were born between 1997-2006 does not alter the overall outcome in any significant way.

Looking at South Korea and the United States there were once again very few differences to be found between those without higher education and those with higher educations. For South Korea and the United States, the main difference was that those without higher education were somewhat more held back at the beginning of the consultation when asked to what extend the participants were familiar with robots before joining the consultation. Participants without higher education were also a little less positive when asked what kind of impact that they think robot technology will have on society. However, apart from these minor differences in the answers there are not any noticeable difference of opinion between the two groups.[3]

[2] The questions that showed noticeable differences were: S4Q1: *Currently there is little regulation on robots driven by Artificial Intelligence. Do you think this is something that needs to be regulated, and, if so, how?* And: S4Q2: *Who should be responsible for ensuring that robots are socially and ethically acceptable?* And S4Q5*: Among the issues relative to data listed below, which 3 do you think would have the most negative impact?*

[3] The questions that showed noticeable differences were: S1Q1: *To what extent were you familiar with robots before joining this consultation?* And: S2Q4: *What kind of impact do you think robot technology will have on society?*

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4. Analysis - What do European Citizens Think of Robotics?

The structure of this analysis resembles that of the consultation itself, with a few exceptions. The consultation was divided into 4 sections, each with focus on a specific topic but all within the broader scope of robotics.

- Section 1 – Setting the Stage. This focused on presenting the structure of the consultation and on getting the participants familiar with the themes and vocabulary used.
- Section 2 – The Social Impact of Robots. Here questions concerning barriers towards acceptance of robotics in society were raised.
- Section 3 – Robots in the Future. This turned towards the questions that arise when considering the future role of robotics in our society.
- Section 4 – The Legal Question. This focused the legal question of responsibility.

Each section was introduced by a video presenting the topic to the citizens. The videos can be watched below:

Section 1
Setting the Stage
https://youtu.be/8BVtc7PqsOM

Section 2
The Social Impact of Robots
https://youtu.be/oNTVb_h2l_U

Section 3
Robots in the Future
https://www.youtube.com/watch?v=G1yttEl-4AQ

Section 4
The Legal Question
https://www.youtube.com/watch?v=WvCB6kgHg6I

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The last section also included some final considerations for the participants to answer, such as, whether the consultation had made them rethink their view on robotics or changed their view in some other way. (See Appendix 2 for the full overview of sections and questions).

4.1. Citizen Familiarity, Barriers, and Trust in Robotics

This chapter will present the citizens' preliminary and immediate views on robotics before being given in-depth examples, definitions and descriptions from the informational videos. It was important to capture their initial thoughts and opinions before these might be influenced by the questionnaire and discussions. This is also valuable knowledge, as it will serve as a form of baseline for comparison during later activities in the project. See Appendix 2 for an overview of all the questions and answers.

4.1.1. Citizens do not see Robots as Futuristic

At the beginning of the consultation, the citizens were asked to state their current opinion about robots. The citizens were surprisingly positive with more than 75% of them leaning towards a positive view on robots.

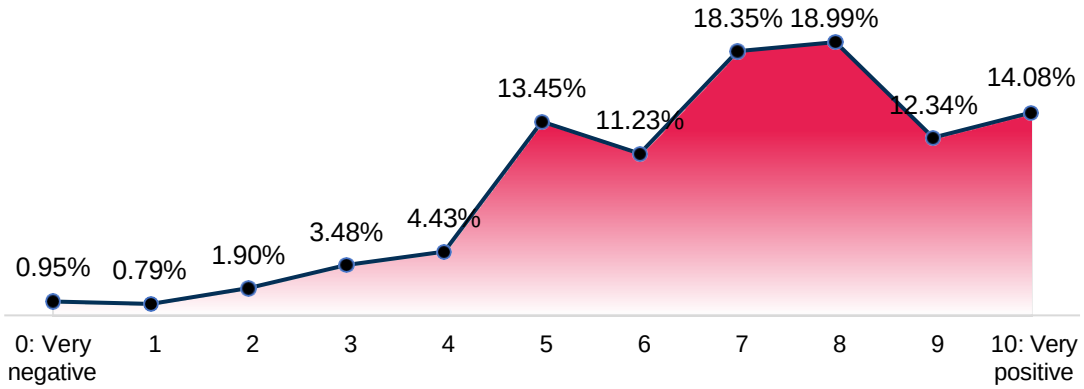
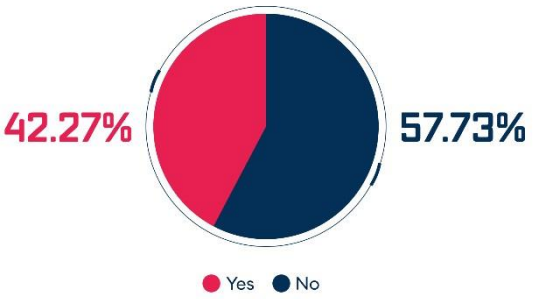


Figure 2: What is your opinion about robots?

It is noteworthy that a large majority of the citizens state that they already have some knowledge of robots prior to the consultation. A reason for this could be that people with a prior knowledge or interest in robots are more likely to join a consultation like this, or that there is already frequent communication on this topic in the media.

Even more interesting is the fact that almost 60% of the citizens state that they have a robot at home or in their workplace. It is hard to say, from this questionnaire only, whether the participants included in the term "robot" any type of smart devices such as coffee machines or other household appliances.



But it remains a fact that they feel like they have robots in their everyday life,

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so they do not see them as mainly a futuristic phenomenon. This might have an impact on their views on robots going forward.

4.1.2. Barriers Mentioned by the Citizens

Before giving the citizens examples of possible barriers to the adoption of robotics, it was important to let them reflect on this individually and provide some unprompted answers. This was the only way to uncover whether there might be some barriers which the Robotics4EU project had not thought of. Therefore, the citizens were presented with this question: *Do you see any barriers to the acceptance of robots in everyday life?*

Several citizens answered that a barrier to the acceptance of robots was the fear of unemployment and the lack of social interactions between humans. One citizen stated:

> *"Many people are afraid of being replaced by robots. I feel that society would stop interacting less and we would lose social interaction." (USA)*

Another barrier was the fear of failures and safety issues caused by robots:

> *"Fear of imperfection in the performance of tasks and fear that the robot will not function properly and cause damage due to systemic failure" (Lithuania)*

Several citizens elaborated that their fears also related to their lack of knowledge and education on the technology of robots:

> *"I believe that investing in robots and awareness combined with education on the subject is essential for our future." (Malta)*
>
> *"Lack of knowledge about the use of robots" (Denmark)*

The lack of trust in robotics and the engineers/designers developing and steering the technology was also an important barrier. This was mentioned by many different citizens:

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> *"It depends on the individual's wishes, social and work status and opportunities. Furthermore, it's about who owns the robots, what their wishes and norms are ... there are far more barriers than I have words for." (Denmark)*
>
> *"Distrust - maybe not so much towards robotics itself, but towards the corporations that make them" (Slovakia)*
>
> *"People as a whole don't seem to trust robots very much" (USA)*

4.1.3. Trust and Safety

When asked whether they think that robots are safe most of the answers are positive. This could be linked with the fact that most of the citizens feel that they already have robots in their everyday life, or that they already have a good level of trust in the regulation on the safety of products commercialized in their country, or in science in general.

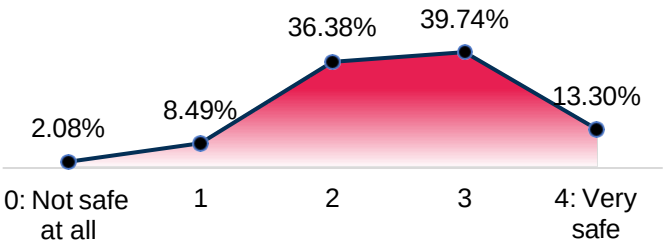

Figure 4: Do you think robots are safe?

This same view is evident when answering the question: 'What types of robots could cause challenges being adopted by society?' where household and daily life robots score the lowest by far. They are simply not seen as a type of robot which could cause challenges being adopted by society. One could note however that in this case there could be a range of issues concerning data and privacy when robots come into the home, but this is not a connection the citizens make unprompted, which is interesting.

In the same question, Military/Defense and Healthcare are the areas where the citizens predict most challenges. And they point to robots with a high level of artificial intelligence (AI) as the type which would be most challenging. This is a very relevant point, as these same citizens will be invited to validate robotic solutions which are AI-based in the next citizen engagement activity of the project. This will take place as part of Task 4.2 in Robotics4EU – Citizen Validation of Robotic Business Ideas. This task is described in Chapter 7.1.

When asked what needs to be in place to trust a robot, they point to regulations and law as well as more transparency. Introduction to robotics in grade school scores lowest as a way to ensure more trust in robots. This is interesting since many of the citizens also pointed to their lack of knowledge and education on the technology of robots as a barrier to the acceptance of robotics. (See Appendix 2 for the full answers)

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4.1.4. Impact on Society and the job Market

Most of the citizens feel that the impact of robot technology on society will be positive or very positive.

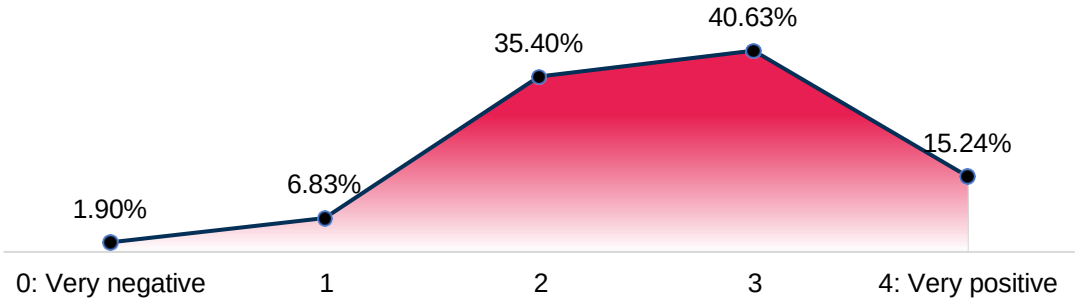

Figure 5: What kind of impact do you think robot technology will have on society?

Some give these examples of the positive impact of robots:

> *"Overall, robots improve life in general, reducing dangerous and repetitive work. Ideally, they also create a* safer society." *(Malta)*
>
> *"Balancing pros and cons, the balance seems to me to be extremely positive in the sense that in an aging society, as is the future trend of humanity, robots with the ability to support and interact with humans will be indispensable." (Portugal)*

However, when asked what would happen if robots became able to perform many of the jobs currently done by humans more than 60% answer that this would result in more inequality.

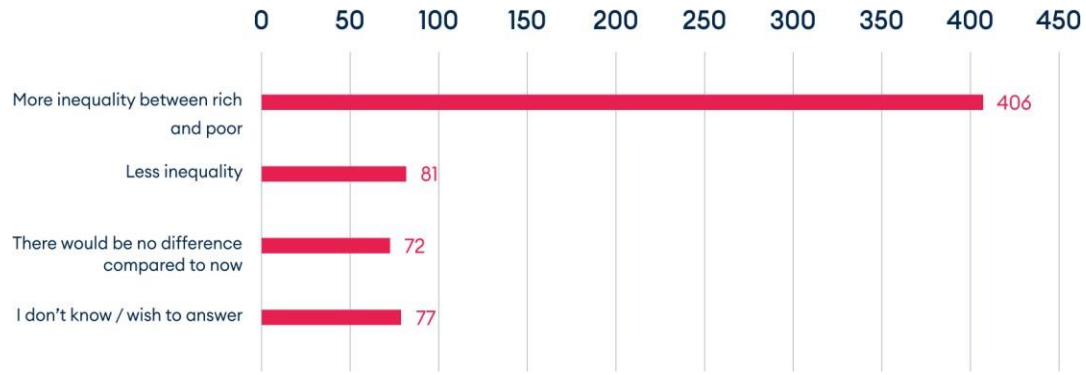

Figure 6: If robots become able to perform many of the jobs currently done by humans, do you think this would result in:

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This is supported by statements like:

> *"I think that many may be skeptical that robots will take over jobs." (Norway)*
>
> *"The question of guaranteeing social security for people who eventually lose or may lose their jobs because they are replaced by robots at work." (Portugal)*

While others point to the positive sides and seem more optimistic:

> *"People won't like having their jobs replaced, but if the benefit is clear, I think they will be accepted and will melt away like the rest of technology that we adopt regularly as a society (e.g., smartphones, wireless tech, simple task automation)." (USA)*
>
> *"I think they will help solve the staffing challenges of the future in the health care system and in other sectors to which it is difficult to recruit." (Norway)*

So there seems to be a kind of dissonance in the answers when it comes to the impact of robotic technology on society and especially the job market.

4.2. Citizens' Ideal Robot – Creative Task

As part of the consultation, the citizens were asked to do a creative exercise working together as a group.

The goal of the exercise was to create/build/draw a futuristic dream robot and then upload a picture of it. The citizens were asked how they see robots creating value in the future and how robots could be a help in their everyday life in the future. They were urged to discuss, in the group meetings, what their ideal dream robot would look like and why, which they together should draw or build from materials they had at hand and upload a picture of it in the EngageSuite platform.

The purpose of this task was to insert a break from the screens, invite the citizens to use their creativity and get the group to reflect on the possible positive uses of robots in the future. The exercise was also created to spark discussions and conversation with another point-of-view than in the rest of the consultation, and to get the citizens to elaborate on the positive uses of future robotics seen from their perspective.

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Figure 7: Pictures from the creative task

Several of the robots drawn or built by citizens were robots that could help human life in a positive way by making life easier – for example by helping with different chores, taking-over trivial tasks, fixing broken things in one's house or driving the children to school, as seen in the pictures. Another thing that seemed important was the safety of the robots, as they should not harm people and they should work in close collaboration with people in everyday life.

The citizens had very different approaches to the creative task, as seen in the pictures. Some of them built a full-scale prototype of a robot, where others made a small figure or a drawing. However, when going through all the uploaded pictures it seems like the task was a fun and inclusive way to break away from the more serious discussions, which might have sparked the discussions in other directions and areas.

4.3. Future Robots in Society: Acceptance and Dilemmas

This part of the consultation focused on possible future dilemmas regarding the acceptance of robots in society. See Appendix 2 for an overview of all the questions and answers.

The citizens were first asked to consider a series of statements describing future dilemmas. Naturally, some of these questions concern problems and dilemmas that are unactualized as of now. However, they were mostly meant as inspiration for the participants to get them to consider potential problems that might arise due to technological advancements in robotics. This information was conveyed to the participants before they answered the questions in this section.

The answers to these questions will be analyzed below.

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4.3.1 Robot Appearances and Human Interaction

When asked whether it would be acceptable if robots used in work and public areas are made to look and behave like human beings, participants mostly opted for the middle of the road choices.

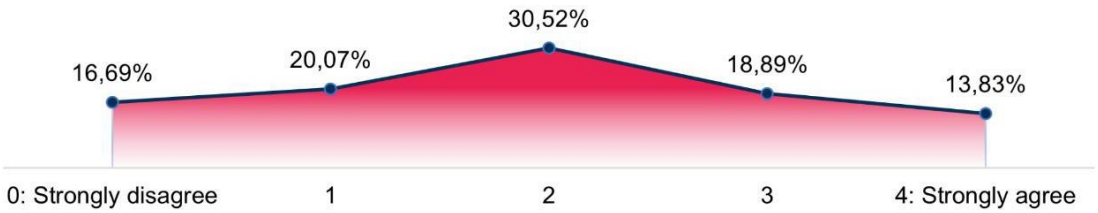

Figure 8: If robots are more commonly used in the workplace and in public places, it would be okay if they were made to look and behave like human beings.

Exactly why this is the case is difficult to say. One reason might relate to the apparent ambiguity of the question as it is evident that it can be difficult to conceptualize precisely what humanoid robotics might one day look like and what they might be able to do. This ambiguity might in turn cause some participants to be slightly more reserved regarding their answers.

However, it is evident that considering robots as potential romantic partners is something that is generally frowned upon. And when asked whether it would be acceptable for people to robot as a romantic partner (i.e., a girlfriend or boyfriend) 45% strongly disagreed.

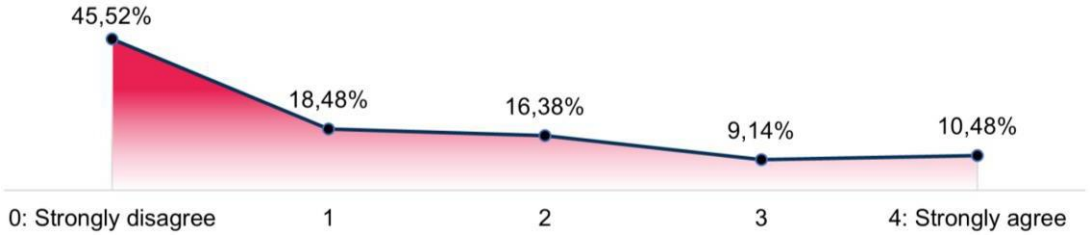

Figure 9: It would be acceptable if people have a robot as a romantic partner, that is: a girlfriend or boyfriend.

One very interesting tendency here is that the citizens find it mostly acceptable for robots to care for older adults, but they do not find it acceptable for robots to take care of children.

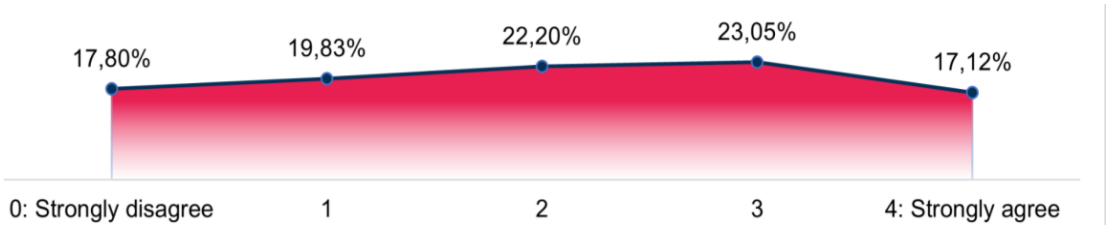

Figure 10: It would be acceptable for robots to be the main caretakers of elderly people who are no longer self-sufficient.

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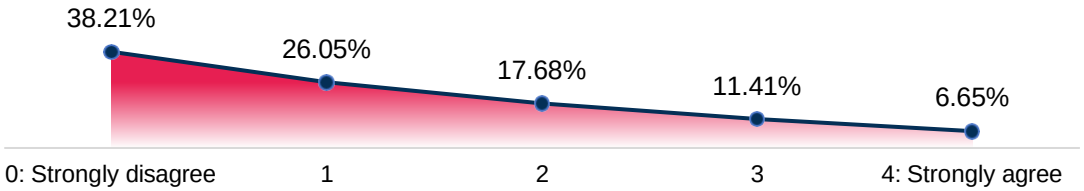

Figure 11: It would be acceptable for robots to be the main caretakers of children who are not yet self-sufficient because of their age.

There is an indication that the participants are more reluctant towards children interacting with robots as caretakers. This may be because they themselves have already seen examples of robotics involved in the care for elders. However, while many considered it acceptable for robots to be the main caretakers for the older adults, a general sentiment which was echoed throughout the written answers in the consultation was that a robot should never fully replace human interaction, one citizen said:

> *"Robots can never replace human interaction." (Malta)*

And another participant stated that:

> *"[Yes] a robot will not be able to replace what social people have. It will not be able to replace a human being with emotions and care. A robot will also not be able to think socially and make a decision based on care and emotions." (Denmark)*

Different iterations of this type of answer were given by participants from every country throughout the consultation hinting that a way forward could be to frame and design robotic caregivers as collaborative partners to human caregivers rather than substitutes to replace humans.

4.3.2 Rights, Intelligence and Feelings

Another interesting point is that there is generally a consensus that robots should not be given any rights – neither rights similar to human rights or animal rights – even if they become as intelligent as humans. Regarding rights similar to those of animals 40% strongly disagreed.

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Figure 12: If robots become as intelligent as humans, they should have similar rights as animals.

And when considering rights similar to humans 46% strongly disagreed.

Figure 13: If robots become as intelligent as humans, they should have similar rights as humans.

This is an interesting tendency; however, caution should be taken in analyzing this statement, as the answers rely on a particularly complicated notion, namely that of what it means for something to be intelligent/possess intelligence. The consultation had not previously introduced the notion of intelligence and its relation to AI-based robotics, so what participants at this point in the consultation take this statement to mean, will undoubtedly vary a great deal. It is, however, interesting that there is such a strong aversion towards the idea of robots at some point obtaining rights. This points toward a disposition to consider robots as mere 'things' regardless of how the technology might develop in the future. Another possible reason might be that it is simply difficult to conceptualize if and how the scenarios described in the questions might look in the future.

It is also interesting that more than 60% agree or strongly agree that they could fear that if future robots develop feelings, those may include negative feelings too.

Figure 14: If future robots can develop feelings, I fear those may include negative feelings too.

However, as with the previous question we should be careful with the definitions that are being employed here. What it means for a robot to develop feelings is neither specified nor elaborated on at any other times during the consultation and consequently we must expect that participants might have several different conceptions regarding the notion of feelings and what it means. However, it is interesting to consider what reasons there might be for this overwhelmingly negative attitude. One reason that is worthwhile to

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consider might be related to the way robots and AI is often depicted in popular culture (literature, film, video games, tv etc.) and what might happen if robots become able to develop something that resembles feelings. Several participants even point to this as a reason throughout the consultation, worrying about what might happen if robots become too intelligent:

> *"The intelligence of these [robots] could exceed that of humans, it is one of the greatest fears of humans concerning robots."*
> *(France)*

These concerns should be taken seriously, as barriers towards acceptance of robotics in society may very well often hinge on these cultural depictions.

Lastly, we had expected the citizens to disagree more strongly with the last statement, concerning whether it would be acceptable for robots to have full control in situations with direct risk to human life or health.

Figure 15: It would be acceptable for robots to have full control in situations with direct risk to human life or health.

And while more people disagreed than agreed there was a large group who were on the fence on this one – showing that they were not entirely opposed to robots having full control even in situations with direct risk to human life or health. There are several plausible reasons as to why this might be the case. Initially, one of these reasons might be concerned with the ambiguous nature of the question and the fact that it might not be entirely clear what the question entails. There is a big difference in whether a participant thinks of a self-driving vehicle, or a surgical robot, as opposed to a fully automated military robot such as a drone. The fact that the question can be interpreted in different ways might have led some participants to opt for a middle of the road solution. Furthermore, participants had just been shown a video depicting a dilemma involving a self-driving vehicle. This might also have influenced their decision, perhaps causing them to be unsure about what to think regarding these kinds of scenarios.

4.4. Ethical Issues and Limitations

This chapter will explore the citizens' views on limitations and ethical issues around robotics. See Appendix 2 for an overview of all the questions and answers.

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4.4.1. Limitations Wanted in Specific Areas

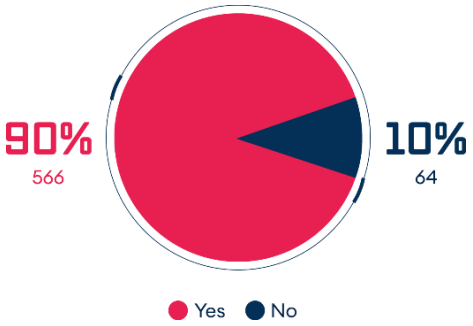

Figure 16: Should there be any areas where there are limitations on the use of robotics?

Around 90% of the citizens find it important that there be imposed limitations on the use of robotics.

And the two areas they point to as most pressing is 'Military use and defense' and 'Law enforcement'. And the two areas scoring the second highest are 'Healthcare' and 'Companionship'. This is especially important to have in mind when working on a system to enforce limitations – that there should maybe be a larger focus on these specific areas where the citizens have concerns. Especially since the acceptance of robotics by the citizens might be influenced by whether they feel that their concerns are being met.

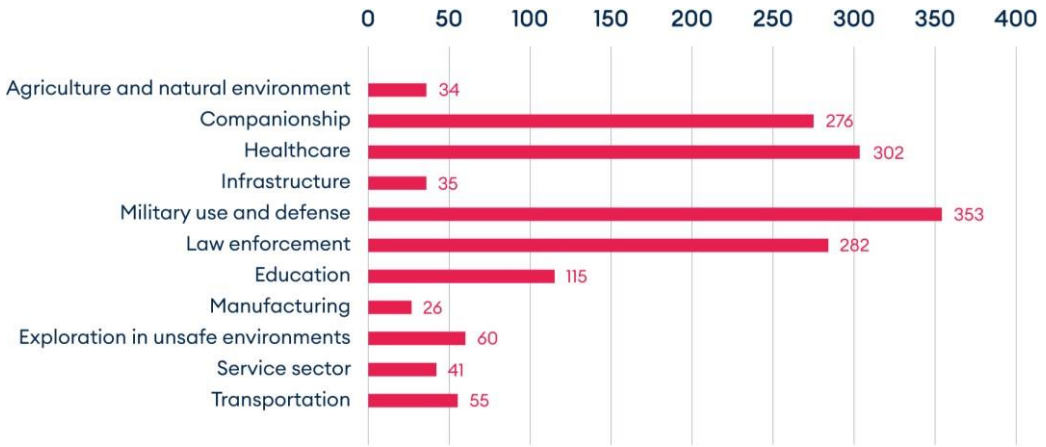

Figure 17: Which of the following areas do you think are the most important to impose limitations on?

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Since Robotics4EU looks among others specifically at the Healthcare sector, it is of special relevance, that the citizens point to a wish for more limitations there. This is backed up by the following comments:

> *"No human contact can make people feel isolated and depressed." (Norway)*
>
> *"The social contact - human to human - can be endangered. The socially disadvantaged can lose all human contact." (Denmark)*

4.4.2. Accountability is the Most Important Ethical Issue

For the citizens, accountability is very important. More than 75% of the citizens feel that engineers and designers of robots should be held morally accountable for their creations.

This focus on accountability continues during the next question, where the citizens are asked to point to ethical issues. 'Lack of responsibility and accountability' is by far the most important ethical issue for them – followed by 'Lack of transparency and liability' and 'Human rights abuse'.

Figure 18: Among the ethical issues listed below, which 3 do you think would have the most negative impact?

When we compare this to the previous survey among the robotics community and stakeholders, what the participants then were most concerned about was the answers concerning "Issue of safety and security at workplace" and "Lack of responsibility and accountability". So, like with the citizens, the issue of responsibility and accountability was seen as important, but they also pointed to safety and security which the citizens prioritize very low – which is interesting. The explanation to this might be found in the robotics community and stakeholders being closer to the robots in their work life and

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therefore see safety as a more relevant and pressing issue while the citizens are imagining all these issues on a more theoretical level, as they don't work directly with robots in their daily lives.

4.5. Responsible Robotics in Society – Laws and Regulations

This chapter looks at the wishes and concerns of citizens concerning the development of responsible robotics. See Appendix 2 for an overview of all the questions and answers.

The citizens were asked to express opinions on who they considered as the responsible actors in robot development and regulation, as well as questions concerning socio-economic issues and issues related to data.

4.5.1 Who is Responsible?

When the citizens were asked about who should be responsible for robots being socially and ethically acceptable, they primarily point to the actors developing the technology - that is, the software and the technology that will be used in the robots.

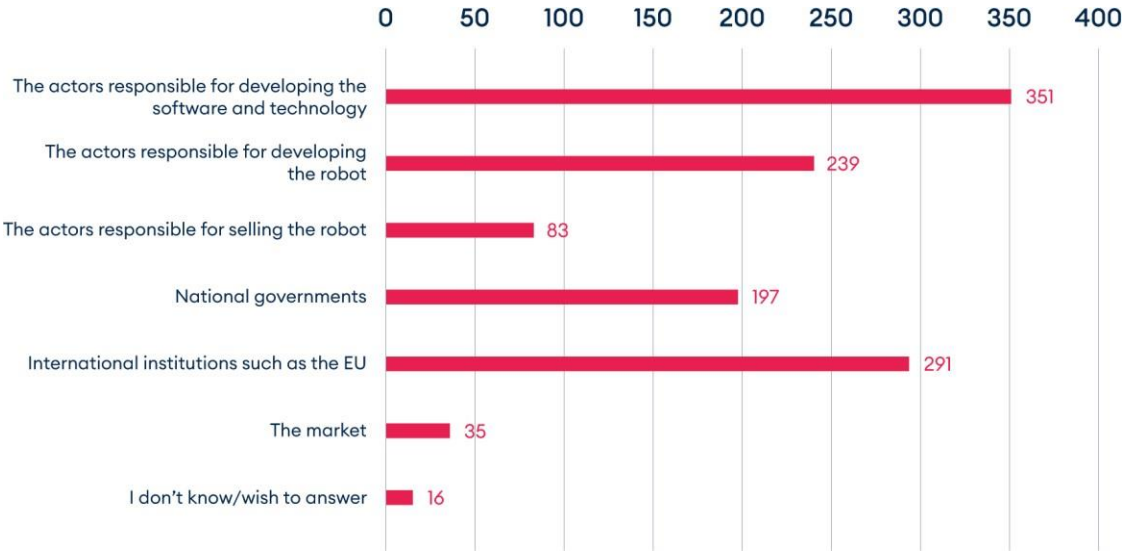

Figure 19: Who should be responsible for ensuring that robots are socially and ethically acceptable?

However, it was also evident that international institutions, such as the EU, also scored very high in this part of the consultation. The two categories that stand out as those of least concern involve the market and the actors responsible for selling the robot, respectively. Considering that a lot of participants also chose the actors responsible for developing the robot as an important player, it is evident that the developing parties collectively rank high when participants consider ethical and social acceptability of

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robots, while the actors that distribute the robots as well as the market cause little concern.[2]

Results from the *Robotics Community and Policymakers Needs Analysis* (D1.2)[3] reinforces these tendencies while at the same time presenting an interesting deviation. Participants in the D1.2 survey were asked the following: *Who is the actor whose efforts will have the most influence on the acceptability of robotics?* And while the majority opted for robot developers as the most influential actor – corresponding to the participants in this consultation – the second most chosen option, above policymakers and researchers, chosen by the robotics community were the end-users. Granted, the consultation on citizens did not include end-users as a possible answer, so where it might have ranked amongst the answers is purely speculation. It is interesting however, that given a strong call for regulation, policymakers ranked lower than end-users in the robotics community.

However, as we saw, international governments and institutions also ranked high, and this tendency is even more apparent when participants were asked how robots driven by artificial intelligence (AI) should be regulated. Here, the participants point to Public/governmental/EU authorities issuing a certification of good practice, which companies can apply for to ensure trust in the ethical soundness of robots. Following this, the kind of regulation with the subsequent highest score was case-by-case approval, meaning that all robots should be individually approved. This ties very well in with the question: 'What do you find to be the best way to ensure that robot development happens in a way that is responsible and socially and morally acceptable?' When participants were asked to specify what they considered to be the best way to ensure development of robotics happens in a responsible, morally, and socially acceptable way, the most chosen answer was, by a considerable margin, 'Certification for responsible robotics so consumers can see what robot products and services are responsible and make informed decisions.' The second most chosen answer was to 'Require social, privacy, and data-protection assessments of all robot systems.' Once again, it is evident that many citizens consider some sort of certification and quality assessment of robot technology as a driving factor for responsible development.

4.5.2 Legal Issues – Demand for Governance and Regulation

The importance of international bodies like the EU is again highlighted in the next question: 'Among the legal issues listed below, which 3 do you think would have the most negative impact?'. (See Appendix 2 for a complete overview of the answers) Here, 'Lack of global governance (Not having a unitary body of rules for all kinds of robotic

[2] A caveat here is that the answer: 'The actors responsible for developing the software and technology' and answer: 'The actors responsible for developing the robot', has some overlapping features and meaning. It is evident that the complexity of developing robots is such that it is not always possible to distinguish those developing the software and technology from those developing the actual robot – and often, these might even be the same actors. However, it is still evident that robotic developers, whatever part of the process they might be involved in, are considered by participants as highly responsible actors when considering ethical and socially acceptability.

[3] The deliverable can be accessed here: https://www.robotics4eu.eu/wp-content/uploads/2021/06/D1.2-Robotics-community-citizens-and-policy-makers-needs-analyses.pdf

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applications)' is seen as the most pressing legal issue. So, what is evident here is that the citizens have a clear wish for the EU to take on a role when it comes to the regulation on robotics. The second most chosen answer was 'Unclear and unharmonized regulations (Inconsistent sets of rules for human-machine cooperation)' which further supports and expands on the claim made above. What is evident from these answers is that there is a clear need for a unitary body of regulation within the area of robotics that can ensure streamlined and consistent rules and regulations. However, it is necessary to mention that other answers to this question were somewhat evenly distributed, illustrating that, when considering the legal issues concerning robotics, there are many worrisome parameters that must be taken into careful consideration.[4]

The consensus was shared by those from the robotics community who participated in the *Robotics Community and Policymakers Needs Analysis* (D1.2).[5] Here, the lack of global governance was also considered to be the most worrying aspect when considering legal issues. Furthermore, the second most chosen answer here also concerned regulatory issues – once again underlining the importance of coherent regulations concerning advancements in robot technology.

4.5.3 Socio-economic Issues and Worries

When asked to choose 3 of the most concerning socio-economic issues that might arise due to an increase of robots and robot technology, a clear picture emerged. Evidently, what most participants saw as a considerable cause for alarm was 'Fear of human unemployment due to technological advancements'.

[4] For the complete overview of the distribution of answers see Appendix 2.

[5] The deliverable can be accessed here: https://www.robotics4eu.eu/wp-content/uploads/2021/06/D1.2-Robotics-community-citizens-and-policy-makers-needs-analyses.pdf

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Figure 20: Among the socio-economic issues listed below, which 3 do you think would have the most negative impact on society?

This answer scored considerably higher than any of the others, and while 'Uneven distribution of wealth' and 'The digital divide' turned out to be second and third most chosen causes for concern, they were nowhere near the fear of unemployment. The distribution of answers to this question confirms what is by many thought of as a central worry of increasing implementation of robot technology, namely that it brings about a significant change in the job market that can potentially render humans obsolete in numerous situations as an increase in robotics and automation technology becomes able to take their place. Comparing these answers to those collected in the *Robotics Community and Policymakers Needs Analysis* (D1.2), there is a noticeable similarity concerning the most forefront worry. In the survey of the robotics community 'Fear of technological unemployment' was the most chosen answer by a considerable margin. Apart from this overlap, those within the robotics community were otherwise far more concerned with rising skill gaps and the potential loss of worker autonomy.

In the beginning of the consultation, participants were asked whether they saw any barriers to the acceptance of robotics in everyday life, written answers from some of the participants put further emphasis on the claim above and help to paint a picture of some of the worries that arise:

> *"Yes, if they replace the need for people - for example in jobs." (Denmark)*
>
> *"Fear of being replaced at work." (Italy)*
>
> *"The fact that we could be replaced by these robotic machines in the labor market." (Portugal)*

However, while there was a general worry that technological advancement in robotics can cause a destabilization within the job market, some participants also highlight several positive aspects of robot technology and the possibilities brought along by it, for example doing monotonous or dangerous work:

> *"Robots are here to take over robotic work and make life more efficient, giving people a chance to focus on other skills rather than being stuck at a boring job." (Norway)*

Some also see the increase of robots and robotic solutions in society as tools that can be used to relocate workforces, increase productivity, and create new job opportunities:

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> *"People may feel that losing their job due to a robot is a big problem. I believe that there is a relocation of the workforce, that society as a whole is moving forward." (Malta)*
>
> *"They help with manual human tasks and increase productivity and product quality (at industry level). Are more accurate than humans and create new jobs." (Portugal)*

So, while participants did express some optimism about the future potential of robotics in the job market, their answers were mostly negative and revolved around the negative consequences and dangers of human obsolescence, unemployment (for example in low-skilled jobs) and how this might impact society. One participant stated:

> *"They [robots] can be very helpful, but they should not completely replace human labor." (Slovakia)*

4.5.4 The (mis)use of Data

Finally, participants were asked to consider some of the issues related to data and which of these might have the most negative impact (See Appendix 2). Here, two answers stood out, namely: 'Surveillance issue (Authorization, transparency, legal mandate, online and offline activity monitoring)' and 'Vulnerability of cyber-attacks on robotic systems connected through the internet'. There was also noticeable worry regarding 'Cyberwarfare (Social control and political manipulation)' and 'Data theft (Issue of network security).' The overall theme is apparent, as the most pressing issues all relate to the misuse and vulnerability of data. Thus, worries about what *kind* of data as well as how *much* data the robots we might encounter in our daily lives collect and share, rank high among the citizens that engaged in the consultation. More specifically, some participants pointed towards the Alexa or Echo devices (the virtual assistant technology developed by Amazon) as particular instances of something they considered as robots capable of gathering or stealing personal data/information or being hacked:

> *"I'm nervous about how much data they would collect about me in my home and in my everyday life when I meet them." (Denmark)*

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Concerns as the one above was echoed throughout the consultation and underlines the fear shared by many participants that any robot connected through the internet is potentially susceptible to being hacked and subsequently used with malicious intent. This worry is shared by participants from the *Robotics Community and Policymakers Needs Analysis* (D1.2) and we can see those issues concerning surveillance were also the most chosen answer in their survey.

4.6. Citizens' Opinions on Robots After the Consultation

The consultation ended by once again asking the participants about their opinion about robots, and now only 63% are positive towards robots compared to the 75% in the beginning of the consultation. Thus, we can see a slight shift towards a somewhat more negative view on robots. This is not a surprise – and on the contrary, it was actually predicted that the shift towards a negative view would be even more significant, since the citizens were prompted to reflect on the various impacts robots might cause and barriers other people might have to their adoption. But this outcome is still quite interesting, as it shows that the opinions of citizens can be influenced by involving them and encouraging them to discuss and reflect on certain topics. This is an important learning for future activities in the project – and for other projects that aim to influence the opinions of citizens.

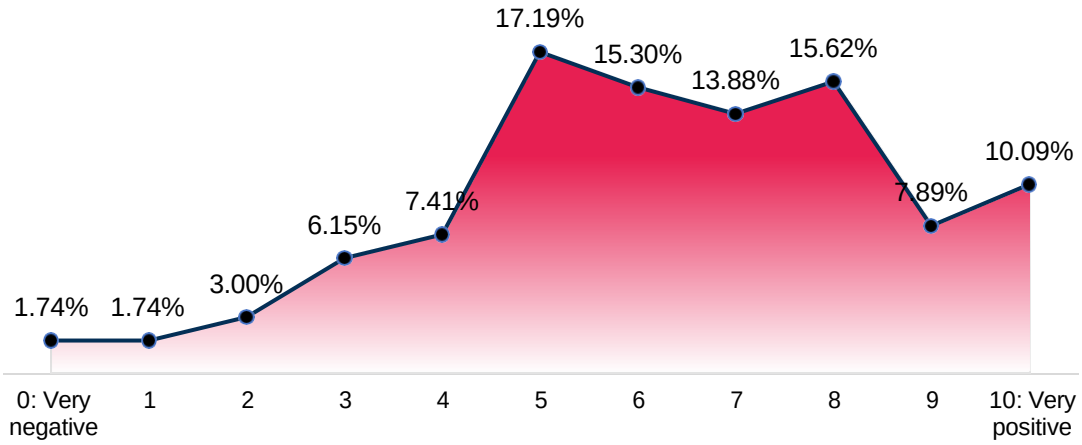

Figure 21: What is your opinion about robots now?

It will be even more interesting when we ask the same people this question again after the next activity of the Robotics4EU project where they will be presented with robotic business ideas and asked to give feedback.

Despite this shift towards a more negative view, the citizens feel that the consultation has improved their understanding of robots in society. And more importantly – 85% of the participants feel that it is important that citizens' considerations are considered when developing and regulating robotic solutions.

One host stated with some irony after participating:

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> *"We know more about robots now – and also about the fact that the European Union would like to manipulate us into liking them :-)" (Denmark)*

Considering the answers to the questions in this final section it is possible to tentatively argue that, at least for some participants, knowing more about the current development, utilization and the potential problems that follow from rising use of robotics in society prompted them to be slightly more negative in their overall view of robots. There is still, however, an overall positive attitude towards robots which is worthwhile to consider based on the statement that participants generally feel that their understanding of robotics has improved as a result of the consultation.

However, the most significant takeaway is the overwhelming attitude that citizens' concerns should be considered in the development and regulation of robotic solutions. Evidently the general attitude is that future technological development and regulation in areas such as robotics should not be limited to a narrow selection of actors. Rather, it should be an engaging and collaborative process that takes the considerations of citizens seriously.

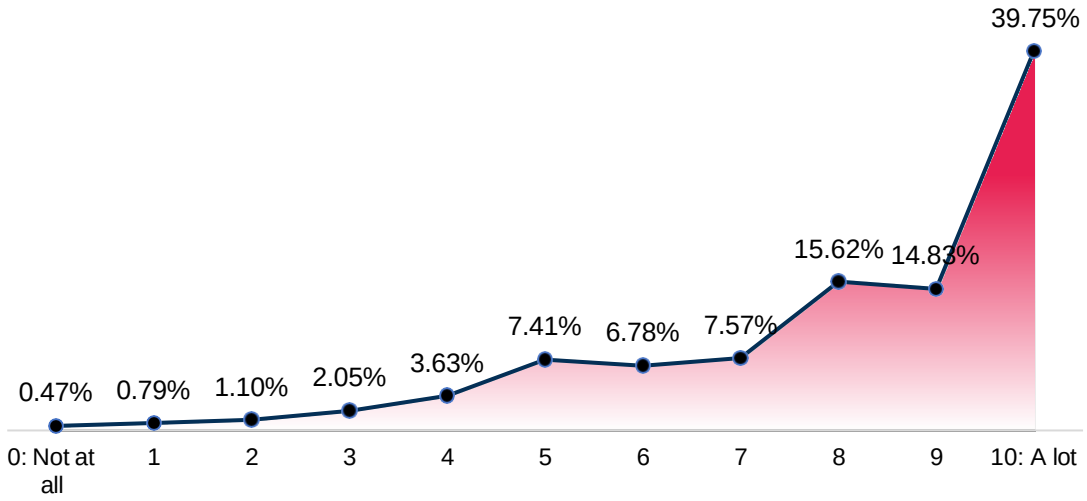

Figure 22: On a scale from 1-10 how important do you feel it is that citizens' considerations are takin into account when developing and regulating robotic solutions?

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5. Comparisons Between Countries

One of the tendencies that is interesting to examine, is whether there is a noticeable difference in how participants from different countries answered during the consultation.[6] We first describe European countries, before adding an international focus with the US and South Korea. However, these are generalized findings from small sample sizes when looked at for individual countries, and since the recruitment and enrollment process was quite heterogeneous, we are careful against being too assertive of assigning countries to be either-or. We do however present these as general starting points for further investigation and discussion, encouraging further investigation in each separate country, as well as further pan-European and international comparisons.

5.1. Differences Within Europe

Comparing the answers given throughout Session 1 of the consultation they were for the most part somewhat evenly distributed, with only minor interesting discrepancies. One interesting tendency is that in countries where many participants answered that they already have a robot at home or in their workplace, they were generally more positive when asked about their opinion about robots and whether they think robots to be safe.

In general, there seemed to be a correlation between participants' knowledge of robotics and their attitude towards it. It was mainly the case that participants who stated that they knew some or a lot about robot technology, also tended to be more positive towards it. However, in some instances, such as Norway and Portugal, participants who claimed to know little about robotics were nonetheless positive towards the technology. Looking at some of the countries individually it is possible to examine these differences closer:

Denmark showed an overall positive attitude towards robots in general and most participants stated that they either knew some or knew a lot about robots at the beginning of the consultation. Danish participants, along with e.g., France and Slovakia, believed citizen involvement was important for discussing this topic, which can partly be explained by the methodology originating in Denmark and having been used in the country on previous occasions on other issues. The Danish participants stood out as someone who knew quite a lot about robots prior to the consultation, compared to the population samples from the other countries.

Estonia represented a middle of the road in almost all questions and had neither more visible negative nor positive views compared to the other countries sampled. The same trend as the rest of the countries had, a more reluctant view on robots after the consultation, could also be observed in Estonia, showing how information makes more critical citizens, which we view as an important outcome for making informed societal/policy decisions as informed citizens co-shaping societies choices on technological adaptation.

France generally showed a somewhat more reserved attitude concerning whether robotic technology will have a positive or negative impact, along with Denmark. French

[6] Evidently, it is not feasible to scrutinize every question of the consultation. Thus, the focal point of the comparisons made here concern instances where the answers differ.

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participants were also amongst those who overwhelmingly stated that they only knew a little about robots at the beginning of the consultation.

Italy stood out in that judging from the responses we obtained, robotization in the home and at work seems to be less widespread than in the other countries included in the study. We ought therefore to assume that direct everyday experience with robots is limited among our Italy-based respondents, even though most reported a degree of knowledge of and familiarity with robots in general. Attitudes towards robots do not seem polarized, in that most respondents do not have extremely positive or negative views on robots. However, overall positive attitudes prevailed. Italy also stands out among the EU countries investigated when it comes to perception of safety. Together with Portugal-based respondents, Italy-based respondents are the respondents' group that feels most safe with robots.

Lithuania Over half of Lithuania-based respondents reported having little or no previous knowledge about robots; however, at the same time, most reported already having a robot at home or at the workplace. Opinions of robots were overall very positive, with few exceptions; Lithuania-based respondents were also overall optimistic regarding robots' safety.

Malta Although Malta is the fourth most densely populated country in the world, our sample group overwhelmingly identified as being from either a suburban or small town, much more so than any other country. In other demographic areas they were close to the median, and their opinions about robots were likewise close to the median. The one notable difference was in questions of income inequality; although all countries were broadly concerned with rising inequality because of robots, Maltese participants were more concerned than any other country.

Norway Norwegians were all in all quite positive towards robots, but gained a slightly more critical view at the end of the consultation. The respondents also expressed various concerns over the acceptance of robotics in the society, such as safety and legal issues, trust, unemployment, etc. Worth mentioning is that the Norwegian sample was the largest one, and also quite diverse in terms of the citizens age-span, and previous experience with robots. This previous experience was a bit higher than for other countries.

Poland Polish and Portuguese participants were among those who most strongly reported that they improved their knowledge of robotics from the consultation, and along with Malta and Lithuania had quite positive scores on the learning outcomes of the events.

Portugal Although Portugal was a country with optimists, both in terms of how important citizen engagement was, and in terms of how they viewed robots, we did observe a slight decline in the Portuguese perceptions of robots after the consultation, showcasing a more critical awareness of the social issues robots can pose. Most respondents knew little or some about the robots before joining this consultation.

Slovakia The Slovak participants were a bit more reluctant to assert too positive values to robotics impact in the future. Slovaks sampled were to a much larger degree, along with Portuguese participants, residing in rural environments. Slovak participants had relatively lower educational levels (primary or lower secondary or general upper secondary education) compared to the other sampled countries.

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5.2. Comparing Europe to South Korea and The United States

The consultation was carried out across 10 European countries, as the Robotics4EU project wished to engage the citizens of Europe. The 10 countries were selected based on geographic spread in both the Northern, Southern, Eastern and Western Europe. But also with a focus on including both countries with advanced robotic technology and countries with less advancement in this area.

The USA and South Korea were also added to represent countries outside Europe with differing cultures and with a high level of robotization. The purpose was to look at possible differences between countries and cultures in the answers, and by looking at the data collected from the EU and comparing it to the data from South Korea and USA, some interesting tendencies can be found.

The consultation engaged 59 participants from South Korea and 42 from the USA. Gender distribution among the participants was 51% male and 49% female. 51% of participants said they resided in large cities with small towns being the second most chosen option with 27%. Concerning educational levels 45% answered that they had a bachelor's degree or equivalent, with the second most chosen option being master's degree or equivalent with 24%.

Participants from South Korea and USA answered in a somewhat more reserved way and while they were generally positive towards robots and think that robots are safe, they were less likely to choose the options ‘very positive’ and ‘very safe’ in this part of the consultation. Europeans on the other hand had stronger opinions—both on the negative and positive dimensions.

In ‘Section 3 – Robots in the Future’ where participants were asked to consider possible future dilemmas, answers from USA and South Korea mostly resembled those of the European participants but some interesting differences were found. In general, European citizens were a little more accepting concerning questions such as whether it would be acceptable for robots to look and behave like humans and function as romantic partners. On the contrary, when considering robots as caretakers for elderly, South Korea and the USA were much more prone to ‘Strongly agree’ than EU citizens. As for robots as main caretakers for children, participants from South Korea and USA were less negative, but still not positive towards the question. When answering the questions concerning rights for robots, participants from South Korea and USA were more on the fence in considering whether robots should have rights similar to animals but had comparable answers as EU citizens concerning rights similar to humans. In consideration of robots developing negative feelings, answers were similar. However, concerning situations in which it would be acceptable for robots to have full control in situations with direct risk to human life or health EU citizens tended to choose the middle options while participants from South Korea and USA were more prone to ‘Strongly disagree’. Overall, there was agreement that some areas of robotics should be regulated.

Throughout ‘Section 4 – The Legal Question’ answers were generally very similar. One interesting difference is that when asked about how robots with a high level of artificial intelligence should be regulated, participants from South Korea and USA focused more on the fact that: ‘Training and information of ethical and social implications of robots for developers should be more widely available’ – an answer that scored relatively low amongst EU citizens.

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At the end of the consultation the sentiment that there is a clear need for involving citizens and their considerations in development and regulation of robotics is shared by 92% of the participants from USA and South Korea.

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6. Conclusions of the consultations

This citizen consultation on robotics sought to engage European citizens in deliberations on the potential impact of the ongoing developments within the field of robot technology. It was intended to provide insights into the wishes and concerns of citizens in relation to the increasing implementation of robotic technology and to pave the way for a wider adoption of robotics into society.

The first section of the analysis revealed that most participants had a positive attitude towards robots. Furthermore, 60% stated that they already have a robot in their home or at their workplace. Safety did not appear as a major concern – especially when considering robotics in people's homes. The biggest worries by far concerned military and defense robotics, robotics in healthcare, and robotics with a high level of Artificial Intelligence. Throughout this section it also became clear that fear of unemployment due to technological advancement is one of the major barriers amongst citizens towards a wider adoption of robotic technology. However, considering the impact of robotics on the job market and on society as a whole there are two different directions overall. 60% think that there will be more inequality, while 56% were either positive or very positive that robotics can make life easier and more convenient for people overall.

In the subsequent section, the results clearly showed that, when it comes to care, participants generally considered it to be acceptable for robots to be the primary caretakers for older adults, but not for children. Furthermore, many participants did not think robots should have any kinds of rights, not even similar to animals.

In the third section of the analysis, an overwhelming 90% of the participants endorsed placing limitations on robotics. Military, law, healthcare, and companionship were highlighted as being some of the most important areas on which to impose limitations. Furthermore, in this part of the consultation it was also made clear that citizens considered accountability to be the most important ethical issue when developing responsible robotics.

The fourth section of the analysis showed that the citizens were especially concerned with the actors developing the technology for the robots. They also highlighted international governments and institutions (like the EU) as important actors when it comes to the regulation of robotic technology. Certification of robotic technology was emphasized as a key factor as well as the need for general regulatory bodies such as the EU. Specifically, case-by-case approval for individual robotic solutions was highlighted as the best means to ensure regulation

This section again touched on the participants' fear of unemployment due to advancement and implementation of robotic technology – as well as a destabilization of the job market. Furthermore, participants worried about how their data is being collected and used/misused as well as a general fear concerning robots connected through the internet and the vulnerability that follows from this.

Finally, the last section of the analysis showed that the citizens were less positive towards robotics after discussing the topic. This was a predictable outcome, as the consultation focused mainly on impacts and possible barriers to the uptake of robotics. But it is still quite interesting, because it shows how the opinions of citizens can be

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influenced by involving them and encouraging them to discuss and reflect on certain topics.

This final section also showed that 85% thought it to be very important that citizens are heard and included when it comes to developing and implementing new robotic technology. This is probably the most important finding in the consultation, and it stresses how essential it is to take the citizens' opinions into account when developing new robotic technology.

In the final chapter of the report, an analysis of how the citizens' opinions will affect the rest of the Robotics4EU project will be presented.

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7. How Can We Use This Going Forward?

Involving citizens in these types of consultations and/or tests is important when trying to establish a broader acceptance of robotics in society. We need to take their fears, and the barriers they put forward, seriously if we are to overcome them and subsequently create more trust and acceptance. In this chapter, we will examine how the knowledge gained from this consultation can be used going forward with the Robotics4EU project.

7.1. Using the Results to Inform the next Citizen Engagement Activity

In the next citizen engagement activity of the Robotics4EU project, the same citizens, who participated in this consultation will be asked to validate robotic business ideas through an online consultation. Participants will be presented with specific robotic solutions through the consultation and the results will be shared directly with the robotic developers and producers – and as a result the citizens will be given a real influence on the development of the robots presented in the consultation.

When assessing and validating the robotic business ideas the citizens will especially be asked to consider whether the robots live up to the parameters above which they pointed to as most important.

7.2 The Citizens Wish for Regulations Initiated by Institutions like the EU

Through this consultation it became clear that the citizens had a wish for additional regulation within the area of robotics. Particularly, they pointed to international governments and institutions (like the EU) to take responsibility for this regulation. The citizens also pointed to a case-by-case regulation of robotic solutions in the form of certification.

These tendencies conform nicely with the overall scope of the Robotics4EU project as it is an EU funded project which is looking into the best form of regulations. The project is currently leaning towards recommending a form of certification which is done on a case-by-case basis. This will be done through a maturity assessment model.

7.3 The Maturity Assessment Model

One of the main outputs of the Robotics4EU project is to produce a maturity assessment model. The overall objective of the maturity assessment model is to provide producers, end-users, regulatory bodies, and other relevant stakeholders, with the capacity to assess and score the maturity of robots before and after their production. The objective of the maturity score is to spot the robots that are not mature enough for society.

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7.3.1 Ensuring Responsibility and Accountability

Participants noted that the most critical ethical issues are the lack of responsibility and accountability, the lack of transparency and liability, and the risk of human rights abuse. They also mostly declare that there should be regulatory constraints on the robot designers, acknowledging that they follow good practice in the design (such as certification). The participants also considered that engineers and designers should be held morally accountable for their creations, and that they are the main actors responsible for ensuring that the robots are socially and ethically acceptable (followed by international institutions such as the EU).

The results of this consultation thus show that it seems reasonable to envision a maturity assessment performed by the designer themselves, or by an accredited external third-party.

7.3.2 The Citizens Highlight Important Areas

The answers of the participants in this citizen consultation highlighted some areas of interest that could constitute an inspiration to the impact assesment in the maturity assessment model. Naturally, the results should be adapted on a case-by-case basis, depending on the specific type of robot and its functions.

The results of the consultation show that there are some critical areas to consider: military and healthcare robots are specific types of robots that could be harder for society to accept; the areas requiring more limitations are robots designed for companionship, healthcare, military, law enforcement; the participants also noted the challenge caused by robots driven by a high level of AI. This could mean that the maturity of the robots that may impact directly the health, well-being and safety of individuals, and robots able to make advanced automated decisions, may need to be assessed in a more thorough manner.

When asked what needs to be in place to trust a robot, the participants point to regulations, law and transparency. It then seems important to check that the robot designers are involved in regulatory activities or that the robot is compliant with existing regulations. Transparency is a topic in itself that needs to be explored further in the maturity assessment model, since it may cover several notions according to the context, such as data transparency, accountability, information to the user, etc. However, results from the consultation confirms that this notion is prevalent for societal acceptance.

7.3.3 The Job Market

Concerning the impact on the job market, participants noted the risk of generating inequality. This result confirms the importance of ensuring that putting the robot on the market does not impact the job balance in a sector too strongly. Naturally, such topics are debatable, since innovation naturally leads to a restructuring of the market; however, it will be important that the robot designer shows a controlled impact, for example by guaranteeing collaborative functions that leverage the knowledge and expertise of co-

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workers, or by ensuring that the functions of the robot offer a good trade-off between diminishing hard tasks for workers and preserving workers expertise.

7.3.4 The Importance of Including the Citizens

The most important result of this study for the maturity assessment model is the nature of the initiative itself. Engaging the citizens themselves in the design of a robot can contribute to guaranteeing its societal acceptance, and robot designers could then be encouraged to perform such an impact assessment, not only on the target final users, but also on the society as a whole. One specific checkpoint of the maturity assessment model could then consist in verifying if the robot designer/developers has included citizens at some point in the development - in this context, both the results and the methodology of consultation would be considered.

The maturity assessment model could also include the analysis of the extent to which the robot designer takes into consideration ethical dilemmas, such as the ones presented in this consultation and/or adapted to the context of their own robot. The analysis could focus on the dilemmas that seemed to be the most critical for the citizens in this consultation (being the main caretaker of children, the importance of not having robots with negative feelings (if they have such a function), etc.), or be based on a consultation specifically carried out by the designer during their impact assessment. The assessment of the maturity of the robot would then consist in verifying the impact of the robot on citizens, based on the dilemmas presented. The assessment would also be based on the relevance of the dilemmas presented - for example, there may be no point in assessing the impact of romantic partnership when looking at an industrial robot.

The importance of including citizens is also that it contributes to laying the groundwork for future outputs for the Robotics4EU project. More specifically, the project will produce a strategy for responsible implementation of robotics based on these findings (subtask T4.4.1). Subsequently these results will be disseminated at high-level policy debates at EU level. These debates are to be organized together with representatives from the robotics community (subtask T4.4.2).

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8. Acknowledgements

Firstly, we would like to say a special thanks to all the citizens who participated in this consultation. Especially the hosts, who invited their friends, opened their homes, and made sure everybody had a good experience.

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We thank all of you for your persistence and hard work – it has been such a pleasure to collaborate.

9. Appendix

Overview of Appendices

- Appendix 1: Demographics
- Appendix 2: All questions from the consultation including the videos and the responses.
- Appendix 3: Partner Manual

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Appendix 1: Demographics

Presented below is an overview of the demographic questions asked.

Demographic questions

Before we get started, we would like to get to know a bit more about you, to better understand who the people answering this consultation are.
Now it is time for you to get out your smartphone, tablet, laptop or other device that can access the internet. We want you to individually answer the following questions.

What is your year of birth?

What is your gender?

- Female
- Male
- Other
- Would prefer not to answer

What is your country of residence?

- Denmark
- Estonia
- France
- Italy
- Lithuania
- Malta
- Norway
- Poland
- Portugal
- Slovakia
- South Korea
- United States of America

What is your area of residence?

- Large city
- Suburban
- Small town
- Rural

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What is your highest attained level of education?

- Primary or lower secondary education
- General upper secondary education
- Vocational education or training
- Bachelor's degree or equivalent
- Master's degree or equivalent
- Doctoral degree or higher
- I do not know / wish to answer

We will not share your personal data with anyone and once you have pressed complete at the end of the consultation, your answers will be completely anonymized.

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Appendix 2: All questions from the consultation including the videos and the responses

Presented below is an overview of the consultation including all the questions and answers.

CONSENT FORM

Dear participant,

To organize this meeting, we will collect information about your:

- **Name, email, age, gender, geographical zone, level of education and occupation.**

We will collect this data, to make an analysis about the wishes, concerns, attitudes, and barriers towards the implementation of robotics in society.
This data will be anonymized immediately after the meeting and your contributions to the analysis will be used for a report which will be published on the Robotics4EU website.

Before we can start the consultation we need you to agree to the following consent form:

I undertake to preserve the reputation of the project and not take any deliberate action that could undermine the image of the project.
I am informed that photos, taken during the project might be used for the dissemination or for further activities of the project without additional prior consent.

I understand that issues related to confidential information and commercial secrets are regulated by the regulations of (insert the name of the country where this activity takes place).

The Data Protection Officer, Olena Nedozhogina, Civitta, Estonia, process my personal data – name, surname, email address, phone number, LinkedIn contact data, for the purpose of administrating the Robotics4EU project contact database. Processed data will be saved and kept for up to 3 (three) years after the project ends and then deleted. In order to cancel consent beforehand, an e-mail must be sent to Olena Nedozhogina at olena.nedozhogina@civitta.com.
I understand that I have the right to cancel my given agreement at any time and in that case, I understand that I lose the opportunity to participate in the project and to receive information about the project activities. I am informed, that in accordance with the rights

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and in the manner prescribed by Articles 15, 16, 17, 21 of the EU General Data Protection Regulation (GDPR), I have the right:

- To know (to be informed) about the processing of my personal data.
- To get acquainted with my personal data and receive a copy.
- To request to delete my personal data or to suspend my personal data processing operations when the data is processed without complying with the provisions of the GDPR and other legal acts regulating the processing of personal data.
- To object with the processing of my personal data. I am informed that if I am unable to resolve the issue with the Data Protection Officer, I can contact the relevant supervisory institution.

Personal data is any information related to an identified or identifiable individual (data subject); a physical individual who can be identified, directly or indirectly, in particular by reference to an identificatory data, e.g., given-name and last name, the person's identification number, physical location, IP address or one ore more factors specific to his/her physical, physiological, mental, economic, cultural or social identity.

Without expectation of compensation or other renumeration, now or in the future, I hereby give my consent to The Danish Board of Technology, to use my image on its publications and media activities (including the Internet) for strictly research and dissemination purposes in the context of the project Robotics4EU. This consent includes:

- Permission to photograph
- Permission to use quotes

Processed data will be saved and kept for up to 3 (three) years after the project ends and then deleted.

I allow my personal information to be used in the context of Robotics4EU project in the aforementioned purposes.

Yes

I allow the project to use pictures I upload during the consultation

During the consultation you will be asked to upload a voluntary picture. You don't need to include any people on the picture if you are not comfortable doing so.

Yes

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Introduction Video

Before we get started, please watch this introduction video:

https://www.youtube.com/watch?v=s9DKF9WrcsQ

Section 1 - Setting the Stage

Discussion

Please spend 5 minutes to discuss the following question:

What comes to mind when you hear the word “robot”?

Setting the Stage - Information Video

https://www.youtube.com/watch?v=8BVtc7PqsOM

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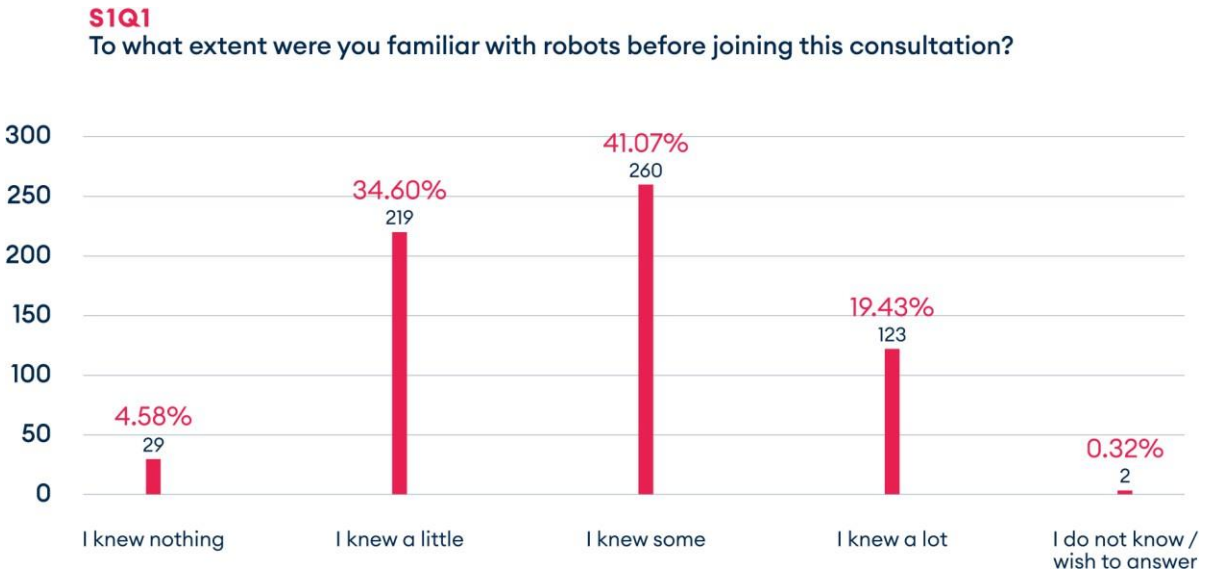
Discussion round two

Please spend 5 minutes to discuss the following question:

Can you think of any other uses or possibilities of robots, which are not mentioned in the video?

Section 1 Setting the Stage - questions and answers:



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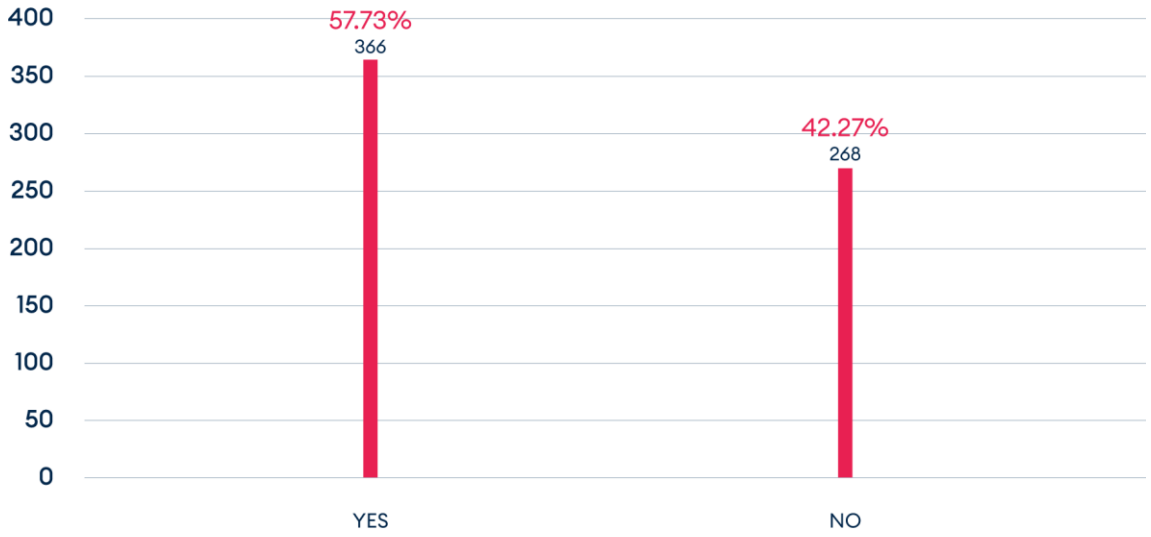
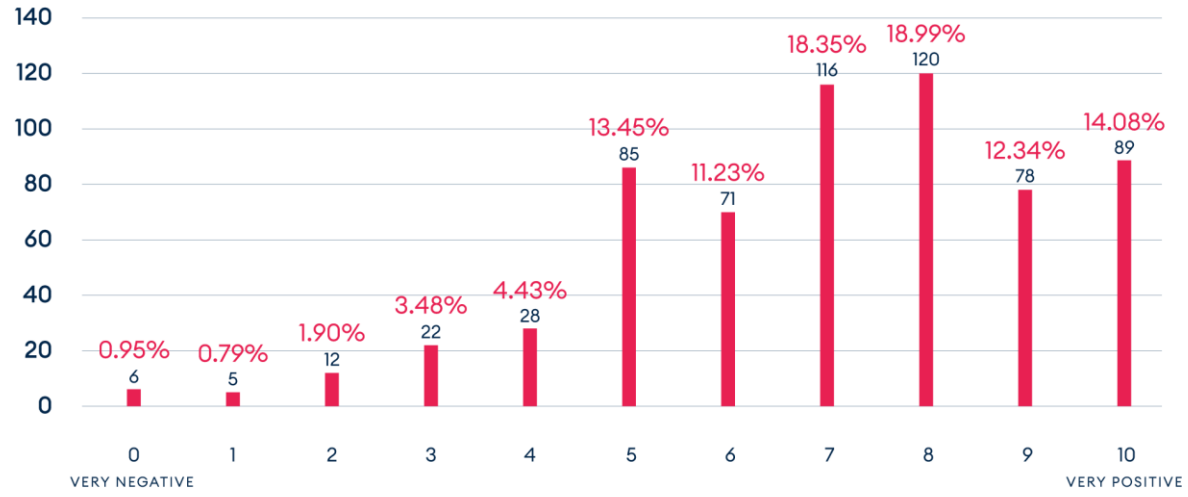
S1Q2
Do you already have a robot at home or at your workplace?



S1Q3
What is your opinion about robots?



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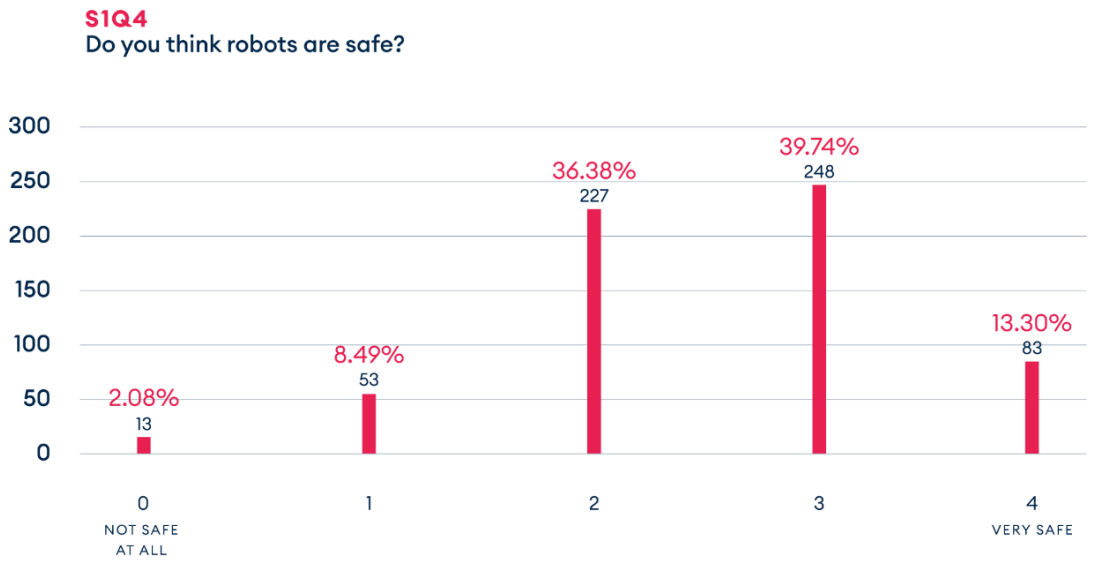

Section 2 - The Social Impact of Robots

The Social Impact of Robots - Information Video

https://www.youtube.com/watch?v=oNTVb_h2l_U

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Discussion

Please spend 10 minuttes to discuss the following questions:

Beside the example from the job market explained in the video, can you think of any other examples of how robots can have a social impact on our society and everyday life?

And do you see any challenges that might arise from this?

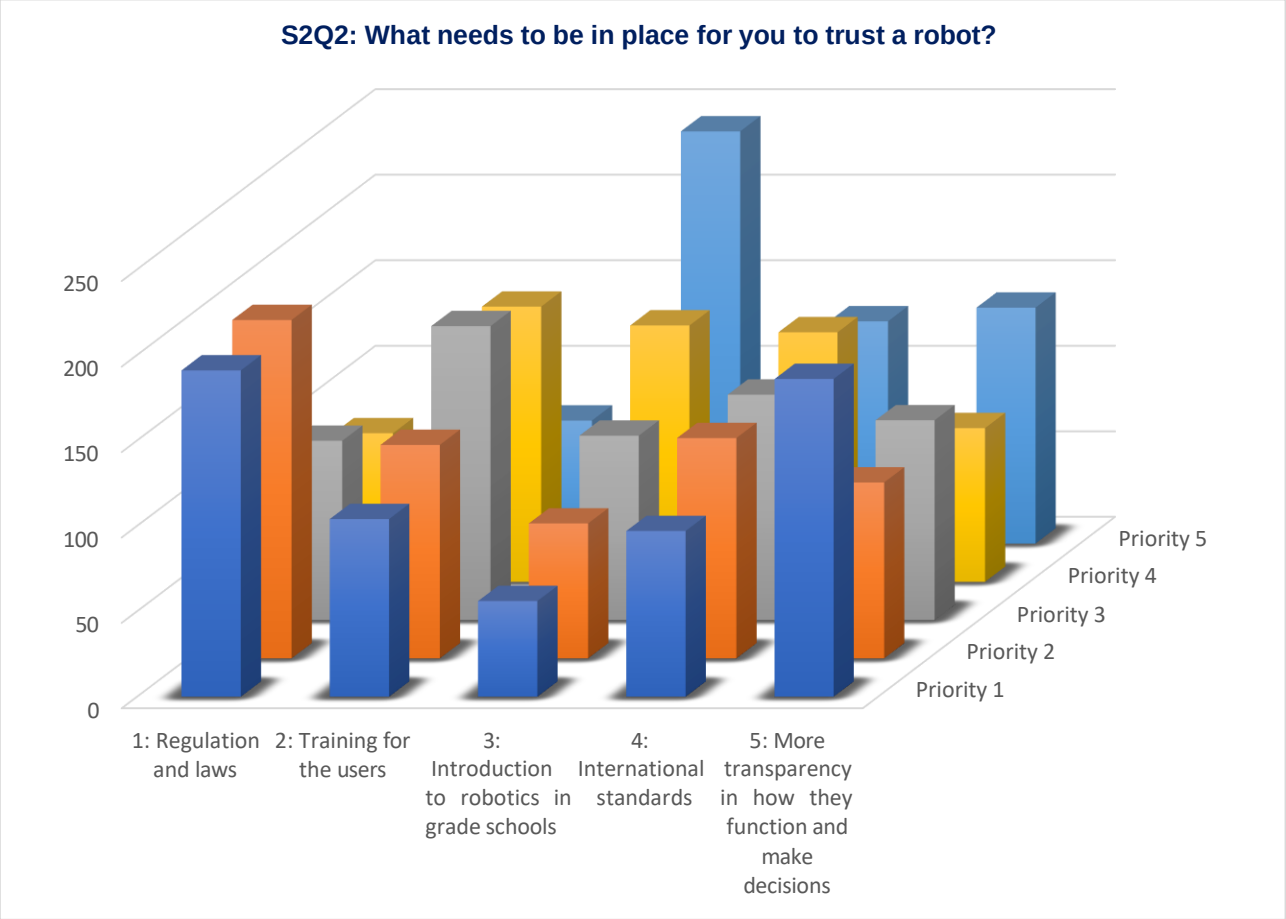
Do you trust robots?

Why / why not?

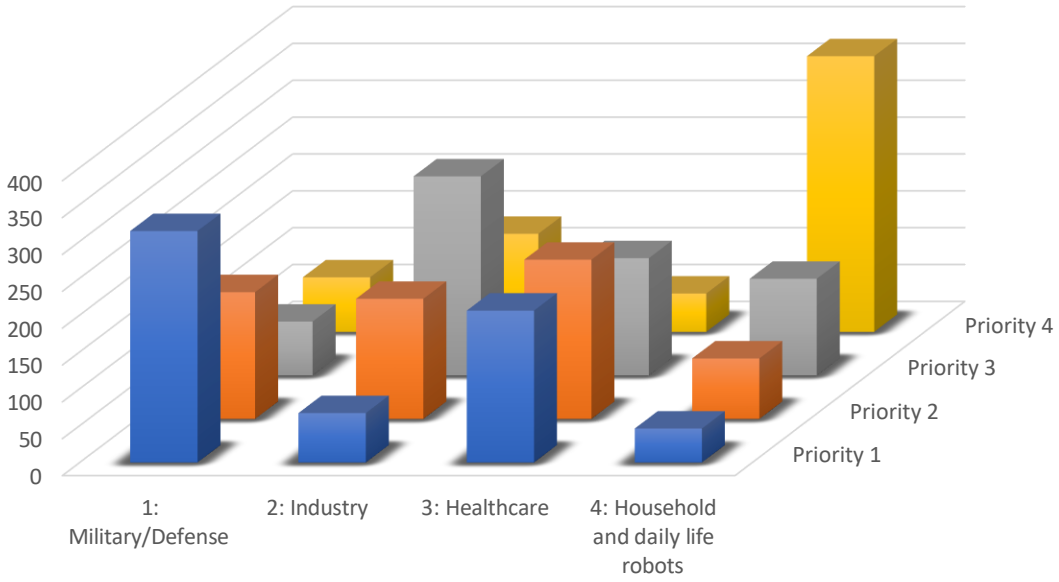
Section 2: The Social Impact of Robots - questions and answers:

S2Q1: Do you see any barriers to the acceptance of robots in everyday life?

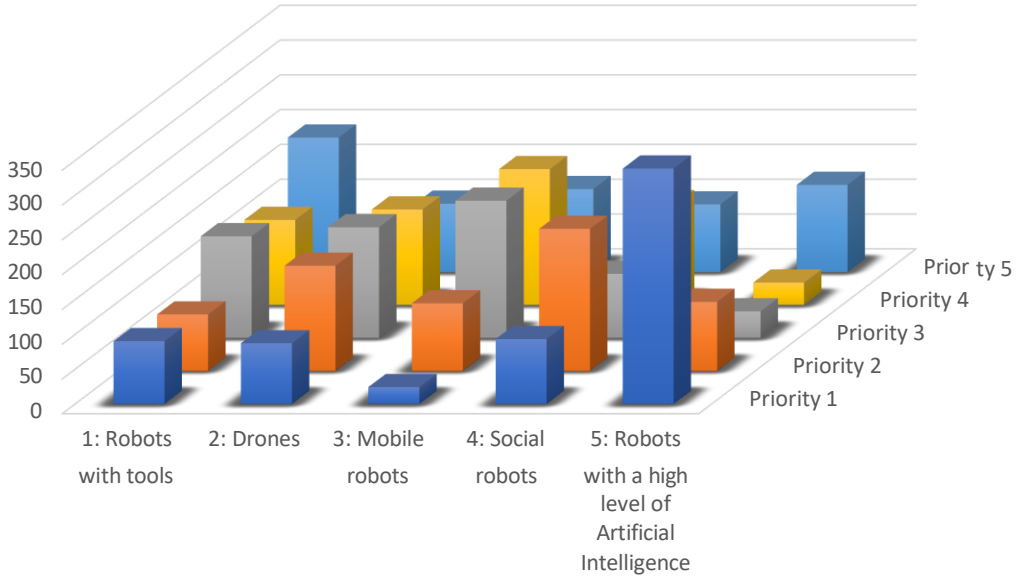
Please elaborate in your own words:



S2Q3: What types of robots could cause challenges being adopted by society? (PER DOMAIN)



S2Q3.1: What types of robots could cause challenges being adopted by society? (PER TYPE OF ROBOT)



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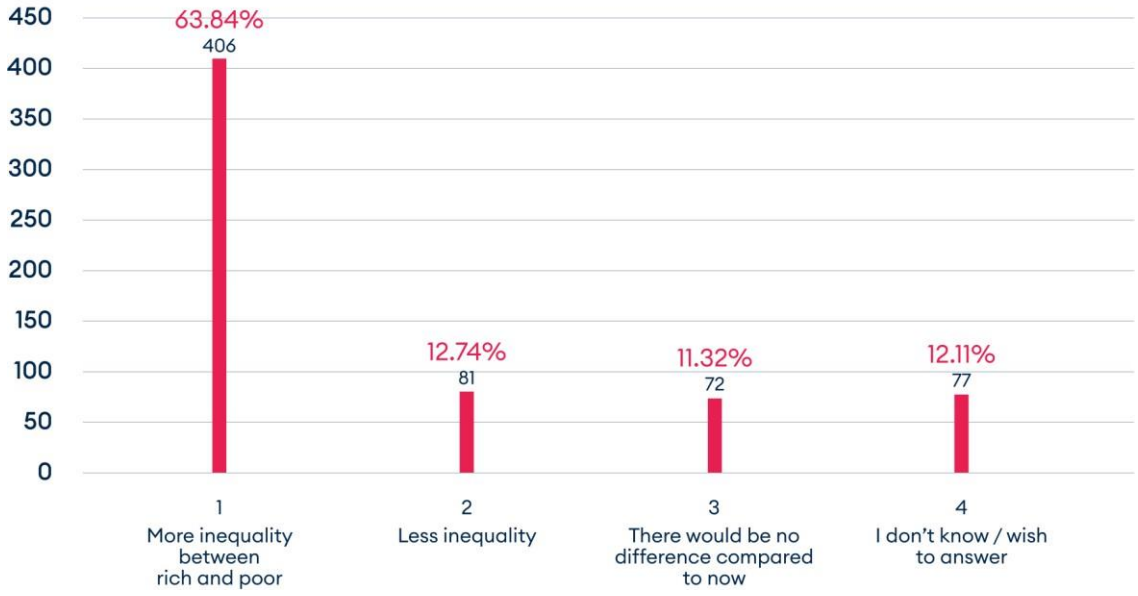
S2Q4
What kind of impact do you think robot technology will have on society?

S2Q5
If robots become able to perform many of the jobs currently done by humans, do you think this would result in:



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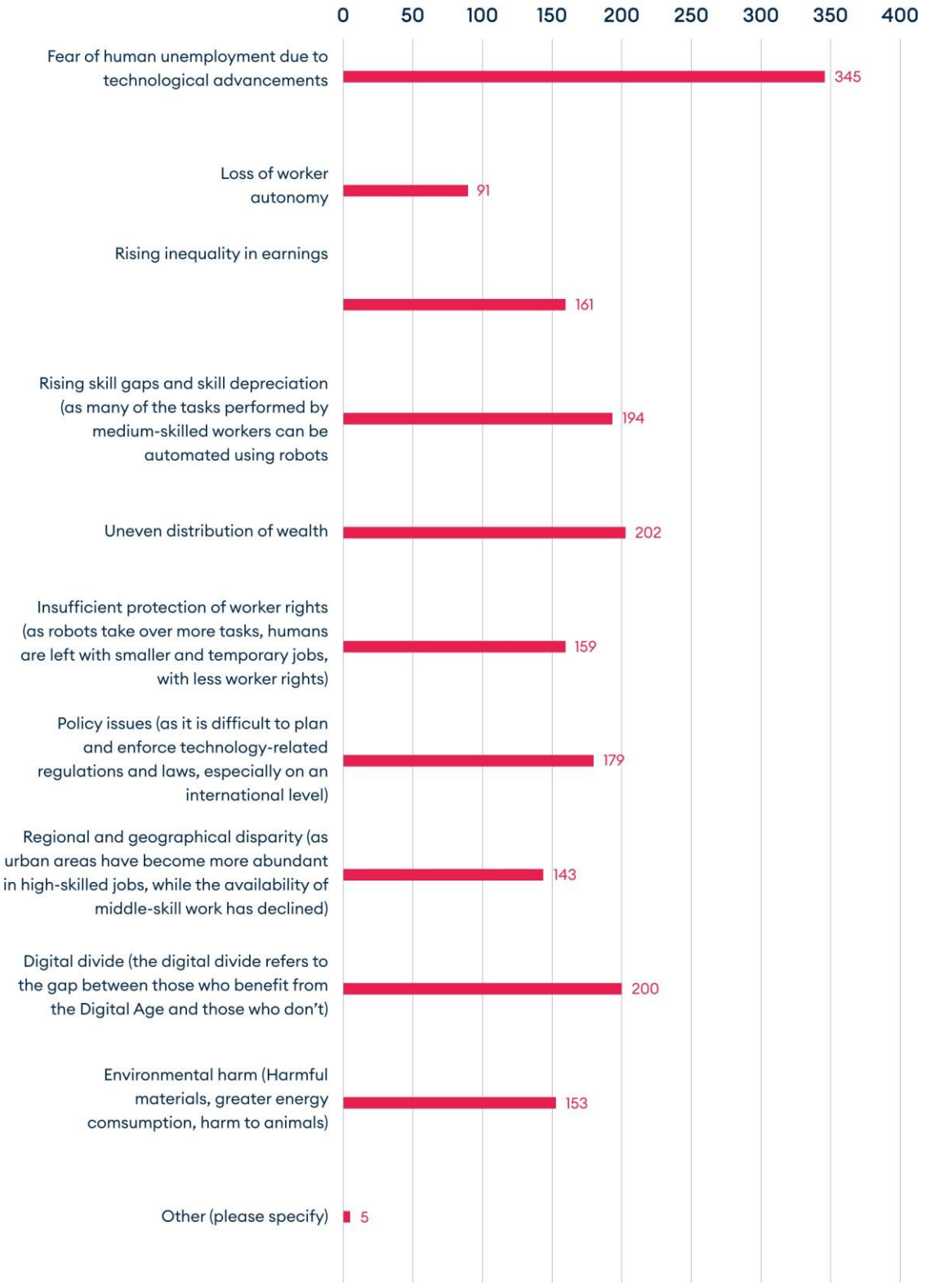
S2Q6
Among the socioeconomic issues listed below, which 3 do you think would have the most negative impact on society?



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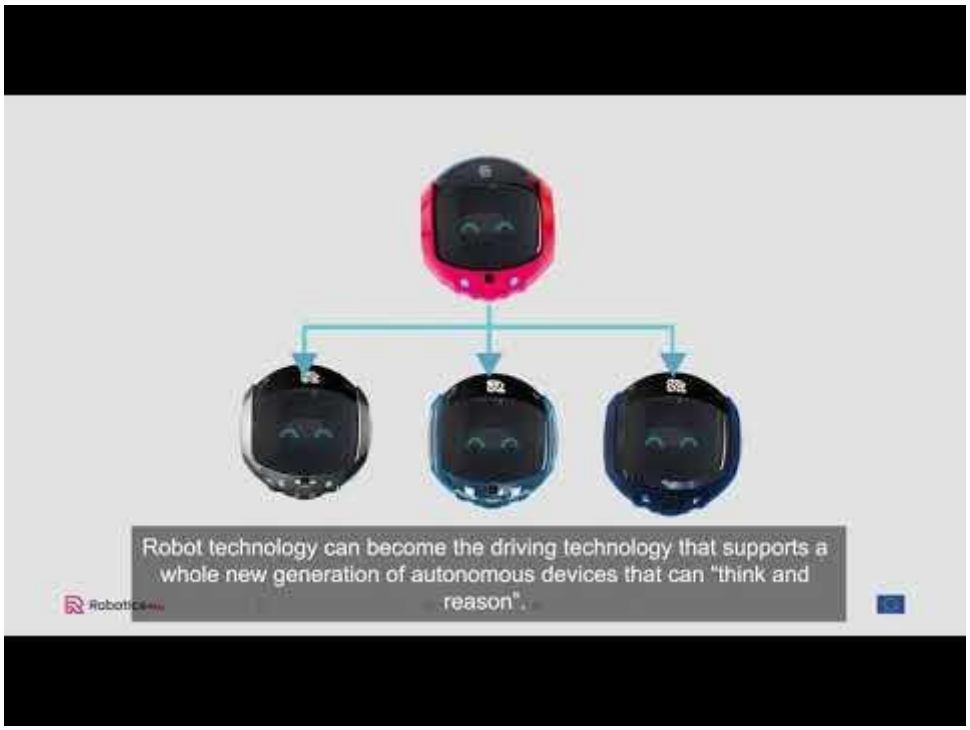
Section 3 – Robots in the Future

Information Video



https://www.youtube.com/watch?v=G1yttEl-4AQ

Creative task

Please spend 15 minuttes to perform the following creative task as a group:

Work together to draw or build your ideal robot using materials at hand (pens, paper, cardboard, straws, tinfoil, Lego, play dough, toothpicks etc.). Take pictures of the group creating the robot and pictures of the final result.* Share the pictures by using the upload function below or send them to this email: mvh@tekno.dk

These questions can help you define your ideal robot:

How do you see robots creating value in the future?

How do you see robots being a help to you in your everyday life in the future?

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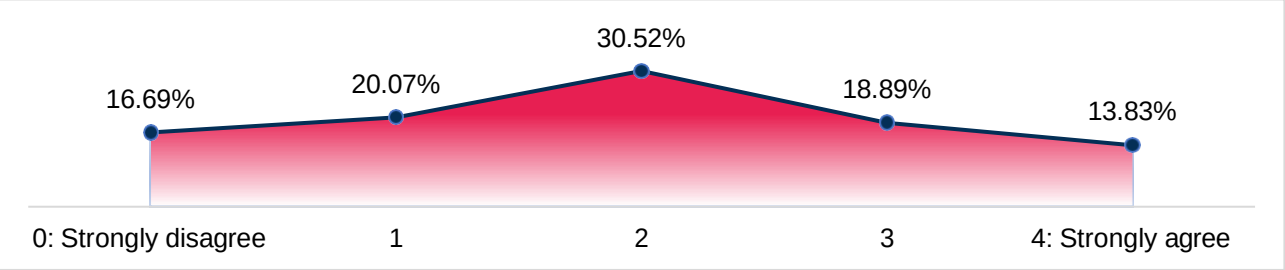
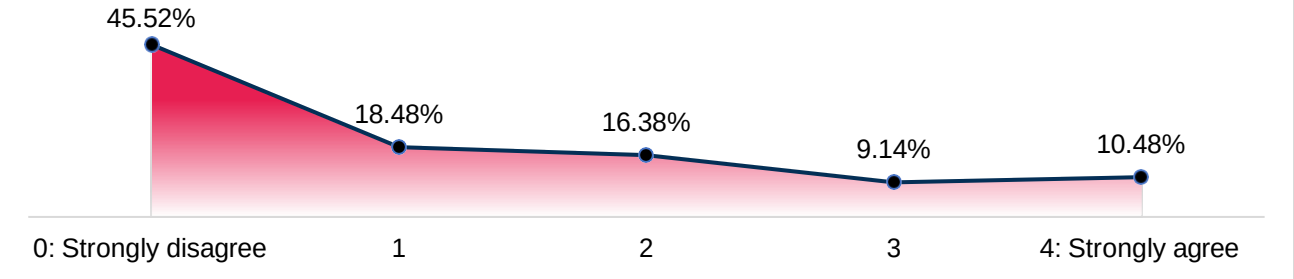
Section 3: Robots in the Future - questions and answers:

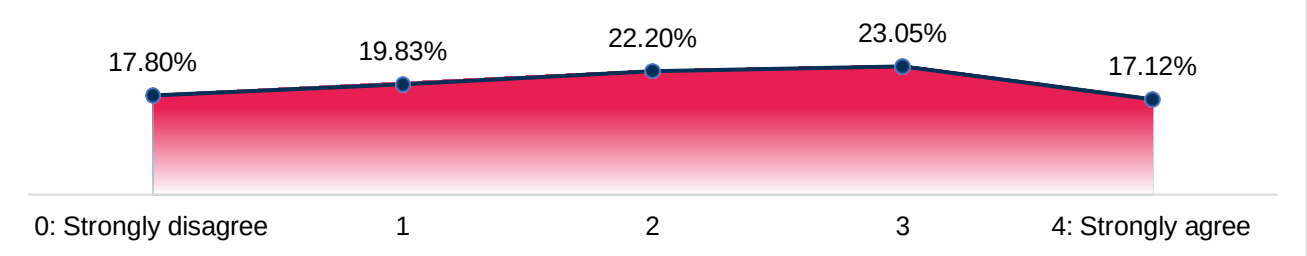
S3Q1: If robots are more commonly used in the workplace and in public places, it would be okay if they were made to look and behave like human beings:



S3Q2: It would be acceptable if people have a robot as a romantic partner, that is: a girlfriend or boyfriend:



S3Q3: It would be acceptable for robots to be the main caretakers of elderly people who are no longer self-sufficient:



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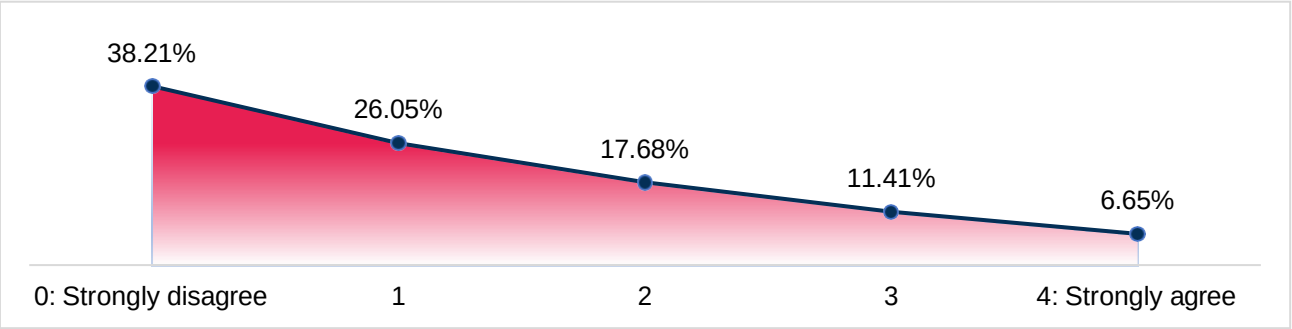
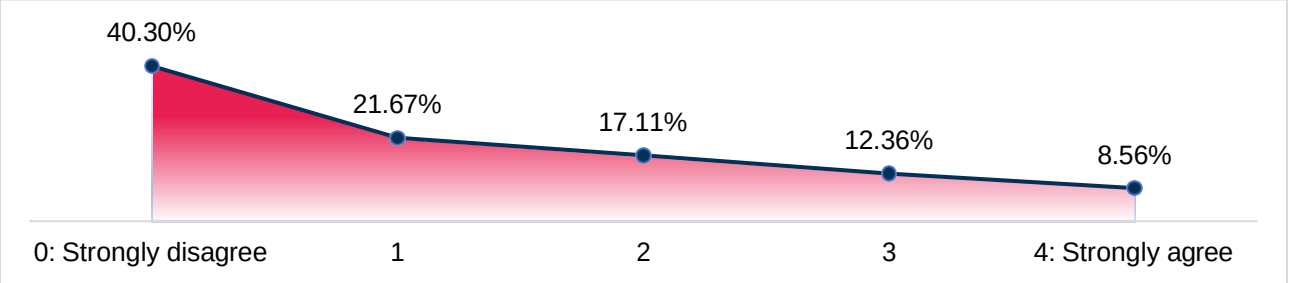
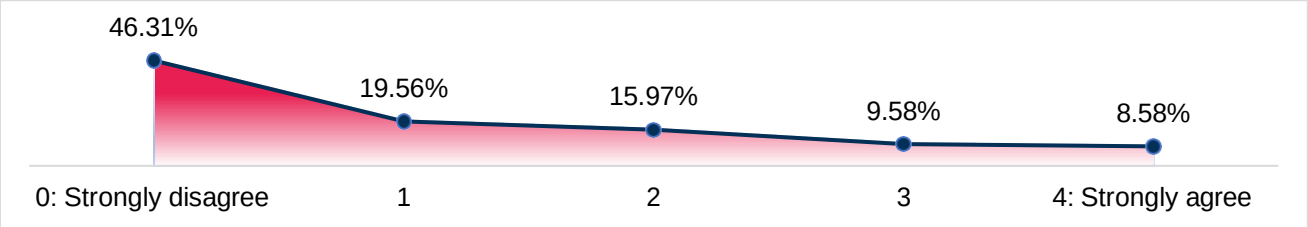
S3Q4: It would be acceptable for robots to be the main caretakers of children who are not yet self-sufficient because of their age:



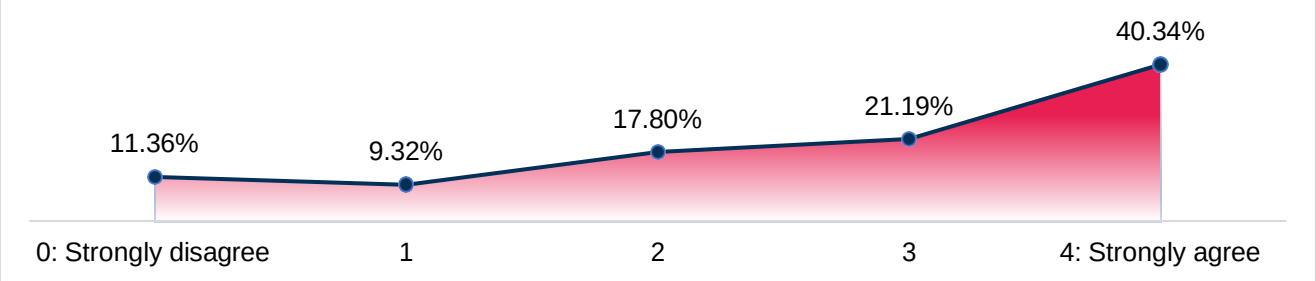
S3Q5: If robots become as intelligent as humans, they should have similar rights as animals:



S3Q6: If robots become as intelligent as humans, they should have similar rights as humans:



S3Q7: If future robots can develop feelings, I fear those may include negative feelings too



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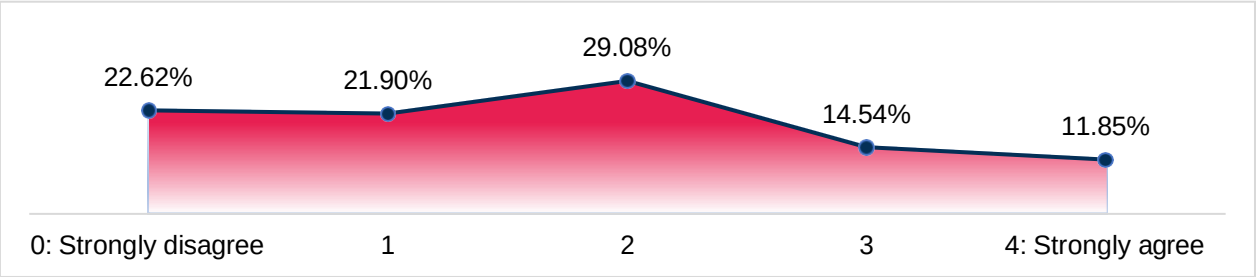
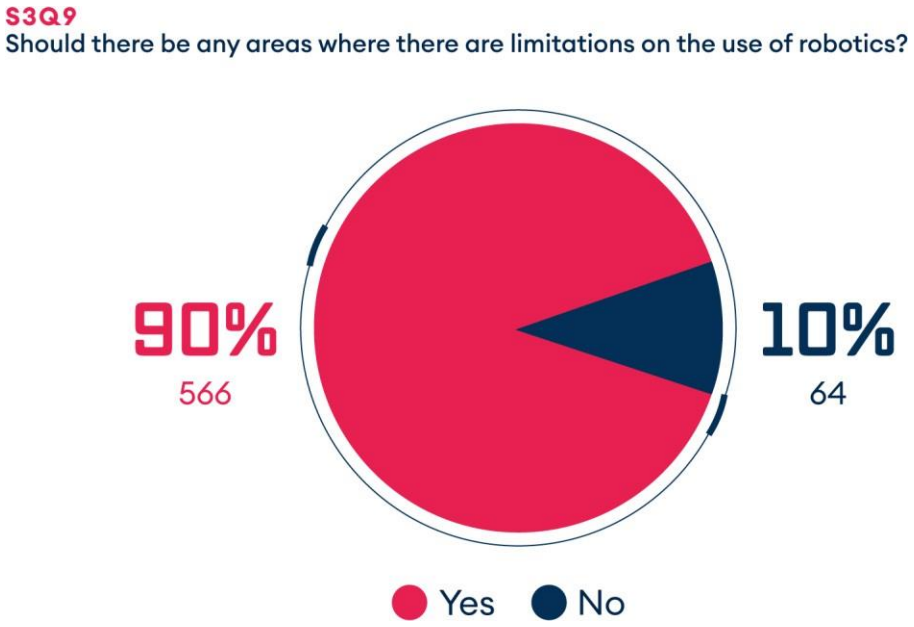
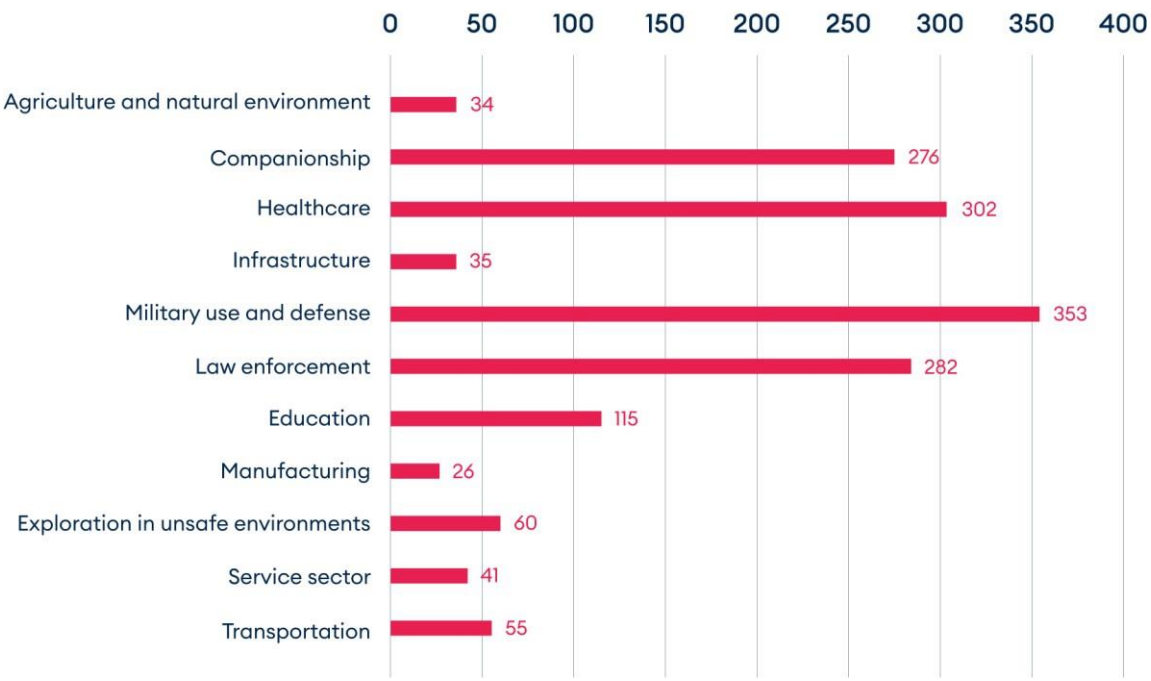
S3Q8: It would be acceptable for robots to have full control in situations with direct risk to human life or health

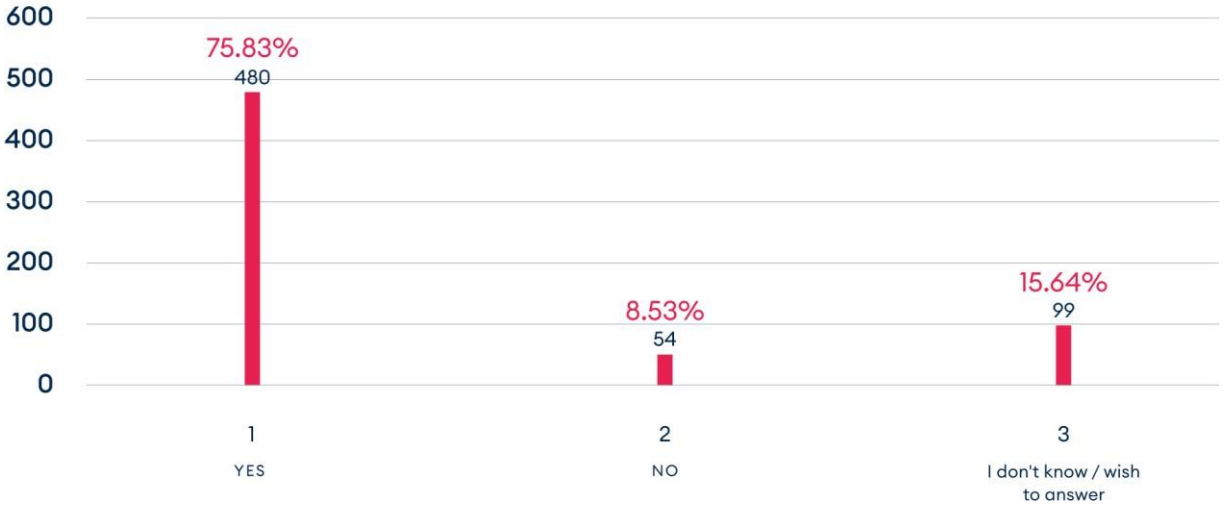




S3Q10
Which of the following areas do you think are the most important to impose limitations on?



S3Q11
Should engineers and designers of robots be held morally accountable for their creations?



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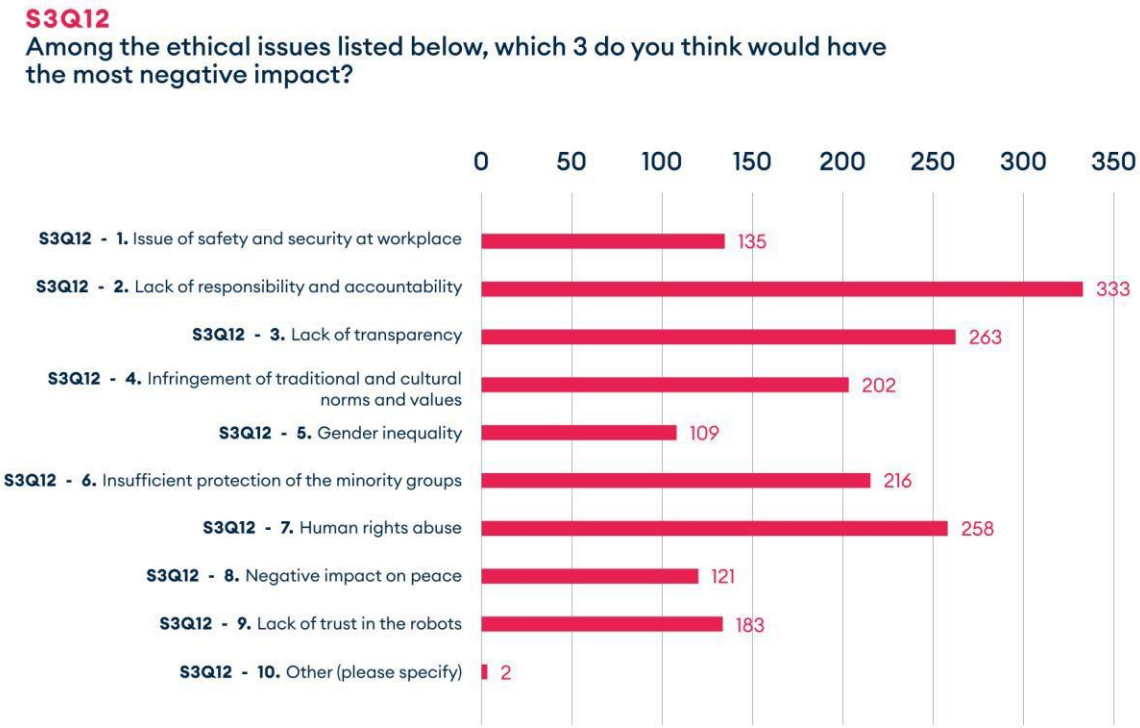

Section 4 – The Legal Question. Who is Responsible?

Information Video

https://www.youtube.com/watch?v=WvCB6kgHg6I

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Discussion

Please spend 10 minutes to discuss the following questions:

Do you think the use of robots in society should be regulated?

How? Why? And by whom?

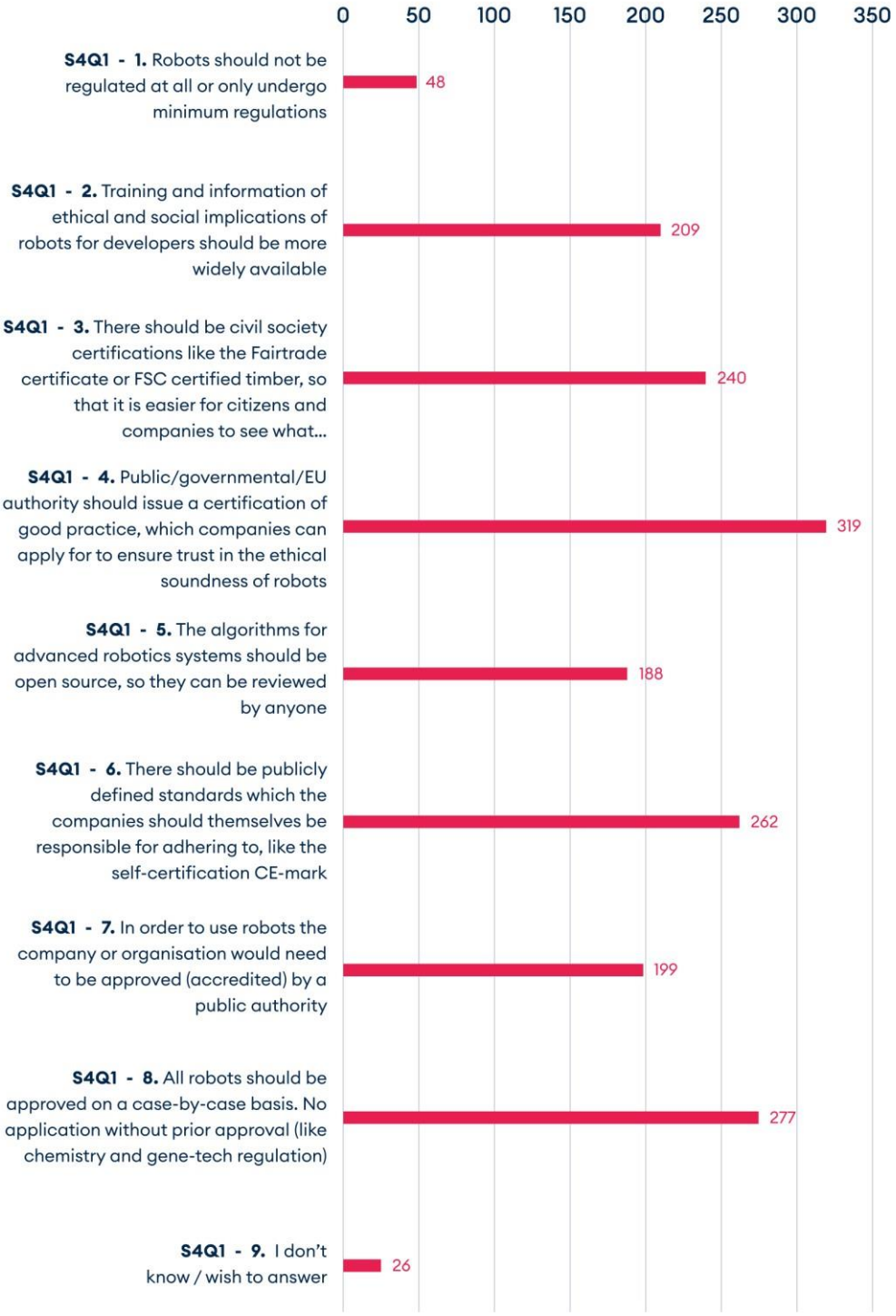
Should someone be responsible for ensuring that robots are socially, ethically, and morally acceptable?

Who?

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017283

Session 4: The Legal Question – Who is Responsible? - questions and answers:

S4Q1
Currently there is little regulation on robots driven by artificial intelligence*. do you think this is something that needs to be regulated, and, if so, how?



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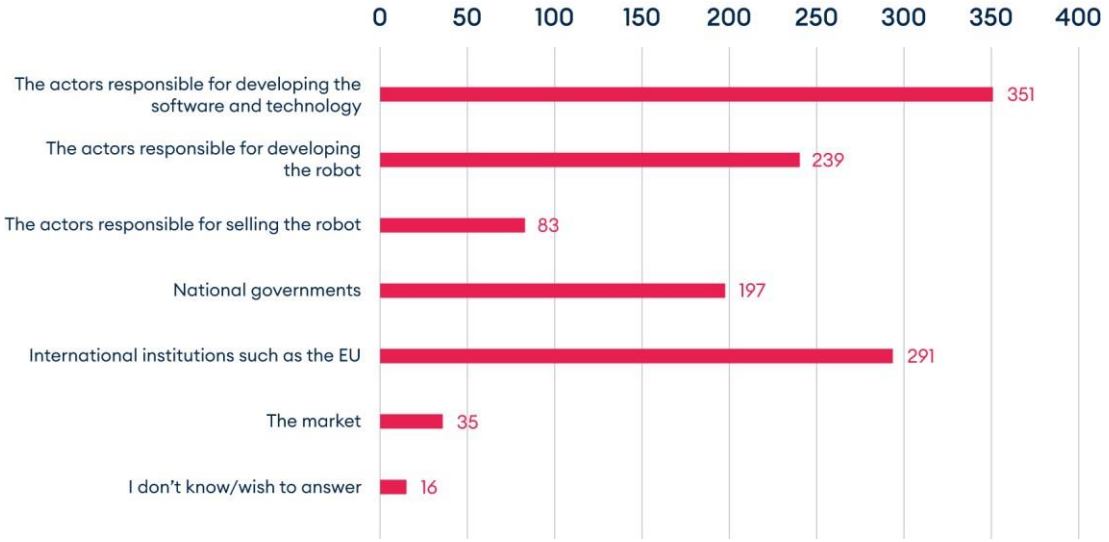
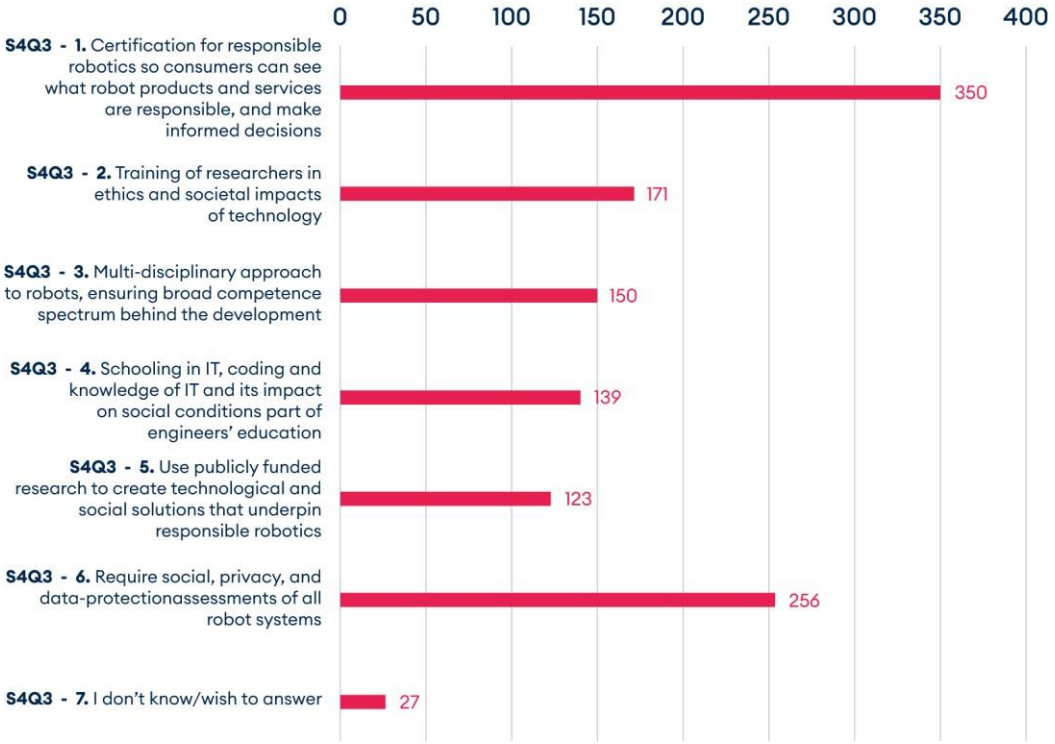
S4Q2
Who should be responsible for ensuring that robots are socially and ethically acceptable?



S4Q3
What do you find to be the best way to ensure that robot development happens in a way that is responsible and socially and morally acceptable?



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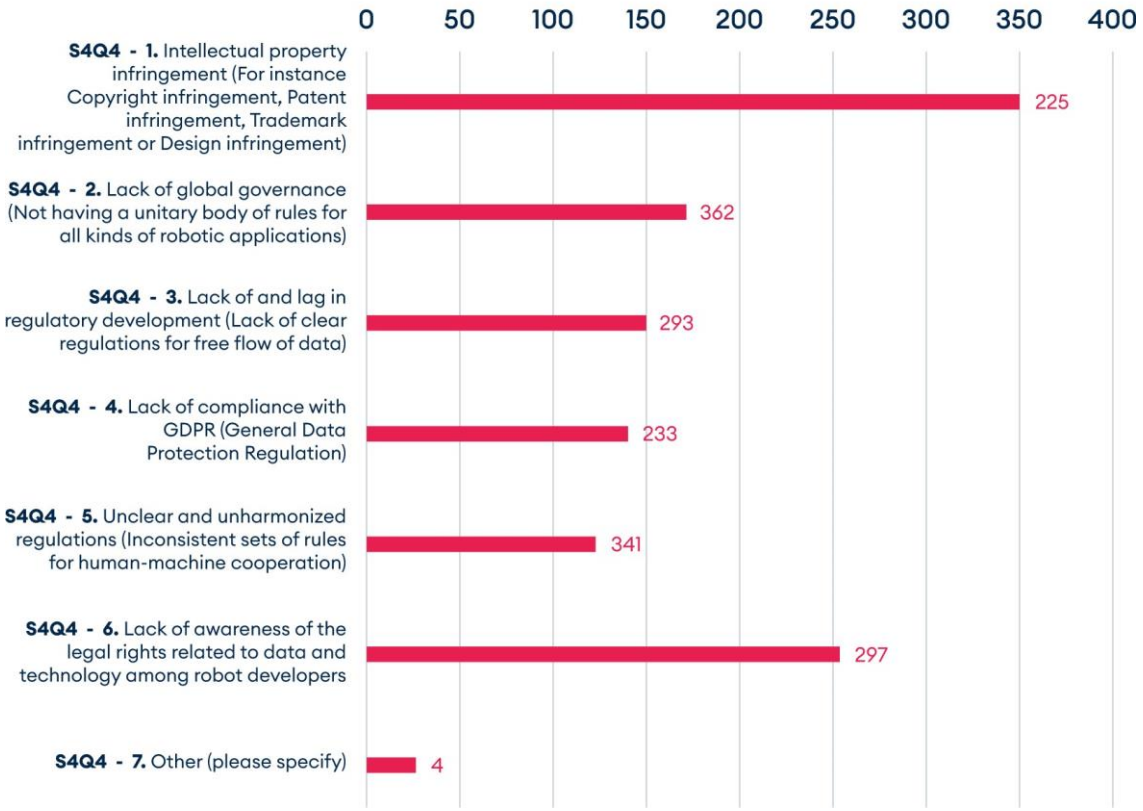
S4Q4
Among the legal issues listed below, which 3 do you think would have the most negative impact?



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S4Q5
Among the issues relative to data listed below, which 3 do you think would have the most negative impact?

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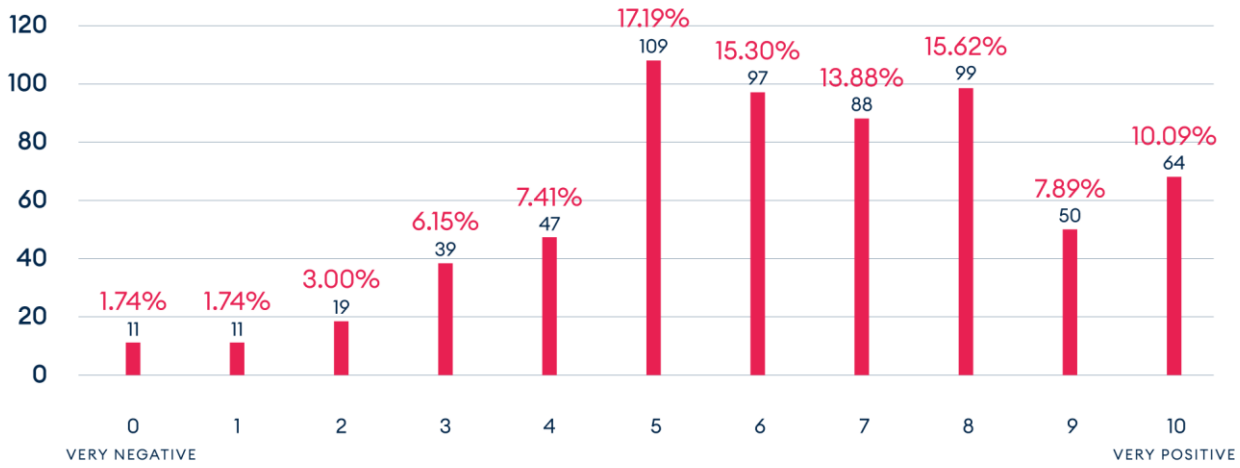
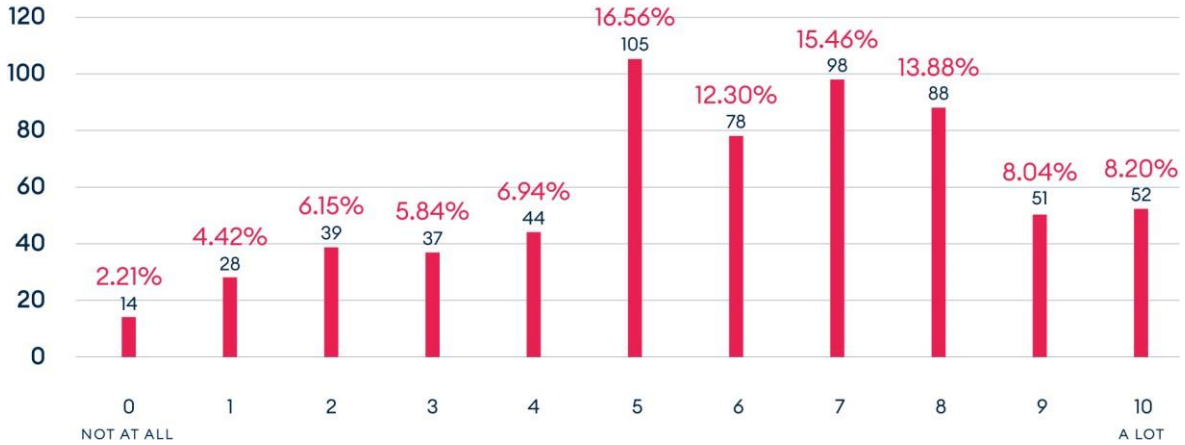
Session 5: Final Questions

S5Q1
What is your opinion about robots now?



S5Q2
On a scale from 1 - 10, how much has this consultation improved your understanding of the role of robots in society?



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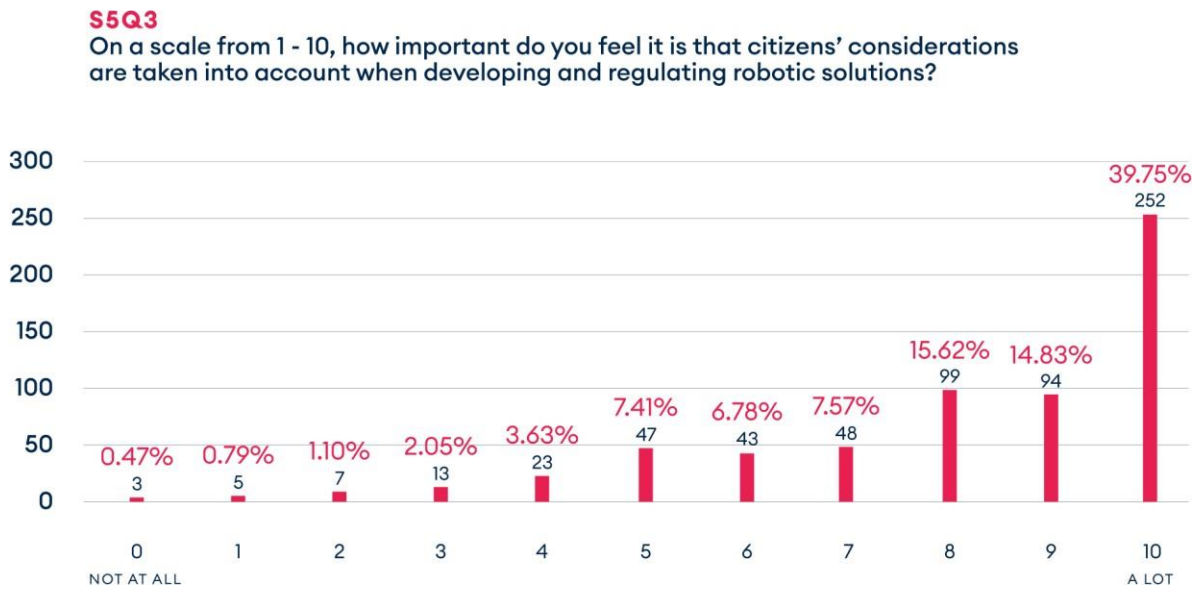

Appendix 3: Partner Manual

Presented below is the partner manual which was used to train and guide the partners in the 12 different countries recruiting hosts for the consultation.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017283

Partner Manual

Internal Document
V.4

Internal Document	10/6/2021
WORK PACKAGE WP 4 Task 4.1	**LEADER** Danish Board of Technology
DISSEMINATION LEVEL Internal	**AUTHORS** Mette Marie Simonsen

Programme	Contract Number	Duration	Start
H2020	101017283	36 Months	January 1st, 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017283

The setting

Implementation of new technologies, including robotics solutions, can have a large impact on our society and transform it both in a positive way, but they can also have potentially far-reaching, uncertain, and unpredictable social consequences. While robots are already being deployed in various industrial settings, they require various considerations to be considered in order to ensure their safety and reliability. And as the robots become more complex and widespread in our society, it is necessary to understand the various challenges, opinions, barriers, and solutions from multiple perspectives. This event sets out to understand the perspective of the citizens.

So far little public engagement has been carried out exploring the citizens perspectives on robotics. Therefore, there is little knowledge about what the European population thinks of robots in general, and of the many different aspects in which it is already affecting their daily lives, as well as the manifold ways it could potentially do so in the future.

We need to have a public dialogue about what we want robots to do; what uses that we as a society can justify with each other, and where the line should be drawn for what constitutes unethical, dangerous or simply unacceptable use. Having this dialogue is essential to ensure that the full potentials of the technology can be wielded for beneficial purposes while at the same time addressing and curtailing the negative potentials inherent in the technology. So much the more so, because not having this discussion could lead to tech-lash against robots and have a negative impact on the adoption of robots in our society. It is urgently important to have these discussions now, while the paths the technology develops along can still be defined. Technological development and application do not develop deterministically; this development can be steered.

The European population not only indirectly funds a lot of the research in robotics, but they also have to live with the way robots are applied now and in the future. For this reason, they should also have a say in how the technology develops.

In October 2021, approximately 700 citizens will take part in a GlobalSay citizen consultation on robotics, a part of the Robitcs4EU project endeavors to be responsive to the issues, dilemmas, and ethical questions that robotics brings about, ethically and societally. The consultations will take place in 12 countries: 6 from the six partnering countries of Robotics4EU and 6 other relevant countries; 4 European and 2 non-European.

When engaging citizens in deliberations about the societal and ethical impact of robots, we aim to democratically qualify the debate by including the concerns and opinions of the wider public and thus supplement the viewpoints of those who are already well-represented, such as researchers, policy-makers, engineers, businesses and interest organizations. The output will be used to broaden the knowledge base of stakeholders (participating in the community building activities in WP3) and for the Maturity Assessment Model.

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The results of the citizen deliberation will be the basis of a report that will be compiled by DBT.

Timeline

⇒ **June 11th:** You received this partner manual, so you can plan your work.

⇒ **June 30th:** You will receive the first video for voice-over, the guide to hosts and promotional material for translation. (Deadline August 23rd)

⇒ **June 30th:** Task information meeting.

⇒ **July 30th:** You will receive the last four videos for speak. (Deadline September 10th)

⇒ **August 9th**: You will receive the text for translation. (Deadline September 10th)

⇒ **September 1st:** Task information meeting.

⇒ **August 9th – September 30th:** The period for recruitment in each partner country. (Deadline September 30th)

⇒ **September 30th:** Task information meeting.

⇒ **October 1st:** The GlobalSay on Robotics consultation goes live.

⇒ **October 1st – 31st:** Support for the hosts.

⇒ **November 1st**: The GlobalSay on Robotics consultation finishes.

⇒ **November – December**: DBT analyzes the results and writes the deliverable.

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The Global Say Methodology

GlobalSay is a concept for distributed dialogue that is designed to engage citizens in deliberations about select topics. The citizens are engaged in micro-meetings of 5-10 participants which are organized by regular citizens volunteering to host the meetings. The meetings can take place where and whenever it is convenient for the participants, and instead of having a human facilitator, the event is facilitated by an online platform: EngageSuite. At the meetings, participants will gather around a computer in the living room of the host, the break room of the office, the local library or where it is convenient. The online platform will guide them through a predefined process during which they will engage in consecutive rounds of deliberation, alternating between presentation of information in the shape of short texts, video presentations and deliberation on questions addressed by the platform. At the end of each round, they will be asked to provide answers to a range of questions with predefined answering options.

In short, the methodology enables anyone to invite friends, family, colleagues etc. to join them for a face-to-face deliberation, wherever they like and whenever they like, using a digital platform to facilitate and inform the meetings and to collect the results.

GlobalSay in short:

- Self-organized: Anyone can set up a meeting and invite whoever they would like to. No prior knowledge or interest in the topic is necessary to take part.
- Distributed: The meetings can be set up where and when it is convenient for the host. The only requirement is a computer with internet connection.
- Digitally supported: GlobalSay makes use of an online engagement platform, EngageSuite, which provides the structure for the meetings and facilitates the deliberation, as well as collect the participants' assessments and opinions. In addition, it enables everyone to participate in their own language.

Thus, the methodology provides the flexibility of online participation while ensuring that participants have had time to reflect over their answers and have had their preconceptions and values challenged in open face-to-face deliberation.

Each GlobalSay partner recruits 10 hosts locally in the country in question. These are chosen based on a range of criteria intended to ensure diversity of the hosts. As there are only 10 of these meetings per country, representativeness is not an option, so instead the intention is that the recruitment should ensure diversity among the hosts. There are, however, no constraints to who the hosts want to invite. Approximately 700 citizens from 12 countries are engaged.

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With this composition of participants, the methodology can and does not make claims to statistical representativeness. Rather what it seeks to achieve is a well-grounded picture of the quantitative tendencies in the population, both at the national and transnational level. This picture can be very useful for getting a rough understanding of what the citizens think of robotics and how its development should be steered, and thus lay out an initial guiding line for the maturity assessment model to follow.

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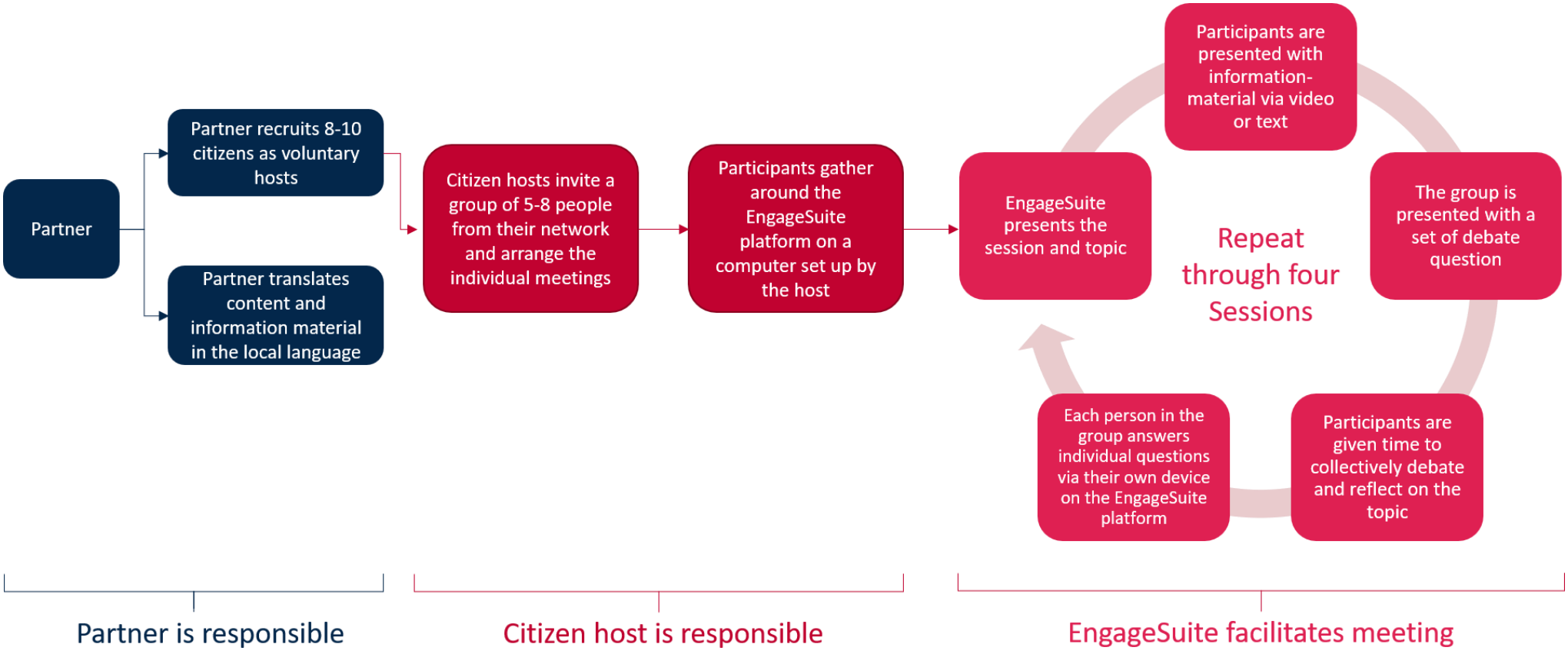

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The Partners Tasks and Responsibility

Overview

• Translation of EngageSuite content, promotion material and producing voice-over or subtitles for information videos.

• Recruitment of 10 hosts according to the recruitment criteria specified below

• Assisting hosts with EngageSuite and setting up their meetings

• Fill out a brief evaluation of the GlobalSay methodology and process.

The partners are responsible for executing their tasks in the following countries:

Consortium partners:

- CE or ROBOTEX = Estonia
- LOBA = Portugal
- LNE = France
- DBT = Denmark
- AFL = Lithuania
- NTNU = Norway

National partners outside of the consortium will be responsible for the following countries:

- Poland
- Malta
- Italy
- Slovakia
- USA
- South Korea

The Translation Task Includes the Following:

1) The local GlobalSay partners are responsible for translation of relevant materials into their local language. This will include:
    - The EngageSuite content (guide to EngageSuite can be found in Appendix 1).
    - The host guide to EngageSuite for the 10 recruited hosts.
    - Information and promotion material.

2) In addition, they should produce either subtitles or speak voice-overs for the information videos in their local language.
    - Each partner can choose whether they want to record a voice over in their native language or provide translations for subtitles. The partner should choose one or the other based on cultural conditions and whether the citizens are used to subtitles in the media.
    - We do not expect a professional speaker for the voice-over. The partners can speak it themselves with the use of a simple setup. A more in-depth guide to the speaker of the voice-over can be found in Appendix 2 of this document.

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guide to the speaker of the voice-over can be found in Appendix 2 of this document.

The Recruitment Task Includes the Following:

The GlobalSay partners are responsible for recruiting 10 hosts in their own country. The hosts should be recruited ensuring as much demographic diversity among them as possible.

Once recruited, the hosts must receive instructions on their role, the event procedure and the EngageSuite guide for hosts.

It is the partners' responsibility to ensure that the 10 hosts carry out their meetings in the timeframe between the 1st and 31st of October and that they are assisted in any questions or technical problems they may have.

Evaluation

After the consultation, each partner is asked to fill out a brief evaluation of the methodology and process for internal assessment.

Budget

The task should be performed for each partners amended PMs. Please note that you can not sub-contract the task. However, if the partner wishes there is an option to use budget flexibility and transfer budget between cost categories (PM to other direct costs) in order to buy smaller services locally (translations and recruitment of citizens) to support their work with the local organisations of citizen consultations on wishes and concerns. Each individual partner will be free to do this if they need to cover minor costs for recruitment, voice-over, promotion, food, refreshments etc.

If the partner chooses to use budget flexibility, they must keep in mind that each partner has to explain what they have spent their direct costs on, when they do their half-year and final reporting, **if it exceeds 15% of the personnel cost**. If less than 15% is transferred, explanation is not needed.

Previous experience with the methodology has shown that a budget for direct costs for food, gift cards, refreshment etc., was not needed, and that the task can be performed based on hosts volunteering.

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Recruitment of Hosts

In the following we will focus on how the partners should recruit the 10 specifically selected hosts. They must be varied in relation to age, gender, geographical zone of residency, educational level, and other relevant parameters to achieve and ensure a diverse group of hosts. All hosts should be ordinary people in line with the descriptions below; no expertise is required to be a host.

When you have recruited a host, go to EngageSuite and set up a meeting for them, and send the link to the host for them to distribute to their participants. (see Appendix 1 for EngageSuite guide)

Do note that the hosts should be able to provide a computer with internet connection and speakers to access the EngageSuite platform and show the information videos, and that all participants should have internet access on individual devices, via Wi-Fi or 3G/4G.

Once you have started recruiting your hosts, we would like you to provide us with the demographic information of each of them, so that we can see how you are progressing with the recruitment. **Link to spreadsheet.**

Criteria for the Selection of Hosts

The criterion aims at having a diverse group of people hosting the meetings. It is therefore very important that you aim at diversity in your sample of hosts, with respect to the following parameters:

- ⇒ Age (18-29, 30-39, 40-49, 50-59, 60-69, 70+. Aim at recruiting at least 1 from each group).
- ⇒ Gender (50% male and 50% women or as balanced as possible).
- ⇒ Geographical zone (a balanced representation of major city, suburb, town, and rural zone of living)
- ⇒ Educational level (Primary or lower secondary education, General upper secondary education, Vocational education or training, Bachelor's degree or equivalent, Master's degree or higher)

Please be aware, that the demographic criteria for choosing the hosts are guidelines. The most important goal is to achieve diversity on the demographic parameters, not complete representativity.

Examples of Different Ways to Recruit the 10 Hosts

To ensure a varied group of hosts in line with the above-mentioned criteria you will need to reach out to quite a few citizens. The hosts can be recruited in several different ways. To ensure you get the right hosts recruited, you need to adjust the recruitment strategy to meet the host where you believe the chances of reaching them are highest. You will

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most likely have to use more than one of the below-described recruitment methods. Keep in mind that in order to recruit 10 diverse hosts you will properly need to get an acknowledge of interest from at least 20 possible hosts. If more than 10 hosts are interested, the partners are more than welcome to recruit +10 hosts.

The-snowball-method

This recruitment procedure is based on network, and network's network. You contact three people (it could be from your network) and ask each person to ask three people they know, who will then do the same. Using this method, the sample group appears to grow like a rolling snowball. The snowball strategy has the disadvantage that citizens might only invite the same kind of people, therefore you need to stress the importance that they should invite citizens with backgrounds/characteristics different to their own.

Face-to-face Recruitment

Another way of inviting citizens is via face-to-face recruitment. To ensure diversity in your sample so that participants ultimately reflect the population in the best possible way, you could select several different recruitment areas around your country. Aim for places where you would expect different specific 'types' of people to be available. Coordinate which profile you are searching for in each geographical area, so you have a list were all the characteristics could be represented. You could pick several geographical areas and within them pick different host descriptions. From here you could pick out potential places such as train stations, supermarkets, malls, education institutions, public parks and spaces, sports associations, local activity centers or activity groups, etc. to find the host you are searching for. For example, if you are searching for a male with a high level of education, who lives in the city, for this 'type' of person you might try to reach them in a public park or space in a major city or via an association in the city.

Advertising

Advertising in different media (newspaper, radio, online media, social media etc.), to spread awareness of the consultation and the possibility to join. Do note that it can be an expensive method, however, the benefit of using advertising as a recruitment method is that you get an extended territorial reach. A variation of this method could be to enter into a collaboration with a media organisation, for example a newspaper or online news site, and have them write articles or interview you about the consultation and promote the possibility to join in their communication channels.

Database-based Invitations

Invitations based on your databases from previous recruitment or events. This recruitment method is based on the use of former participants who have agreed to be invited to events again. The benefit of this approach is the already established contact with the citizens**.** You already have their contact information and since people have already shown interest once, they are more likely to be interested again. However, it is very important to ensure that the participants are ordinary citizens and not experts. You can either selectively invite people in this way to match the demographic criteria or send out invitations to your entire database. Please be aware of your organizations GDPR-politics if you use this approach.

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Social Media Recruitment

Make a post on your organization's SoMe channels presenting the consultation and the possibility to participate. Citizens would be encouraged to register if you send out a general announcement on social platforms (Facebook, LinkedIn, Snap Chat, Instagram etc.) That way you also increase the chances of the message reaching out to as many as possible. Set up an information page on your local organisation's webpage or an event page, where you provide your contact information, and a link to EngageSuite. You can choose to pay to have the post promoted, in which case you can also target specific groups that you would like to attract, if you lack certain demographics.

Sending Letters of Invitation

Sending letters or emails to possible hosts. Physical or email addresses may be obtained from a national central registration office or from a market research company. These can draw out a large representative set of names and addresses in line with the parameters mentioned above. Ensure that the data set is random, except with respect to the criteria, since this will be the best way to obtain diversity. Furthermore, be aware and prepared for the fact that only a small part of those invited will agree to participate in the end. Sending physical letters to peoples' addresses has the advantage that it seems more legitimate and people feel more specially selected, however, it is more expensive than emails.

Recruitment by telephone

Contact citizens by telephone if a national telephone register is available, have a speech ready and consider the time you are calling at. This method of recruitment could lead you to a more open and direct dialog with the possible host. If calling at a suitable time, recruitment by telephone could be used to all types and ages, as long as the citizen has a number to be called. With this method you must expect that only a few of the contacted citizens will actually follow up on the process. You should also think through what could happen if they say yes and how you help them register on the EngageSuite platform and how you provide them with the appropriate host guide to EngageSuite. To keep an overview of hosts recruited this way, it is a good idea to make an excel sheet in advance so you have a host directory and should they be interested then have a registration list ready.

Get Creative

It is no secret that it can be challenging to find citizens who want to volunteer. Therefore, you may find that you need to think outside of the box on how you can find your 10 hosts. Here are some examples of different approaches you could take inspiration from:

- Contact clubs or associations that already meet for different purposes.
    - Sport-clubs, Book-clubs, Food-clubs, Debate-clubs, Housing associations, Volunteer centers, local councils, village associations, Activity centers, libraries etc.
- Ask if there is a group of University students who want to participate. They might be interested in citizen engagement, co-creation, science & technology studies, ethics etc. Just make sure they don't have any expert knowledge on robots.

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- Contact local newspapers about writing a short article.
- Convert some of your PMs to direct personal costs and provide the host with funds for buying cake, food, snacks, or other refreshments for their meetings.

The Citizen Hosts Find the Remaining Participants

Once the hosts have been recruited by the partner organization it will be entirely up to the hosts to decide who they would like to invite for their meeting. The remaining participants do not need to adhere to any predetermined demographic criteria. The hosts can invite their friends, family, colleagues or whomever for the meeting. But you can encourage them to mix up the group a little.

As with the hosts, the most important part is that the other participants are regular citizens as well. They should not be experts in robots, or have vested interests.

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The Meetings

Setting up the Meeting

For the host, setting up the meeting is very easy. First step is to find the participants that the host wants to invite for the meeting. Each meeting should have a total of 5-8 participants including the host. These can be friends, family, colleagues, people in their sports club or local association etc. The meeting can take place anywhere the host wants, as long as there is access to the internet for everybody. This can be in the hosts own living room, in a meeting room at the office, in the local community center etc. The idea is to have a nice and comfortable setting for the meeting. The host may offer refreshments such as coffee and tea and maybe some of the participants has brought food, cake or other refreshments.

Once the participants have been found, and a time and date has been set, the host registers the meeting on the EngageSuite platform, by following the EngageSuite guide for hosts. Before the meeting starts, the host sends the link for the specific meeting to the other participants.

What Will Happen at the Meetings?

When the participants have all arrived, the host can start the meeting. The participants should sit so that they can all see each other when they talk, and so that they can all see the screen of the hosts computer, so preferably in a circle around a table.

The host logs on to EngageSuite and asks the other participants to go to the link they have received for the meeting and gathers them around the computer. Now they simply follow the instructions on the screen.

The meeting will start off with an information video/presentation, explaining the context of the consultation, the format for the meeting and what the results will be used for. Then, to get started they will be asked a few demographic questions for which they will need their individual devices with access to the internet (phone, tablet, laptop etc.). Subsequently, the meeting consists of four sessions which will be structured the same way: first, a short video/presentation provides the participants with information about the topic of the session in question. Subsequently the participants are presented with two-three questions, one at a time, which they are asked to discuss, and which will address the same topic as the information video they have just seen. The platform will advise the participants how long they should approximately spend discussing these questions. Once they have discussed in plenary, it is time to vote individually. The participants are asked to get out their phone, tablet, laptop or other device which they can access the internet from, and to make individual votes to the questions posed on the platform.
At the end of the last round, they will be asked to upload a photo to document the meeting. It can be a group selfie, or perhaps a picture of their hands in front of the screen with the consultation logo.

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During the meeting, the host will be a participant on equal footing with the rest of the participants. So the host will have no special responsibility once the meeting is under way, only to take part in it.

The meeting will take approximately 1½ - 2½ hours.

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Covid-19 back-up plan

The methodology of GlobalSay can and should be altered in accordance with each countries individual Covid-19 restrictions.

The current set-up requires that the restrictions allow 5-8 people gathering in peoples private home and/or in a public space. If the countries restrictions do not allow for this or if the participants are not comfortable gathering physically, the partner organization can help the host setting-up a virtual video-meeting via a preferred platform in the organization. The partner should provide the host with a link and make sure they can get administrative/host rights so that the partner does not have to be present at the meeting. The citizen-host and participants can also set up their own virtual video-meeting via video chat functions in Facebook messenger, Teams, Zoom, WhatsApp, Google Meet etc.

In the case of a virtual video-meeting we recommend that each participant watch the videos individually instead of playing them from the host's screen, unless the hosts is used to using the screenshare functions for media.

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